

# Public Works DIGEST

Volume XXVI, No. 4  
October/November/December  
2014

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**Energy, Water  
and Waste**

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PV panels can be found on buildings across the USAG Stuttgart installation. Complete story is on page 19.

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U.S. Army Installation  
Management Command  
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## Corps Contributes to the Army Meeting Energy and Sustainment Challenges

by Mr. Stacey K. Hirata, SES

As the need for energy efficiency, energy security, and resiliency increases, the Army continues to look to the U.S. Army Corps of Engineers (USACE) for technical expertise and solutions. During this time of dwindling defense budgets and sequestration, it has become extremely important to find ways to leverage existing resources to meet expanding requirements. The Corps wide range of technical expertise and design and construction experience positions us to respond quickly and decisively to the Army's energy needs. USACE's broad portfolio of knowledge and capabilities provides the Army a level of expertise that does not currently exist anywhere else in a single organization within the federal government.

As USACE continues to support the Army's efforts to address current and emerging energy challenges, we do so using an enterprise approach. Key to this is ensuring that opportunities for energy conservation and efficiency awareness are imbedded in the foundation of installation and facility management. Simply put, energy is a fundamental component of the Installation Master Plan. Therefore, in accordance with the Unified Facilities Criteria (UFC) 2-100-01 Installation Master Planning, which governs all master planning for Department of Defense (DOD) activities worldwide, the Army changed its master planning direction from a land-use model to a sustainable-use model. USACE assists Army installations in developing Area Development Plans which included more compact development of buildings, the use of narrow building footprints to allow greater use of natural lighting, and other design features that will cultivate more efficient use of energy.

To meet the ever increasing demand to reduce energy consumption and improve energy efficiency, as well as to comply with the Energy Policy Act (EPAAct) of



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2005, USACE was assigned the mission to execute the Army Central Meter Program (AMP). Under the AMP, facilities larger than 29,000 square feet and/or with a utility bill greater than \$35,000 will be metered with advanced metering systems. The data measured by those advanced metering systems will be automatically transferred into an enterprise level Meter Data Management System (MDMS) where analytics will be performed. Once those analytics have been done, the information derived will be automatically routed back to installation energy managers for their use in making informed energy related decisions. USACE is currently executing Phase I of the AMP, which covers electric meters for facilities meeting the assigned criteria. Phase II, will expand the mission to metering gas, water, and steam utilities as well as completing the electric meter requirement.

USACE, as the Army's design and construction agent, is responsible for executing the Army's Military Construction (MILCON) program, as well as the Energy Conservation

Acronyms and Abbreviations	
AMP	Army Meter Program
CERL	Construction Engineering Research Laboratory
CUP	Commercial Utilities Program
DER	Deep Energy Retrofit
DOD	Department of Defense
ECIP	Energy Conservation Investment Program
EEP	Energy Execution Program
EPAAct	Energy Policy Act
ERDC	Engineer Research and Development Center
ESCO	Energy Services Company
ESPC	Energy Savings Performance Contract
EW2	Energy, Water, and Waste
FEMP	Federal Energy Management Program
HNC	Huntsville Center
LCCA	Life Cycle Cost Analysis
MDMS	Meter Data Management System
MILCON	Military Construction
PPCC	Presidential Performance Contracting Challenge
R&D	Research and Development
RECX	Regional Technical Centers of Expertise
SPIDERS	Smart Power Infrastructure Demonstration for Energy Reliability and Security
SRM	Sustainment, Restoration, and Modernization
UESC	Utility Energy Services Contract
UFC	Unified Facilities Criteria
USACE	U.S. Army Corps of Engineers

Investment Program (ECIP). As such, energy efficiency is a major component of the facility and building design, and in the design and construction of renewable energy projects (i.e. Photovoltaic Microgrids, Wind Turbines, Geothermal, etc.), thereby encompassing both energy savings reduction measures with energy generation to reduce the overall dependency on fossil fuel consumption ➤



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and the Army's carbon footprint.

USACE manages and/or executes a number of energy programs and has available for the Army's use numerous resources and tools at our Engineering and Support Center (aka Huntsville Center (HNC)) located in Alabama and our Engineer Research and Development Center (ERDC)/ Construction Engineering Research Laboratory (CERL) in Champaign, Illinois. The use of these resources allows USACE to continuously incorporate and improve our energy knowledge and capabilities furthering the Army's efforts to meet its energy and sustainment goals. For example, the Energy Execution Program (EEP) helps Army installations and other agencies reduce their fixed installation costs and comply with the Net Zero Energy Initiative. It provides the Army with expertise and assist Army installations and federal entities in developing a list of projects with the goals of reduction, repurposing, recycling and recovery of energy sources. Along with these efforts, research is being performed using Net-Zero Modeling & Simulation, Technology Demonstrations, Power & Energy Architecture & Controls, and Net Zero Planner. These ERDC fixed installation research and development (R&D) initiatives not only integrated installation energy, water, and waste (EW2) modeling, but also investigates modeling and mitigation of energy losses in building envelopes, as well as energy supply and distribution options.

Another major program that USACE executes for the Army is the Energy Savings Performance Contracts (ESPC) program. This acquisition vehicle gives Army installations a tool in which they can use private sector financing to fund energy conservation measures and energy enhancements. The savings generated by executing these projects are guaranteed and are used to pay the Energy Service

Companies. The ESPC program, along with the Utilities Energy Services Contracting (UESC) program, which is done in concert with the local utility company, are used to meet the Army's 30 percent energy and 15 percent water reduction goals. Both programs are key to meeting the Presidential Performance Contracting Challenge (PPCC) which directs federal agencies to achieve \$4 billion of private sector financing investment by 2016, of which \$2 billion has already been accomplished.

USACE works with garrisons to review utility rate structures and negotiate with their servicing utility provider to ensure that the installation has the best rate available. This is done using the Commercial Utilities Program (CUP) which assists the Army in purchasing reliable utilities services at the best rates and helps garrisons secure utility bill reimbursements from their tenant activities.

The Smart Power Infrastructure Demonstration for Energy Reliability and Security (SPIDERS) Program was initiated as a means to test and demonstrate minigrid and control system capabilities that would provide resiliency to critical assets from electrical commercial power loss. USACE continues to leverage lessons learned from the SPIDERS Joint Capability Technical Demonstration and other microgrid projects as the Army continues its journey towards energy security and installation Net Zero Energy.

The U.S. Army Corps of Engineers is postured to meet the Army's energy challenges of today and in the future. By developing over 21 Regional Technical Centers of Expertise (RECX) for energy, sustainability, and life-cycle cost analysis (LCCA), USACE maintains a level of technical competency that ultimately enhances our ability to address various energy and sustainability issues. Whether dealing with high performance building

envelopes, waste-to-energy, hydrology, sustainable design, or micro-grids, the RECX provides consistency and uniformity of knowledge and expertise throughout the organization.

The U.S. Army Corps of Engineers is a proactive participant with the Department of Energy's Federal Energy Management Program (FEMP) on a number of energy programs and task forces. USACE provides its programming, contracting, and technical knowledge, as well as a variety of energy projects experiences which we share with other federal agencies. Partnering and coordinating with FEMP allows USACE an opportunity to further learn about emerging technologies and their application. For example, USACE is engaged with FEMP as a member of the Deep Energy Retrofit (DER) Task Force. USACE and FEMP, along with other DER task force members are currently working on a pilot project to determine the feasibility of performing DER projects with limited Sustainment, Restoration, and Modernization (SRM) funding. We are analyzing the possibility of incorporating third party financing and SRM funding in a DER project using an ESPC contract and involving the Energy Services Company (ESCO) early in the design phase in identifying potential Energy Savings Conservation measures.

USACE's vast engineering, construction, research, and contracting capabilities, coupled with energy savings and power generation principles help us maintain a level of expertise required to meet the Army's energy efficiency, energy security, and resiliency challenges now and into the future.

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# Advancing Energy Excellence at Fort Irwin

by Jack Porter Jr.

As the country moves towards energy independence and conservation of our natural resources, Fort Irwin is making great strides to exceed the goals set for us by various legislation, executive orders, DOD, and Army policies. Fort Irwin is located in the Mojave Desert, approximately 35 miles from the town of Barstow and is the home of the National Training Center and has the important mission of training the force. Fort Irwin has set forth an aggressive goal to achieve Net Zero Waste by 2017 and Net Zero Energy by 2020. Fort Irwin has also been actively completing water conservation efforts, with plans to enhance the water conservation program to meet all the mandated goals.

Since 2003, Fort Irwin has decreased their fresh water consumption by 19 percent and continues to thrive for other conservation measures. The water conservation initiatives set forward by Fort Irwin include grass reduction and a move toward native landscapes, smart irrigation systems, use of recycled water for bulk irrigation, designing xeriscaping for all new work, and a move toward waterless urinals and low flow toilets. Fort Irwin is also continuing to expand the use of recycled water into other applications such as irrigation, industrial uses and dust control/ construction water. Fort Irwin is also in active construction for a new water treatment plant that, when completed, will treat 6 Million Gallons of Water a Day and a water recovery rate of 99 percent. As we move forward with enhancing the water conservation efforts



Hospital design

we will look into using an Energy Savings Performance Contract to engineer a rainfall retention and percolation system to aid in replenishing this important natural resource. Fort Irwin will also be engaging the USGS to explore new basins. With all that being said, Fort Irwin has been actively reducing the consumption of water and trying to preserve the natural resource.

Throughout the past several years Fort Irwin has been executing renewable energy projects and instituting efficiency and conservation measures. Currently the renewable energy generation capacity at Fort Irwin is approximately 175 kW. The generation is solely from roof top mounted photo voltaic systems. These renewable energy projects were part of major building renovations. Fort Irwin has been striving for conservation through lighting retrofits to include energy efficient fluorescent technology, LED technology, dimming ballasts, occupancy sensors and then networking the system to a central location for controllability. We are planning to install a Central Energy Management Control System which will allow us to monitor and enforce energy conservation measures through effective management and programming of facilities. The system is designed to utilize natural day light as much as possible automatically. Fort Irwin has also put forth a plan to transition all exterior street lighting to solar, LED technology.

The RUFMA is an area on post where the incoming rotational units prepare their vehicles for the training mission and at the conclusion of the field training, prepare their vehicles for transport. This is a 24 hour operation during these periods and the lighting requirement is extreme. Fort Irwin completed a project two years ago to completely overhaul the lighting from 1.1 kW, High Intensity Metal Halide fixtures to 0.272 kW LED Fixtures. The calculated annual usage prior to the project was approximately

Acronyms and Abbreviations	
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
DLA	Defense Logistics Agency
DOD	Department of Defense
DPW	Directorate of Public Works
EITF	Army Energy Initiatives Task Force
ESPC	Energy Savings Performance Contract
ESTCP	Environmental Security Technology Certification Program
HVAC	Heating, Ventilation and Air Conditioning
kW	Kilo Watt
kWh	Kilo Watt Hour
lbs	pounds
LED	Light Emitting Diode
LEED	Leadership in Energy and Environmental Design
LPG	liquid petroleum gas
MW	Mega Watt
RUFMA	Rotational Unit Field Maintenance Area
USAG	United States Army Garrison
USGS	United States Geological Society

1,500,000 kWh. After the project was completed the total calculated annual usage is approximately 380,000 kWh. This is a reduction of approximately 75 percent and equates to approximately 233 lbs. of Greenhouse Gas Reduction. This equates to approximately an \$85,000 yearly savings.

Fort Irwin has contracted through an Energy Savings Performance Contract (ESPC) to construct a Waste to Energy plant. The Waste to Energy plant will process the municipal waste through a Pyrolytic Gaseous System. Once the system is fully operational, Fort Irwin will have a 90 percent reduction in outgoing waste and capacity of 1.1 MW of power. This alleviates Fort Irwin from having to permit and open another cell in the land fill area. The Waste to Energy plant is scheduled to be fully operational by ➤



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the fall of 2015. Also included in the ESPC contract is the construction of two solar Photovoltaic Car Ports which will have the capacity of approximately 750 kW of power. These Car Ports will have electric vehicle charging stations. Finally the ESPC is going to install lighting retrofits in more of the buildings within the cantonment, re-commission two of the LEED facilities on Post, install building automation controls in energy intensive facilities, and install strip curtains in freezers throughout post. All in all, through the ESPC alone, Fort Irwin will install approximately 1.85 MW of renewable energy capacity and numerous conservation and efficiency measures throughout many of the buildings on the installation.

Fort Irwin is building a state of the art hospital. This hospital was originally designed as LEED Silver Certified facility. After close coordination from Public Works staff, United States Army Medical Department Activity, United States Army Corps of Engineers and the design contractor, more energy efficient and energy conserving features were added and now the facility will be certified as LEED Platinum at no additional cost. The design includes covered parking and Photovoltaic Array that will have the capacity of 2.4 MW of power that will meet about 90 percent power requirements for the hospital. The design will exceed the energy efficiency measures set by ASHRAE 90.1 2007. The hospital will contain new tertiary care, emergency medicine, clinical support activities, fifty five exam rooms, fifteen inpatient beds, six treatment rooms, four operating rooms, and five radiology type rooms. This facility is scheduled to be completed and operational by summer of 2016.

Fort Irwin is an ideal test bed for new

technology due to its remote location and the amount of sun energy that can be harvested year around. For this reason, Fort Irwin actively participates in the Environmental Security Technology Certification Program (ESTCP). As an example, Fort Irwin has facilitated the design and construction of a 1 MW Concentrated Solar Photovoltaic System thru ESTCP. Fort Irwin has also facilitated numerous other initiatives including Demand Bidding platforms, control systems for building HVAC units, and fuel cell technology.

Besides the efforts that are already contracted and in the works, as listed above, Fort Irwin is also in the process of striving for other sources of renewable energy and conservation measures to reach Net Zero Waste by 2017 and Net Zero Energy by 2020. As part of the Net Zero Waste initiative, Fort Irwin is exploring the possibility of expanding the Waste to Energy plant to include other streams of waste through permitting. Also Fort Irwin is going to initiate a plan to demolish by deconstruction only and contract to crush and reuse asphalt and concrete. As for the Net Zero Energy, Fort Irwin is in contact with DLA and the EITF to construct a 15 MW solar array at the front gate of the post. Fort Irwin is also planning on initiating a Phase II to the existing ESPC contract. The Phase II would focus on replacing existing LPG with natural gas. Fort Irwin trucks all its LPG from the nearest town, Barstow, which is 35 miles away. This project will bring natural gas pipeline to Fort Irwin. Project includes building natural gas cogeneration plant that will supplement our solar power generation systems to enable Fort Irwin to achieve Net-Zero energy status. The Phase II of the ESPC would also include more conservation measures such as an expansion of the lighting retrofits, and building automation systems.



*RUFMA before and after*

In conclusion, Fort Irwin is striving to exceed the goals set forward by the federal government and striving for Net Zero Waste and Energy. Fort Irwin is also actively reducing the water consumption of the installation to exceed the aggressive mandates. With a combination of the already installed systems, the systems in construction and design, and the future projects, Fort Irwin is within striking distance of their goals. Fort Irwin will continue to place the training mission first while balancing the absolutely need to be energy independent and conserve our natural resources.

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## The Army's Net Zero Initiative

by Kristine Kingery

The Army views Net Zero as an underlying tenet for effective installation management. This is based on a recognition that better resource management contributes to mission effectiveness and more resilient installations. Building on existing sustainability efforts, the Army implemented the Net Zero Initiative to further Army energy, water, waste, and overall sustainability goals, primarily through improved management practices. These goals became an Army Directive in January 2014, which requires installations to strategically implement Net Zero through a several approaches:

- Reducing overall energy use, maximizing efficiency, implementing energy recovery and cogeneration opportunities, offsetting the remaining demand with the production of renewable energy from onsite sources so that the Net Zero energy installation produces as much renewable energy as it uses over the course of a year.
- Reducing overall water use, regardless of the source; increasing use of technology that uses water more efficiently; recycling and reusing water, shifting from the use of potable water to non-potable

sources as much as possible; and minimizing interbasin transfers of any type of water, potable or non-potable, so that a Net Zero water installation recharges as much water back into the aquifer as it withdraws.

- Reducing, reusing, recycling/composting and recovering solid waste streams and converting them to resource values, resulting in zero landfill disposal.

The Directive expands the Net Zero approach to all permanent Army installations, requiring that each evaluate the feasibility of policies, procedures, and technologies, to the extent that they make fiscal and practical sense, and implement those that will help them meet their Net Zero goals. The Army's intent is not to create new requirements but to enable innovative actions without increased investment.

The Net Zero Initiative was launched with the announcement of 17 pilot installations on April 19, 2011, to serve as test beds for the Net Zero Pilot Installation Initiative. As a result, the Army has gained knowledge of robust concepts, requirements and approaches needed to successfully transition and

### Acronyms and Abbreviations

AR	Army Regulation
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institutionalize the Net Zero concept throughout the Army.

A key lesson learned through the pilot site initiative is the importance of baseline data. Renewable energy, energy efficiency and energy and water security assessments, water balances and material flow analyses were conducted at the pilot installations to identify energy, water and waste inefficiencies and provide recommendations of how installations can meet Net Zero goals.

The Army has learned that collaboration enables Net Zero. Collaboration has been a cornerstone of the Net Zero Initiative. Monthly calls with pilot installations and other stakeholders and partners were initiated at the onset of the Net Zero Initiative and still continue. These calls help to jump-start efforts by sharing results of the pilot efforts with other pilots.

The Army has also learned that, although the Initiative has re-energized existing sustainability efforts, institutionalization of Net Zero will take more than incorporating metrics and goals into Army doctrine. Command ➤



*The Net Zero Hierarchies*



# IMCOM Energy Strategy

by Qaiser Toal

**W**hat is IMCOM doing to conserve our energy and water resources? Plenty!

The United States military is one of the nation's largest consumers of energy. According to the DOD Energy Management Report published in June 2014, Army facilities consumed over 73 trillion BTUs and the Army spent \$1.29B for facilities energy in FY13. IMCOM has made significant investments in energy and water efficiency projects using appropriate funds, \$360M in the last 3 years; and through third party financing using Energy Saving Performance Contracting (ESPC) and Utility Energy Services Contracts (UESC) of approximately \$500M in the last 3 years. The Army is now operating in an environment of force structure cuts and fiscal constraint with a smaller budget than in previous years. The new fiscal reality challenges the Installation Management Community even more than ever to reduce consumption, increase efficiency, and

make greater use of ESPCs and UESCs.

IMCOM's objective is to create energy and water efficient installations by holding users accountable, modernizing facilities, installing new technologies, and leveraging partnerships that provide Senior Commanders an increased level of energy and water security leading to sustainable and resilient infrastructure and mission assurance. Our keys to success are the three pillars of:

- Conservation
- Efficiency
- Resiliency

IMCOM Garrisons have been operating since 2010 under the IMCOM Energy Strategy to successfully align their efforts to reduce consumption, increase efficiency and ensure the security of our energy and water resources. HQ IMCOM has been continually improving on the Strategy and measuring Garrison progress towards full implementation via a series of annual Operations Orders (OPORD) and reporting the results

Acronyms and Abbreviations	
BEM	Building Energy Monitor
BTU	British Thermal Unit
DOD	Department of Defense
EAP	Energy Action Plan
ESPC	Energy Saving Performance Contracting
IMCOM	Installation Management Command
OPORD	Operations Order
UECO	Unit Energy Conservation Officer
UESC	Utility Energy Services Contracts

in a Scorecard which is briefed to the IMCOM Commander and distributed to Regions and Garrisons. The IMCOM Energy Strategy was most recently articulated in OPORD 13-174, "Region and Garrison Actions in Support of IMCOM Energy Efficiency and Security Implementation Strategy."

The Strategy sets the standard and a base level at which energy programs should function at Garrisons. The goal is to get all installations to that one standard. The Strategy is a holistic approach that integrates the more challenging 'soft' lines of effort that require behavior change together with the full complement of available energy efficiency hardware and technology upgrades to comply with federal mandates, executive orders and policy set by the Secretary and Assistant Secretary of the Army to help IMCOM improve its energy security posture.

The Garrison Energy Action Plan (EAP) is the centerpiece of the Strategy, with 16 separate actions, while a separate list of standard Low Cost / No Cost Energy Conservation Measures, a subset of the EAP, identifies 31 distinct areas where large gains in efficiency can be had at a low or no cost to the Garrison.

Energy Action Plan




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support and leadership engagement will foster the development of a sustainability ethic and promote meaningful successes at striving towards Net Zero goals. Net Zero will continue to be a topic at meetings to ensure senior level visibility and support the organizational change process needed to integrate Net Zero Army-wide.

The Army will continue to embed these practices in standard operating procedures and institutionalize an integrated approach of sustainability and resource security in all installation design, planning, contracting, and investment decisions. For example, the Army is currently incorporating the requirements from the Directive

into the revision of AR 420-1 (Army Facilities Management). AR 420 -1 provides policies and responsibilities for conduct and management of facilities engineering, housing, fire and emergency services, and environmental support. The Directive also requires that Net Zero be incorporated into the Army's environmental regulation, AR 200-1.

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(continued from previous page)

1. Appoint in writing full-time garrison energy managers.
2. Include energy and water conservation responsibilities in position descriptions of commanders, directors and other key positions.
3. Establish a garrison energy steering committee.
4. Implement Building Energy Monitor (BEM) and Unit Energy Conservation Officer (UECO) programs.
5. Provide at least quarterly energy training and awareness for installation and community personnel.
6. Develop an energy security plan and update plans annually based on a review with local utility suppliers.
7. Enter accurate energy data monthly and water data quarterly into the Army Energy and Water Reporting System and conduct monthly quality-control checks.
8. Submit a complete annual energy report each year in October.
9. Nominate worthy projects, individuals and teams for Secretary of the Army Energy and Water Management Awards and Federal Energy Management Program Awards.
10. Review all new construction and repair project plans and specifications for compliance with all appropriate energy policies.
11. Ensure new construction and major repair and renovation projects greater than \$7.5 million incorporate sustainable design principles to achieve a minimum of the Silver level of Leadership in Energy and Environmental Design certification.
12. Ensure all designs reduce energy consumption by 30 percent below the levels established by American Society of Heating, Refrigeration and Air-Conditioning Engineers' Standard 90.1.
13. Perform annual energy audits of at least 25 percent of the garrison facilities' total square footage to evaluate energy usage and determine the best locations to incorporate energy savings measures.
14. Implement all no-cost and low-cost measures.
15. Implement energy and water saving projects that have a simple payback of 10 years or less.
16. Use alternate funding sources such as Energy Savings Performance Contracts, Utility Energy Services Contracts and the Energy Conservation Investment Program to help fund at least one project that cannot be self-funded annually.

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### Example materials for establishing and maintaining the BEM program

<https://www.us.army.mil/suite/files/37783206>

### Energy security plan sample template

<https://www.us.army.mil/suite/doc/37783322>

### Energy audit guidance

[http://www.acq.osd.mil/ie/energy/mgr\\_support.shtml](http://www.acq.osd.mil/ie/energy/mgr_support.shtml)

### Details on how to implement all no-cost and low-cost measures

<https://www.us.army.mil/suite/doc/42668554>

## Call for ARTICLES

The  
January/February/March 2015  
issue of the  
Public Works Digest  
will feature

## Master Planning, Housing and Barracks

Deadline is December 5, 2014

Submit articles to  
editor.pwdigest@usace.army.mil  
202-761-0022

Item	FY10	FY11	FY12	FY13
Energy Action Plan	68%	71%	78%	73%
No Cost/Low Cost	47%	66%	68%	73%

IMCOM Energy Strategy Progress



# Developing Viable Army Energy Projects Start to Finish is a Team Effort

by Julia Bobick

It's been a learning process for the past few years to ensure every new Army Energy Conservation Investment Program (ECIP) project has what it needs from start to finish – from the first photovoltaic module installed to the last foot of cable that securely ties the system into the installation network.

Part of the appropriated fund military construction (MILCON) program but funded separately by the Office of the Secretary of Defense, ECIP projects are designed to dramatically change energy consumption at an installation or joint base, implement renewable energy technologies and generate and store energy to improve supply resilience for critical loads.

Despite it being a requirement to build information technology (IT) needs and associated cost estimates into all MILCON project plans to produce a “complete and useable facility,” it has been an often overlooked requirement for ECIP projects

– primarily because they don't look like normal MILCON projects.

Program managers used to dealing with actual buildings have to rethink network solutions for wind turbines and solar arrays in the middle of an open field that still require cabling and communications systems to relay energy data to a central meter and make them secure, according to Karen R. Moore, the ECIP and Resource Efficiency Manager program manager for the U.S. Army Corps of Engineers' Engineering and Support Center, Huntsville, Ala.

The initial planning process requires thorough coordination and communication between the command or garrison energy manager – the individual who typically initiates an ECIP project – and the Directorate of Public Works, the Network Enterprise Center and the U.S. Army Information Systems Engineer Command (USAISEC), according to Thomas B. Delaney Jr., the Army's ECIP program

Acronyms and Abbreviations	
DD Form 1391	automated Department of Defense Form used to document all MILCON project requirements
ECIP	Energy Conservation Investment Program
FY	Fiscal Year
IT	Information Technology
MILCON	Military Construction
OSD	Office of the Secretary of Defense
REM	Resource Efficiency Manager
USAISEC	U.S. Army Information Systems Engineer Command

## DD Form 1391 Processor

System info: [www.hnc.usace.army.mil/Media/FactSheets/FactSheetArticleView/tabid/10784/Article/11649/dd1391-processor-system.aspx](http://www.hnc.usace.army.mil/Media/FactSheets/FactSheetArticleView/tabid/10784/Article/11649/dd1391-processor-system.aspx)



429 solar dishes at Toole Army Depot are expected to provide 1.5 megawatts of electricity, approximately 30 percent of the depot's annual electric energy need. (Anderson, Toole Army Depot)

manager in the Facilities Policy Division of the Office of the Assistant Chief of Staff for Installation Management at the Pentagon.

The Huntsville Center – which provides technical assistance for and validates all Army ECIP projects before they can be submitted to OSD – is working to enhance ECIP project planning coordination across the Army, Army Reserve and National Guard, and improve cost estimates submitted for ECIP project IT requirements through information workshops and increased communication with project managers. “It's hard for a garrison energy manager to be an expert in wind, solar and geothermal technologies, and develop a really thorough [DD Form] 1391. We provide them a team of experts who can help them develop a robust plan for a project that will accomplish their energy conservation program goals,” Moore said. The DD Form 1391, the automated form used to document all MILCON ➤



# Energy Savings Competition Produces for Fort Benning

by Mike Fincher

Fort Benning created an energy savings competition between on-Post units and directorates using the electrical meter readings from over 700 facilities comprising more than 11.2 million square feet of space. Conserving energy and raising energy conservation awareness through competition were the primary objectives. The results have been outstanding. After three quarters of competition, winning units have saved over \$146,000 in electrical energy. Additionally, participating units that did not win have also significantly reduced their electrical consumption. Savings are estimated at over \$200,000 per year.



Commander's Excellence Breakfast quarterly winners

The contest competition has three categories: large units, small units, and directorates. The large unit category includes those with greater than 500,000 SF of electrically metered space, small units are those with less than 500,000 SF of electrically metered space and directorates are those entities without a unit fund. The large unit and small unit category winners conserved the most energy during the quarter and received \$3000 for their unit fund; the award comes from Qualified Recycle Program funds. The units and directorates quarterly electrical consumption performance in FY 12 was measured against the facility's FY 11 quarterly baseline consumption. This normalized most differences between building efficiencies due to construction, age, fuel use, and other factors.

The category winners are recognized at the quarterly Commander's Excellence Breakfast, and receive the Commander's Trophy with their Unit or Directorate engraved to display in their Unit or Directorate during the following Quarter. The competition will continue until the end of FY 15 when the winning unit or directorate, based on number

Acronyms and Abbreviations	
FY	Fiscal Year
SF	Square Feet

of winning quarters, will receive the Commanders Trophy for permanent display. As additional metering is added we will increase the number of competing facilities.

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Mark Fincher is the energy manager in the Directorate of Public Works at Fort Benning.



## Showcase your **STORY**

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(continued from previous page)

project requirements, is part of the package submitted through Army to OSD for approval and funding.

Beginning with those being submitted for fiscal year 2016 funding, ECIP projects are being looked at with a more holistic approach to ensure every aspect of the project is accurately documented on the 1391 – to include Tab F, which details the information systems cost estimate – and all responsible parties are involved in the planning and development process. Understanding that technologies will likely change from the initial plan to the actual building phase – especially

when it comes to IT requirements – Moore emphasized the DD 1391 is a living document with cost estimates for what will be needed at project completion – a sort of placeholder with funding.

“The ultimate goal – after all FY 16 projects are installed – is that we can push a button and tell exactly what the energy savings are for the entire program,” Moore said. “To make that a reality, we’ve got to get the fiber cable to the wind turbines to collect the data, and that cabling – and all associated cost estimates – to connect it from point A to point B need to be part of the initial plan.” How well the Army is executing current projects is vital to securing future funding, Delaney said. “Bottom line is that when an ECIP

project is complete it should either be saving energy or generating energy, but there should be some number coming out. Right now for too many of them there is just no number at all.”

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# Huntsville Center Connects Joint Base Lewis-McChord, Presidio to Army's Meter Data Management System

by Debra Valine

**J**oint Base Lewis-McChord, Washington, and Presidio of Monterey, California, are the latest installations to connect advanced electric meters to the Army's enterprise-wide Meter Data Management System that allows energy managers to monitor energy consumption from a building level and use that information to help reduce energy consumption and cost.

The U.S. Army Corps of Engineers, Engineering and Support Center, Huntsville (Huntsville Center) manages the \$230 million Army Metering Program. AMP was initiated in response to the Energy Policy Act of 2005 (EPAAct 2005), which requires federal facilities to be metered with advanced meters where practical. Most military installations were originally designed to measure electricity, gas and potable water only at incoming master meters. Resource managers and policy makers have long desired meters on individual buildings, such as those that utilities have provided for homes and businesses for over a century.

Huntsville Center started installing advanced electric meters in 2008 and to date has installed nearly 8,000 of the 8,500 electric meters planned; 1,200 meters are connected to the MDMS and are reporting electric energy use by installation. The goal is to capture 65 percent of the Army's energy use at the building level.

Advanced electric meters are being installed on buildings that meet Office of the Secretary of Defense criteria: buildings had to consume an estimated \$35,000 annually in energy costs to be considered economically justified for metering. The \$35,000 per year cost equates to buildings of 29,000 square feet and larger. By placing the building meters downstream from the master meters, consumption can be measured and usage patterns identified with far greater detail

and accuracy.

"Our program is coming down to finishing the electric meter requirement from EPAAct 2005," said Porscha Porter, a Huntsville Center electrical engineer who has been the program manager since 2012. "It has been a challenge to get all these metering systems installed and reporting automatically. Installing meters on the building was easy; getting the systems accredited and reporting meter data across the Army network has been quite the challenge.

"Now that we have crossed the major hurdle of the system accreditations, it's getting a little easier to get the systems online," Porter said. "Being able to show progress and success is leading to more cooperation and more installations embracing MDMS. Some of the installations with their own internal data gathering systems in place are now seeing the usefulness and benefit of the enterprise level MDMS system and the additional tools it provides to the energy managers."

MDMS collects installation meter data in 15-minute increments and stores it in a secure environment indefinitely so users can access the information on their office computer/workstation.

The system provides garrisons, regions, and headquarters personnel with energy consumption metrics that can be used to develop energy conservation measures that streamline the energy manager's efforts; improve the accuracy and speed of documentation for reimbursable tenant billing; and directly measure and verify the success or failure of ECMs.

"Ms. Porter has the background to work through the technical complexities of this program," said Valerie Shippers, director, Installation Support and Programs Management Directorate, Huntsville Center. "She has ensured that five

Acronyms and Abbreviations	
AMP	Army Metering Program
EPAAct 2005	Energy Policy Act of 2005
MDMS	Meter Data Management System
ECM	Energy Conservation Measures

metering systems received accreditation to allow them to report meter data across the Army network, leading the way in accrediting mission systems of this type."

Shippers said Porter uses her technical expertise to lead her team through difficult challenges such as resolving meter data connectivity issues.

"Our main function as the Army's program manager has been getting all the key stakeholders together and working the critical program issues and challenges, leading and facilitating the decision-making by providing sound recommendations and technical solutions needed to connect these systems," said Porter, who regularly briefs general officers and senior executives on the program's status. "From our collaboration, we have worked together to come up with the most viable cost effective solutions across all the Army Commands."

"We are still in the education phase of the program," Porter said. "It is fairly new for some of the users so they are getting used to the system functionalities and the data recording. To help users become familiar with the system, we are conducting a series of webinars on how to use the system and the benefits from collecting this type of data."

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*Debra Valine is the chief of Public Affairs for the U.S. Army Engineering and Support Center, Huntsville, Alabama.* 



# New Cadet Barracks Increase Space, Decreases Cost

by JoAnne Castagna, Ed.D.

**N**ot too long ago, dozens of Cadets at the U.S. Military Academy at West Point, New York became very ill and missed classes. According to the academy, what caused this is the fact that almost half of the Cadets are living in uncomfortable, crowded dorm rooms and that additional barracks are needed to relieve this situation.

They tapped the U.S. Army Corps of Engineers, New York District, to construct a new barracks since the agency has already successfully built numerous structures on the historic campus. Presently, the District is blasting over 100,000 cubic yards of rock to make way for the new barracks. The look of the new structure will fit in well with the rest of the 200-year-old campus, will be energy efficient, and will save taxpayers approximately 44 thousand dollars annually.

“A new barracks that meets current Army standards is needed to relieve overcrowding in the existing barracks,” said Richard Mandra, project manager, U.S. Army Corps of Engineers, New York District. “Right now, the entire first-year

class and part of the second-year class are housed with three Cadets in rooms designed for two Cadets. This project will allow assignment of two Cadets per room.”

The new cadet barracks is being designed and constructed by Army Corps contractor Walsh Construction Company of Chicago, Illinois and its subcontractor, Clark Nexsen. The barracks will be 287,000 square feet in size and have six floors. Each floor will accommodate 130 Cadets in 2-person rooms. The entire barracks will provide living space for 650 Cadets. Cadets will be provided with latrines and showers, a laundry area, day rooms, office areas, study and collaboration rooms, trash and recycling areas and offices and storage rooms for the Cadets.

The barracks, like the surrounding buildings, will be constructed in military gothic revival architecture. The design will include granite veneers or overlays, gothic arches, sally ports or secure entryways and crenellated parapets with embrasures and limestone accents. Parapets are structures that were

## Acronyms and Abbreviations

LEED	Leadership in Energy & Environmental Design
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constructed on the tops of castles and forts centuries ago that have openings for shooting from the top of the structure.


“The project is located at the Central Post of the main campus which was designated a National Historic Landmark in 1960. The barracks will be constructed of granite from a local supplier to match the existing buildings,” said Matthew A. Ludwig, team leader, U.S. Army Corps of Engineers, New York District.

In addition, the design will also incorporate modern architectural features such as a curtain wall in the center of the façade. A curtain wall is an outer covering of a building that keeps the weather out, such precipitation.

Unlike the other buildings constructed at West Point, the barracks will be Leadership in Energy and Environmental Design (LEED) Silver certified. What will make it energy efficient are a solar hot water system and a radiant heating and cooling system.

During the heating season the radiant system that is being installed at the New Cadet Barracks works by circulating heated water through tubing in the floor, while during the cooling season the radiant system works very much the same way, except the water is chilled and circulated through the same tubing. The construction of the barracks is expected to be completed in summer 2016 and Cadets will be able to use the new facility by the end of December 2016.

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JoAnne Castagna, Ed.D., is a public affairs specialist and writer, New York District, U.S. Army Corps of Engineers. 



Rendering of New Cadet Barracks. (USACE)



# First-Ever Energy Savings Performance Contract for a Corps of Engineers Civil Works Project Underway

by Debra Valine

**M**obile District, U.S. Army Corps of Engineers, is embarking on the first-ever Energy Savings Performance Contract executed for a Corps Civil Works project that could set the stage for other USACE districts.

Mobile District is teaming up with the U.S. Army Engineering and Support Center, Huntsville, to improve the infrastructure along the Tennessee-Tombigbee (Tenn-Tom) Waterway, which the district manages. The project kicked off July 9. During its 21-year performance period, the Tenn-Tom ESPC is expected to save the Corps of Engineers a projected \$5.05 million in energy costs.

Huntsville Center awarded the \$2.8 million ESPC to Siemens Government Technologies Inc., of Arlington, Virginia, May 30. The length of the contract is 21 years, 11 months, which includes the construction phase that is scheduled to start in October and be complete in the spring of 2015. The contractor will install, replace or retrofit elements of the Tenn-Tom's infrastructure — primarily lighting

at its 10 locks and dams.

“A lot of time was spent getting it right,” said William (Wynn) Fuller, chief of Operations for Mobile District. “Along the Tenn-Tom, our facilities are scattered over 234 miles, so that’s a lot of different facilities. It was important to see this as an opportunity to take advantage of ESPC. The measurement and verification are going to be critical.

“It was an education process for both of us,” Fuller said. “Mobile District had to understand the proposed methods, outcomes, etc., that Huntsville Center intended to use — particularly third-party financing. Huntsville Center had to learn about the unique aspects of Civil Works projects, particularly navigation. Civil Works is a different animal altogether. “I am optimistic that working together we can accomplish our goals in terms of reducing energy consumption,” he said.

The Tenn-Tom is a man-made waterway that links the Tennessee River to the Tombigbee and Black Warrior rivers. When the Corps of Engineers completed its construction in 1984, the project offered the nation’s midsection an alternate route to the Port of Mobile and the Gulf of Mexico. The Tenn-Tom encompasses 110,000 acres of land that is used by more than 3 million people for recreation annually. The project stimulates economic development, provides outdoor recreational opportunities, supports navigation and enhances wildlife habitat.

ESPCs leverage industry expertise and private sector financing to make infrastructure upgrades to federal facilities to reduce energy and water consumption, and reduce the waste stream. An energy savings contractor guarantees the improvements will generate sufficient savings to pay for the project during the term of the contract, which cannot exceed 25 years. The ESPC incorporates a


Acronyms and Abbreviations	
ESPC	Energy Savings Performance Contract
Huntsville Center	U.S. Army Engineering and Support Center, Huntsville
Tenn-Tom	Tennessee-Tombigbee Waterway
USACE	U.S. Army Corps of Engineers

process for measurement and verification of the annual savings so that the payment to the Energy Services Contractor never exceeds the actual savings.

“This project award demonstrates that we can use ESPCs to leverage third-party funding at our civil works sites to help us reach our national sustainability goals and energy independence,” said John Coho, the Corps of Engineers’ Energy Coordinator and Senior Adviser for Environmental Compliance. “It is going to be a model for others down the road, and I fully expect we will be able to use it at sites along other rivers as well.”

Huntsville Center is the Corps of Engineers’ technical center of expertise for ESPC, and as such, brings years of experience managing ESPCs for military projects, which includes solar and wind turbine projects at Fort Buchanan, Puerto Rico. The three wind turbines will produce an estimated 5 percent of the energy consumed by the installation. A total of 21,824 solar photovoltaic panels will produce about 5.5 megawatts of power, which is at least 60 percent of the installation’s current power demand at its peak.

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Map of Northern Alabama showing the Tenn-Tom



# USACE Europe District Named Installation Support Program of the Year

by Vince Little

**U**.S. Army Corps of Engineers Europe District has claimed a top honor for its contributions to the public works mission at U.S. Army Garrison Rheinland-Pfalz, Installation Management Command announced recently. The agency was named Installation Support Program of the Year on the list of 2013 Directorate of Public Works annual award winners. The district consistently “made the impossible possible” during the overhaul, consolidation and repackaging of Kaiserslautern military community facilities, which led to savings of over \$150 million in annual base operating costs, according to the local command’s nomination memo.

Col. Matthew Tyler, the Europe District commander, said the accolade is shared and encompasses efforts by every office within his team, from

the Installation Support Branch and Contracting to the Engineering and Construction Division and Employee Support Office.

“It represents the success of a tremendous amount of various work throughout the district and could not have been possible without the strong relationships and communications that enabled performance at a level worthy of such recognition,” he said.

The DPW Annual Awards Program gives leaders an opportunity to recognize individuals and organizations that demonstrate excellence in support of readiness, Soldiers, and families through the management and execution of installation public works and real-property missions, the IMCOM announcement states.

Europe District, along with its area


and resident offices, has developed into a “seamless extension” of USAG Rheinland-Pfalz’s DPW staff, the nomination reads. Infrastructure consolidation and transformation, underway since 2005, have been a major district focus as the Army reduces its footprint on the Continent. That includes more than \$120 million in facility-recapitalization projects over the past five years to allow cost-effective unit moves in support of U.S. Army Europe.

In 2013, Europe District and its contractor, Parsons, received a major award from the American Planning Association after conducting the Sembach Net Zero Energy Installation Plan – the first for an Army installation in theater. “Net zero” refers to the goal of reducing power and water consumption from local suppliers to make installations more self-sustaining. The district’s master planning project is aimed at achieving net-zero energy status on the garrison by 2025.

Leaders also praised USACE’s management of seven military construction and almost 80 sustainment, restoration and modernization projects for USAG Rheinland-Pfalz. Military Construction Army programs in the design, building or closeout phases now total about \$365 million, including the first two funding increments of the Rhine Ordnance Barracks Medical Center Replacement in Weilerbach, near Ramstein Air Base.

The team supporting USAG Rheinland-Pfalz demands project manager accountability while maintaining an open, honest line of communication with stakeholders at the garrison and IMCOM-Europe.

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Vince Little is a public affairs specialist with the U.S. Army Corps of Engineers Europe District located in Wiesbaden, Germany. 



*A project team inspects mechanical systems at Sembach Kaserne near Kaiserslautern, Germany, during an energy audit conducted for an energy master planning project aimed at achieving net-zero energy status by 2025. (USACE)*



# ESPC Offers Multitude of Intangible Benefits to Military, Other Installations

by Will Irby

In times of fiscal uncertainty and budget shortfalls, energy managers, public works directors and military installations struggle to fund necessary infrastructure upgrades and energy-savings projects that impact their energy-reduction goals. Energy Savings Performance Contracting offers a tool that allows for those critical upgrades to take place with zero up-front capital cost. Upgrades are installed, and then the capital investment is paid back over a period of up to 25 years. But there is more to the story ...

While the installation enjoys new equipment upgrades that save energy, there are many benefits to an ESPC that are not captured in the project financials — savings are often realized by the installation in ways that do not impact the cash flow of the ESPC project. The additional savings are above and beyond what goes to pay back the initial investment and are seldom considered when contemplating using an ESPC.

A few examples of these types of



An energy savings performance contract at Aberdeen Proving Ground, Maryland, added a cooling tower to support two 750-ton chillers to operate 24x7x365 in a surety laboratory. (Presgraves)

intangible savings are major reductions in trouble calls, reduced preventive-maintenance costs, expanded technical skill sets of government employees, a quicker path to achieve success versus traditional funding and contracting processes, and end-use customers having more comfortable and productive work environments.

At Fort Bliss, Texas, Gene Curtiss, the Building Operation Control Center Manager for the U.S. Army Garrison, said he believes that ESPC projects have allowed his staff to gain extensive knowledge about complex systems that they may not have been able to gain if not for the ESPC effort. Curtiss said ESPC contracts “often improve the efficiency of identified needs based upon economics.” This allows for smarter use of limited government funding and allows the government to leverage scarce dollars to the greatest extent possible. “When you create a pleasant working atmosphere, that is priceless.”

Garrison Department of Public Works customers are the end-users of the systems often touched by an ESPC project. More often than not, DPW resources are consumed with handling trouble calls to support the mission’s facilities. At Aberdeen Proving Ground, Maryland, Devon Rust and Jeff Presgraves have said since ESPC was implemented, trouble calls have been reduced, thus lowering service technician hours. These types of maintenance savings are not typically captured in ESPC cash flow models — these are savings that stay with the customer, from day one. These benefits are in addition to the fact that a more reliable HVAC system and better-lit working areas are providing their customers a more comfortable and productive working environment.

Rust and Presgraves also pointed out that the ESPC warranty handled by

Acronyms and Abbreviations	
DPW	Directorate of Public Works
ESCO	Energy Service Company
ESPC	Energy Savings Performance Contracting
HVAC	Heating, Ventilation and Air Conditioning

the energy service company takes added workload/stress off of their DPW staff, and their work reception/service order desk has a new routing system directly to the ESCO for ESPC service, resulting in quicker response times. These benefits are key to DPWs and help improve overall efficiencies and generate actual savings to the government.

In the environment of limited resources facing DPWs, using new and different ways to tackle problems are a must. With an ESPC project, many benefits are never captured in the proposal or financial schedules of the project, but they are indeed enjoyed by many DPWs across the world. Fewer maintenance hours, better working environments, opportunities to train and learn on new technology, and reduced funding requirements are a few of the many benefits not commonly touted by the program.

Since installations don’t often claim credit in the project financials for many of these “ancillary” savings, decision makers often don’t realize they exist until after the fact. Once customers realize how much more they can get from an ESPC than just what’s on paper, opportunities abound.

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Will Irby is the ESPC program manager, Energy Division, Energy Implementation Branch, U.S. Army Engineering and Support Center, Huntsville, Alabama, U.S. Army Corps of Engineers.







# HQ IMCOM Resource Efficiency Managers

by Ralph Totorica

**D**id you know that HQ IMCOM has two Resource Efficiency Managers (REMs) on board to assist IMCOM installations?

The REMs are based out of HQ IMCOM offices in San Antonio; however, they are available to travel to IMCOM installations to assist installation Energy Managers with executing their energy programs. HQ IMCOM provides this support primarily for smaller IMCOM installations which do not have dedicated energy staff but may not warrant a full time on-site REM.

The REMs are used primarily to assist installations with performing Comprehensive Energy and Water Evaluations (CEWE) required by the Energy Independence and Security Act

(EISA) and identifying energy and water conservation measures. The REMs are also available to assist with development of projects for appropriated funding and alternative financing.

To date, the REMs have completed site visits to 20 garrisons. During these visits they have audited over 9 million SF of facilities and identified 406 Energy Conservation Measures (ECMs) with total annual energy savings of 560,000 MBTU. Typical energy conservation measures identified include HVAC scheduling, retro-commissioning, temperature resets, and upgrades to controls, air handling, lighting and building envelope. Average payback of the recommended ECMs was 3.7 years.

HQ IMCOM REM support is provided at no cost to the installation; however the host installation must provide support to escort the REMs and provide access to facilities to be surveyed. To obtain additional information or to request an REM visit to your installation please contact the author.

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*Ralph Totorica is a general engineer in the Energy and Utilities Branch, Public Works Division at Headquarters, IMCOM.*

## REM Services for Garrisons:

- Evaluate energy usage, determine normal & weather dependent consumption, and identify peak demand, and reduction strategies
- Perform CEWEs to help meet 25% EISA annual audit requirement
- Identify energy conservation measures (ECMs) with life-cycle cost analysis (LCCA)
- Assist Garrisons with submitting Projects in Project Prioritization System (PPS)
- Assist Garrisons in implementing projects thru QUTM, ECIP, ESPC and UESC

## How to Request REM Services:

- Contact Ralph Totorica, ralph.j.totorica.civ@mail.mil, 210-466-0598, or Steve Tallman, stephen.m.tallman.civ@mail.mil, 210-466-0594, to request assistance
- A building questionnaire will be sent to you. Please complete using the following guidelines:
  - Select buildings recognized as high energy consumers
  - Select buildings that have not been audited in the last 4 years or mor
  - Select buildings that have operational problems, please identify in questionnaire
- HQ IMCOM will evaluate information and will follow up to schedule REM site visit

Acronyms and Abbreviations	
CEWE	Comprehensive Energy and Water Evaluations
DPW	Directorate of Public Works
ECM	Energy Conservation Measures
EISA	Energy Independence and Security Act
HQ	Headquarters
HVAC	Heating, Ventilation and Air Conditioning
IMCOM	Installation Management Command
MBTU	A Thousand British Thermal Unit
REM	Resource Efficiency Managers

## Public Works Digest

### 2015 Theme and Deadline Schedule

Issue	Theme	Deadline
Jan-Feb-Mar	Master Planning, Housing and Barracks	5-Dec-14
Apr-May-Jun	Environment and Sustainability	6-Mar-15
Jul-Aug-Sep	Operations, Maintenance and Engineering	TBD
Oct-Nov-Dec	Energy, Water and Waste	TBD



# Energy Savings Performance Contract Sets Fort Buchanan on Path Toward Achieving Army's Net Zero Goals

by Julia Bobick

The Army Corps of Engineers' first and only Energy Savings Performance Contract (ESPC) to include wind power generation is nearly complete at Fort Buchanan, Puerto Rico. One of several energy conservation measures implemented through the ESPC, two wind turbines will produce an estimated 5 percent of the energy consumed by the installation. In addition, a total of 21,824 solar photovoltaic panels will produce about 5.5 megawatts of power, which is at least 60 percent of the installation's current power demand at its peak production.

Through the ESPC, managed by the U.S. Army Engineering and Support Center, Huntsville, the Army has also replaced old chiller systems and package and split-type air conditioners with more efficient units, replaced rooftop mounted package air conditioners with a central chiller plant at the post exchange, installed cool roofs and energy management controls, replaced window-type air conditioners with mini split inverter-driven units, installed LED lighting and other efficient interior and exterior lighting systems and installed solar thermal water heaters.

Two ESPC measures instrumental toward helping Fort Buchanan achieve the Army's Net Zero water program goals were the implementation of a potable water well to reduce reliance on Puerto

Rico's Aqueduct and Sewer Authority and installation of a 2 million-gallon irrigation lake fed from a previously government installed non potable ground water well that will supply the necessary water to a new irrigation system at the post golf course, according to Yamil Hernandez, Fort Buchanan Directorate of Public Works Environmental Division. "In combination, all measures are expected to save about 30 percent of the fort's energy demand and 60 percent of potable water demand, well in excess of current federal requirements," Hernandez said. Estimated savings resulting from all the conservation measures is more than 59,000 MBtu per year and more than \$4 million in avoided costs.

Through an ESPC, an energy services company provides the capital and expertise to make comprehensive energy and water efficiency improvements or implements new renewable energy capabilities on government facilities and installations, and maintains them for a specified time period. Johnson Controls Inc. was awarded the \$34 million ESPC at the end of 2012. There is no upfront investment by the Army, according to Wes Malone, project manager at the U.S. Army Engineering and Support Center, Huntsville, which manages 85 to 90 percent of the Army's ESPC portfolio. "With an ESPC, your energy budget doesn't go down; you still pay for your utilities and the savings pay for the service through a given payback period. The utility bill is reduced by the energy conservation measures that were implemented, but the extra money goes to the contractor to pay for the work that was done and continued maintenance of the new systems. The high utility rates in Puerto Rico, which at 28 to 30 cents per Kwh are nearly double the rates in the continental U.S., make ESPC renewable

Acronyms and Abbreviations	
ESPC	Energy Savings Performance Contracting


energy projects very attractive options for the Army," Malone said.

Photovoltaic installations in Puerto Rico have a payback of about 20 years, in contrast to an average of 37 years in the continental U.S., according to Hernandez. "For this reason, we have also required that for all new construction on post at least 33 percent of the building's daytime power needs be supplied through solar photovoltaic energy in order to ensure energy independence," Hernandez said. "By being more self sustainable and applying sustainability principles in our building designs, revitalizations, construction, retrofits, and operation and maintenance, we not only help ourselves to be more independent and augment our operational readiness, but also help our neighbors to have a more stable power and water infrastructure capacity."

The work is helping the installation pave the way toward achieving the Army's Net Zero installations goal of producing as much energy as it consumes by the year 2030, Hernandez said.

"Without the ESPC, we would still be facing rising energy and water costs, which in turn hinder our ability to provide quality services to our Soldiers, civilians and their families."

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## Energy Savings Performance Contracting Information:

<http://www.hnc.usace.army.mil/Media/FactSheets/FactSheetArticleView/tabid/10784/Article/484226/energy-division-energy-savings-performance-contracting-espcc-program.aspx>



# USAG Stuttgart Increases Utilization of Solar Panels

by Jessica Baldrige

Since 1967, USAG Stuttgart has been home to EUCOM headquarters. By 2003, USAG Stuttgart was under the maximum occupancy for the garrison. When AFRICOM headquarters was established at USAG Stuttgart in 2008, occupancy rose to about 70 percent. Now in 2014, occupancy is 113 percent, and it's evident by the energy consumption. In an effort to counteract the excessive energy consumption, USAG Stuttgart has begun implementing PV panel systems as a means of generating and using renewable energy.

PV systems are designed to convert sunlight into electric energy. These systems are made up of panels, solar inverters, a power grid, and a counter to monitor the solar power being fed into the system. The inverter is necessary to convert the incoming direct current (DC) provided by the panels to alternating current (AC) so that it may enter the alternating current of the grid. When oriented and inclined properly (depending on geographical location), the panels will operate at optimal performance. The power-generating capacity of a PV system is denoted by kWp.

The Energy Policy Act of 2005 established by the Congressional OMB aims to reduce energy consumption by three percent annually. Using the energy consumption from 2003 as a baseline, USAG Stuttgart has been tracking the

MMBTU per KSF since 2006. MMBTU per KSF is defined as energy intensity, which is not dependent on population. Regardless of the number of occupants at USAG Stuttgart, the energy utilized may not exceed the baseline set in 2003, which is 67.7 MMBTU/KSF. Due to the presence of EUCOM and AFRICOM, the garrison experiences energy intensity similar to hospitals and commercial facilities instead of the energy intensity to be expected from day-to-day living. More people and equipment per square foot means more energy consumption per square foot.

USAG Stuttgart results for FY12 reported an actual energy intensity of 80.4 MMBTU/KSF, exceeding the OMB goal for 2013 by 24 percent and exceeding the 2003 baseline by 18 percent. Instead of reducing the energy intensity by three percent from FY12 to FY 13, the energy intensity increased seven percent for the single year.


Since the FY13 performance has been evaluated, USAG Stuttgart has begun rapidly implementing state of the art PV panels on the roofs of buildings across all of the installations. In 2013, only one PV system existed on the garrison. Since then, PV systems have been installed on nine additional buildings, totaling over 800 panels. The total energy consumption in FY13 was 675,200 MMBTU, which

Acronyms and Abbreviations	
AC	Alternating Current
AFRICOM	United States Africa Command
DC	Direct Current
EUCOM	United States European Command
FY	Fiscal Year
KSF	Thousand Square Feet
kWp	kilowatts-peak
MMBTU	Million Metric British Thermal Units
MWh	megawatt-hours
OMB	Office of Management and Budget
PV	Photovoltaic
USAG	United States Army Garrison

converts to 197,882 MWh and includes all energy sources such as electricity, natural gas, and district heat. The single PV system online during FY13 generated 51.79 MMBTU (15.18 MWh) of electricity. This single system accounted for a very small portion of the garrison's energy use in FY13; however, with two more PV systems online and seven on the way, 58.5 MWh of energy has been generated during FY 14 and 455,848 MMBTU (113,596 MWh) has been used so far. This marks a 385 percent increase in energy generation from FY13 to FY14.

Additionally, PV systems totaling over \$3.5M have been funded for FY14 and are awaiting construction across nine additional buildings on the USAG Stuttgart installations. Once all FY14 PV systems have been installed and go online, they will span 19 buildings totaling 727 kWp and USAG Stuttgart will be well on its way to significantly increasing generation of renewable energy for years to come.

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PV panels on the USAG Stuttgart installation



# Understanding LEED

by Bradley T. Barber

The success and value of a green building rating system depends on the availability of information to those who utilize it, and the system's ability to adapt to new challenges and technology. Contractors, engineers, and architects of large scale projects for the United States Government might have an idea of what LEED is. However, most people don't. According to a recent Energy and Environment Consumer Survey done by Navigant Research, 72 percent of Americans didn't know what LEED was or have an opinion about it.

LEED stands for Leadership in Energy and Environmental Design. LEED is a green building certification system that aims to create a cleaner, more sustainable building process. The criteria are constantly being reviewed and revised due to new policy and technology. LEED is a system in which points are allotted based on the type of construction. There are several categories to include Building Design and Construction, Interior Design and Construction, Building Operations and Maintenance, Neighborhood Development, and lastly Homes. The criteria is slightly different based on category, but all will yield a new or renovated building that is

sustainable, consumes less energy, and will have a lower negative impact on the environment.

Within each category there are several different credit categories such as location and transportation, sustainable sites and water efficiency. Overall, there are several graded aspects and points can be accrued towards the project total. United States Army Corps of Engineers, (USACE) requires all of its projects to achieve at least a silver level certificate. A silver level certificate is the second performance level in the LEED Green Building Rating System® and is the mandated minimum level for Army Facilities.

LEED tends to work well for large projects or corporations because of longevity - the savings over a lifetime are worth the cost. Smaller companies can have a harder time because of the cost/benefit ratio. Often initial costs are too great for the more efficient building materials, mechanical systems, and power systems. Becoming LEED certified is often much more expensive than non-LEED processes and materials. Sometimes the payout is not monetary, but instead refers to the long term sustainability of the building and minimal environmental impact. It is important for governments to set the precedent and begin to limit thoughtless building practices.

In any project there are many phases, such as planning, building, and maintenance. All of the criteria sought after must be monitored and evaluated periodically until commissioned for use. This ensures that those points are actually achieved in the eyes of a third party LEED certification company.


Building a "green" building is just the start; maintenance of the project is a critical to remain sustainable. In order to maintain a green building, the people

Acronyms and Abbreviations	
LEED	Leadership in Energy and Environmental Design
LEED AP	LEED Accredited Professional
USACE	United States Army Corps of Engineers

that occupy and operate the building must be aware of their responsibility to maintain an energy efficient and non-wasteful environment. LEED is not simply a "build and forget" program. Under the operations and maintenance section of LEED, points are credited based on the monitoring of water and gas flow, the amount of natural sunlight illumination, utilizing alternative means of transportation, and even by employing LEED Accredited Professionals, LEED APs, to track performance. The goal is to produce an environmentally conscious building which can continue to have a reduced impact on the environment.

There is much more to the LEED program than can be presented here and though the certification criterion continues to change and grow, the fundamentals remain the same. Without the desire to get LEED certification, not much thought would go into sustainability and the thoughtless building practices that cause 25 percent of America's landfills to be full of construction related debris would continue. Many states, countries, and organizations have adopted green building polices such as LEED certification taking a step in the right direction. More thought is going into green building practices, but there must be more education by voters, policymakers, and organization leaders to have the greatest impact.

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Several large bays for windows to get maximum sunlight illumination



# Huntsville Center Sustains DOD Fueling Capability Worldwide

by William S. Farrow

**H**untsville Center’s Installation Support and Programs Management Directorate manages a maintenance and repair service program sustaining worldwide fueling capability to the Department of Defense and other agencies. The Defense Logistics Agency-Fuels program provides maintenance, inspection, repair and emergency response actions at 212 DLA sites on military installations world-wide under the jurisdiction of DLA-Energy.

In 1980 DLA approached Huntsville Center to award contracts for the creation of operations and maintenance manuals for Defense Fuel Supply Center coastal sites. DLA then requested Huntsville Center develop a recurring maintenance contract to provide periodic and preventive maintenance and minor repair services and actions. “The program will double in the next 12-18 months as more than 200 Air Force sites are brought into the recurring maintenance and minor repair program,” said Dennis Bacon, DLA-Fuels program manager. “We are increasing our DLA-Fuels staff at Huntsville Center commensurate with the program requirements,” Bacon said. “We have the expertise and ability to support multi-service installations and customers in maintaining and repairing

fueling equipment in compliance with federal, state and local code, criteria and regulations.”

Maintenance is executed in a decentralized manner with each DOD installation providing a “site representative” responsible for developing the scope and subsequent verification of work completion to standard. The program provides additional quality assurance via the use of U.S. Army Corps of Engineers local district offices and periodic Huntsville Center visits as added checks and balances.

DLA Energy provides funding to the military services for sustainment, restoration and modernization and military construction for fuel-related projects to executing agents through centrally managed programs. Within USACE, Omaha District executes the MILCON, SRM, tank inspection, project and planning studies missions in support of DLA-Energy and the services.

As the program has grown, the DLA-Fuels team has experienced a great appreciation for the program which provides direct support to the U.S. military’s global deployment capability.

Bridget Knatt, DLA-Fuels administrative staff, is new to the Corps of Engineers and Huntsville Center, having come on board the program in July. She said before getting involved with the program she had limited knowledge of the span of work Huntsville Center and ISPM does to support the U.S. military services. “The Army Corps of Engineers is a new experience for me so I thought that the Corps was only about constructing buildings and dams,” she said. “Now, working on the DLA-Fuels team, I know that we provide services to many federal agencies such as the Defense Logistics Agency.”

Acronyms and Abbreviations	
DLA	Defense Logistics Agency
DOD	Department of Defense
ISPM	Huntsville Center’s Installation Support and Programs Management Directorate
MILCON	military construction
SRM	sustainment, restoration and modernization
USACE	U.S. Army Corps of Engineers

## DLA-Fuels program fact sheet

<http://www.hnc.usace.army.mil/Media/FactSheets/FactSheetArticleView/tabid/10784/Article/482124/facilities-division-dla-fuels-recurring-maintenance-minor-repair-program.aspx>

Wes Trammell, DLA-Fuels lead engineer, said the fast-paced program requires a committed team working together to ensure the program’s success. “Enjoying your job makes all the difference when you are involved with something as high speed as this program,” Trammell said. “The team atmosphere directly relates to the success of our program and ultimately to the support we are providing to DLA, the service control points and to the warfighter.”

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*A recently renovated service control point ensures fuel is delivered*



# JBLM Wastewater Treatment Plant and the Puget Sound

by Miriam Easley

**J**oint Base Lewis-McChord (JBLM) is one of the eight pilot installations designated by the Honorable Katherine Hammack to become a Net Zero Water installation by 2020 and includes an essential upgrade to its existing 60 year old wastewater treatment plant (WWTP).

JBLM is located in Washington State and part of the installation, to include its WWTP, borders the Puget Sound. The Puget Sound is home to thousands of species and many industries, including fishing and clamming. The region depends on this body of water for environmental, economic, and recreational use.

The JBLM WWTP plant uses 1950s-1970s-era technology. As a result, this plant doesn't have the ability to reliably treat wastewater to today's more stringent water quality standards, specifically nutrient limits which include nitrogen. This shortfall was confirmed by a 2009 United States Army Corps of Engineer feasibility study. The study recommended construction of a treatment plant that would use more up-to-date processes that would enable it to meet current and future water quality requirements for the Puget Sound, including nutrient limits.

JBLM's \$91 million WWTP treatment plant upgrade will feature the most current technologies, ensuring that the plant will meet current and future discharge requirements to protect water quality in the Puget Sound. The plant will be capable of

treating effluent to Class A reclaimed water standards, setting the stage for future water reuse, in lieu of the present practice of wastewater discharge to the Puget Sound. Phase One construction of the WWTP upgrade is scheduled to be complete by March 2016.

The upgraded WWTP plant paves the way for a future Phase Two project that would build a reclaimed water distribution system on JBLM. Once complete, the distribution system would allow redirection of reclaimed water across the installation for aquifer recharge, possible wetlands creation, irrigation, wash racks, fire suppression, and mechanical systems.

Also, if Phase Two is completed, JBLM would no longer discharge municipal WWTP effluent, reducing the overall WWTP effluents going to the Puget Sound, and increasing the health of the ecosystems not only adjacent to JBLM but throughout the Puget Sound. Two of the greatest environmental issues facing Puget Sound are toxic contamination and eutrophication (low oxygen due to excess nutrients). WWTP effluent is a contributing factor to both issues.

This not only results in positive changes for the environment but also to the surrounding community and economy. Currently, the Washington State Department of Health has established a shellfish exclusion zone around the JBLM WWTP outfall in the Puget Sound. Phase

Acronyms and Abbreviations	
JBLM	Joint Base Lewis-McChord
WWTP	Wastewater Treatment Plant

Two could result in this zone being opened up for commercial fishing and shellfish beds for the Nisqually tribe.

The JBLM WWTP upgrades represent a nexus of the Army's three Net Zero categories: Energy, Water, and Waste.

- **WATER:** Phase One improves the quality of the effluent pumped into Puget Sound and Phase Two would make the WWTP a zero discharge plant.
- **ENERGY:** Methane-rich sludge digester gas will fuel two hot water boilers that heat the digesters, creating a closed-loop system. A ground loop heat pump (GLHP) system will provide heating and cooling to the administrative offices and analytical laboratory.
- **WASTE:** Biosolids from the WWTP are taken to JBLM's composting facility and turned into compost that is used on the installation and sold through the Qualified Recycling Program (QRP). QRP funds are then used to fund recycling, sustainability, and Moral, Welfare, and Recreation programs.

Phase One of the JBLM WWTP is a step towards meeting current and future compliance requirements and provides the momentum needed to complete Phase Two. Phase Two will move the installation beyond compliance doing our part in preserving the Puget Sound.

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Wastewater Treatment Plant flyover view with the Puget Sound in the background. (CDM-Smith)



# Fort Carson Pushes to Net Zero Water through Large-Scale Projects

by Susan C. Galentine

**W**ater that swirls down the drain and flushes down the toilet is being looked at as a means to an end in Fort Carson, Colorado's, march toward Net Zero water by 2020. A reclaimed water expansion project and installation-wide initiative to replace older water fixtures in buildings will yield substantial water and dollar savings for the post. Fort Carson, through the U.S. Army Corps of Engineers Omaha District, is working on a reclaimed water system expansion project – the installation's largest-scale Net Zero water initiative to date.

The post's Cheyenne Shadows Golf Course has used reclaimed water from Fort Carson's onsite sewage treatment plant since the 1970s for irrigation. Through the expansion project, now other turf areas on post will transition to reclaimed water irrigation including, Iron Horse Park and the Fort Carson sports complex, by next summer.

The project entails upgrading 5 miles of existing pipe and installing close to 2.3 miles of new lines to the system, adding new pumps at the sewage treatment plant, a new booster pump station and doubling the size of the holding pond at the golf course, which will be able to store up to 30 million gallons of water. Once



*Fort Carson's golf course holding pond is undergoing expansion to double its capacity to carry 30 million gallons of water to accommodate a reclaimed water project for irrigation on post.*

completed, the system will increase from pumping 500 gallons per minute to up to 3,200 gpm to accommodate the increased irrigation demand.

The desired outcome of the water system expansion effort is to ultimately use 100 percent, roughly 200 million gallons, of Fort Carson's treated waste water to irrigate large, priority turf areas, said Vince Guthrie, Directorate of Public Works Operations and Maintenance Division utility program manager. "To me it is about using the right quality water for the right use," said Guthrie.

The cost of using reclaimed water for irrigation in summer is currently \$.80 per thousand gallons, versus \$6.07 for drinking water - an 87 percent savings, calculated Guthrie. Annually the installation could save more than \$1 million dollars by using reclaimed water instead of drinking water. The treated waste water is safe for watering turf. "The reclaimed water is fine for irrigation, but does not meet drinking water standards," said Jim Casey, DPW Operations and Maintenance Division utility engineering technician. "It is the same quality you would find in a mountain lake." Signs will be posted in reclaimed water irrigated locations to notify people using the areas.

Fort Carson is taking steps to ensure the reclaimed water available during the summer will fill the bill to reduce or eventually even eliminate the need for using drinking water for irrigation. "We will continue to conserve water using smart irrigation, drip irrigation and efficient sprinklers heads to avoid having to supplement with potable water," said Guthrie.

On the water fixture front, Fort Carson contracted with an energy savings performance contractor to replace inefficient shower heads and toilets and install low-flow aerators on sinks in post facilities. The contractor was selected to assist in accomplishing energy and water

Acronyms and Abbreviations	
DPW	Directorate of Public Works
FY	fiscal year
gpm	gallons per minute
gpf	gallons per flush

savings projects without up-front capital, explained Scott Clark DPW Operations and Maintenance Division energy program manager. Fort Carson pays the contractor for the completed work based on the annual energy and water savings related to the projects. The contractor guarantees that the improvements will generate enough energy cost savings to pay for the work in a pre-established period of time. After the contract ends, all additional cost savings will benefit Fort Carson.

The project, which began in FY13 and will end in early FY15, included the replacement of thousands of water fixtures in 133 buildings, including Soldier barracks. The \$2M initiative included retrofitting:

Clark estimates Fort Carson will realize a savings of close to 85 million gallons of water per year and 11,258 million British thermal units annually in natural gas savings attributed to less hot water used for showerheads and sinks. The initiative is anticipated to reduce overall water consumption approximately 8 percent per year on post and save more than \$423,000 annually in utility costs – a significant bump toward Net Zero water objectives. Additionally, Fort Carson will receive a total of \$87,000 in Colorado Springs Utilities rebates during the course of the water fixture replacement project.

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# West Point's Drive Toward Net Zero

by Matthew Talaber and Jonah Havranek

The objective of reaching Net Zero (NZ) energy by 2020 demands all of West Point (WP) to focus on energy conservation and security. Achieving NZ energy is a formidable challenge, but this has not deterred our effort; in fact, it has served as a motivator. Significant gains have already been realized and future efforts are being prepared for launch.

Conservation initiatives to date include:

- An Energy Council, comprised of representatives from both Garrison and Mission, coordinates the NZ effort across WP, keeping Command continually apprised. The council's chief doctrine is the Energy Policy. The Council also issues Energy Notices to the WP community that recognizes positive conservation efforts and offer specific suggestions on how agencies can achieve additional savings.
- A unique component of our Energy Savings Performance Contract is a behavioral survey with follow-up recommendations promoting sustainable, proactive energy awareness and behavior.
- Via our energy management control system we have changed temperature timer set points

to a threshold beyond industry standards. Additionally, we turn HVAC systems down or off prior to building vacancy at the end of the business day. Small temperature and schedule changes throughout many buildings translate into considerable savings.

- Regardless of project scope, we construct to a standard beyond energy code requirements. Return on investment supports the initial cost increase.
- Metering allows DPW to collect reimbursement for the cost of operating vending machines, which will hopefully lead to the installation of more efficient machines.
- When MILCON projects are awarded below the program amount, we use bid savings for energy conservation enhancements.

Ongoing energy initiatives include:

- This year we anticipate constructing three micro-hydro generator plants at three of our 21 dams, generating over a combined 500 megawatt-hours per year. The micro-hydro project at WP is at the forefront of a proposed Army-wide initiative for energy reduction.
- Installation of 149 advanced smart electrical utility meters in 120 buildings and construction of a combined fiber optic and secured wireless network to collect and distribute data to the Army Meter Data Management System, academic centers for Cadet training, the Operations & Maintenance electrical shop, and a meter data collection database for building monitoring.
- A co-generation plant will use natural gas to produce electricity for back-up power. The steam

Acronyms and Abbreviations	
DPW	Directorate of Public Works
HVAC	Heating, Ventilation, and Air Conditioning
MILCON	Military Construction
NZ	Net Zero
WP	West Point

by-product will help supply our steam distribution system for heating and cooling.

- A program to systematically replace deteriorated steam condensate lines, which will return lost condensate to the steam plant, saves energy and costs for water treatment. Also, under evaluation is replacing portions of the central steam network with high temperature hot water lines.
- A 1-2 megawatt combined solar array on various selected buildings will complement our cogeneration plant with renewable energy.
- Smaller and more energy-efficient boilers will be used when seasonal loads do not mandate full boiler capacity, while the larger boilers will be taken off-line. Where replacement is necessary, modern energy efficient boilers will be installed.
- Wood chips will serve as the principle fuel for a boiler that will supply heat to our Roads and Grounds buildings.
- Plans to render Camps Buckner and Natural Bridge as NZ complexes through a combination of renewable energy and conservation techniques.
- Coils placed in our reservoir will use the water body in support of conditioning air in Michie Stadium.

Because of the wide variety of NZ projects either underway or planned, ➤



Representatives from West Point and Huntsville Center assembled for a Net Zero summit. (Havranek)





# Fort Bragg Electronic Metering Program


by Paul Hora

Properly promoting energy conservation and enforcing energy reduction efforts begins with having data to benchmark facilities and show progress toward goals. Fort Bragg has been tracking energy reduction at the utility substation levels but today with resources like FOCUS the job is a lot more efficient. Providing units with a mock energy bill can show them a lot. Even though there are no current plans to bill the Army tenants for facility utilization at least they can be shown how much they would be spending for the facilities they occupy. “It’s a handy tool when we tell a customer that their facility would cost \$25,000 a month and they need to be more cognoscente of exterior lights being left on during the day and having open doors or windows during a hot summer afternoon.”, stated Coby Jones the Fort Bragg Energy Manager. “We work with soldiers and staff in buildings to educate them on how to reduce energy intensity. The best thing

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WP has partnered with the Corps of Engineers, Huntsville Center to add clarity to the energy master plan and to develop the capital investment strategy that defines the road to NZ. Recently, participants from WP and Huntsville Center held two NZ summits to share ideas, develop roles and responsibilities, and set the foundation for the energy master plan effort.

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we can do is tell them that Fort Bragg spends \$46 million a year and then follow that up with a mock bill showing their portion of that bill.”

Fort Bragg North Carolina, Home of the Airborne, Special Operations Forces, Forces Command and Reserve Command is comprised of approximately 33 million square feet of conditioned space with a \$45,000,000 annual energy bill. With over 25 individual organizations present on Fort Bragg and so many moving parts allocating accountability and responsibility becomes a major challenge. Fort Bragg has experienced 30 percent growth in building square footage over the last ten years but an effective metering program was in its early stages during the in the growth cycle thus dated analog utility grade meters were installed on new and existing facilities. As a result of increasing populations and ever-rising energy costs a plan was implemented to improve the metering process. Beginning with the installation of a Utility Monitoring and Control System with electronic metering on all energy services, facilities were monitored and recorded remotely. The project included logging devices which could send interval data back to a Building Operations Command Center (BOCC) and display that information on a dashboard. One major challenge with this project was physically connecting the meters to the facilities. This effort required coordination with the local utility company to disconnect power service to the buildings so the current transformers (CT) could be installed in a safe manner. The project was split into several phases but the initial effort required a lengthy coordination process which took approximately eight months.

After the hardware was installed, a connection to an independent work station was made. This allows the end user to interact with the system and harvest information from a central


Acronyms and Abbreviations	
BOCC	Building Operations Command Center
CT	Current Transformers
FOCUS	Facilities-based Overview of Customers, Utilities, and Services

location.

The Director of Public Works, Gregory Bean, envisioned one more step. “I want to have a program where he (the end user) can open his computer, look at a map, pick a building and see how much energy they are using.” said Mr. Bean. This initiative would ultimately create a centralized dashboard that could streamline work management systems, promote energy efficiency and optimize space utilization.

Facilities-based Overview of Customers, Utilities, and Services (FOCUS) is a solution to the problem and it puts the managers back in control of the data. It is a geospatially enabled single-source web portal designed to provide installation decision makers and tenants with situational awareness and actionable information about facilities and installation components to include energy usage, real property data, work management, and more. FOCUS retrieves the data from the various programs and provides a centralized access point for quick and easy viewing as well as accurate information assessment by facility managers. One of the unique attributes of FOCUS is that it was taken off the shelf from another military application and was retooled for the specific needs of Fort Bragg Public Works. This provides a platform by which comparisons can be made between facilities and relative to the installation as a whole.

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# PM ABCT MFT Leads the Way in Zero Boot Print Challenge

by Christine Luciano

Fort Hood’s net zero waste program challenges Soldiers, civilians and their families to rethink their lifestyles, make changes to their daily routines, and take advantage of the environmental services available. This year, the program challenged military, civilian and contractor activities to reduce their environmental footprint with an initiative called the zero boot print challenge. Units and activities have been challenged to meet a checklist of strategies in the areas of reduce, repurpose, recycle and outreach. “The challenge is an opportunity for Soldiers, civilians and contractors to get involved in net zero waste,” said Jennifer Rawlings, net zero waste project officer. “This will help motivate individuals get involved and become better stewards of the environment.”

A checklist of strategies is provided to help activities understand what can be done to reduce, repurpose and recycle in their building footprint. The Program Manager Armored Brigade Combat Team Materiel Fielding Team (PM ABCT MFT) have taken up the mission to



*Environmental compliance officers and recycle coordinators from the PM ABCT MFT coordinate a training event at the recycle center to learn more about the different types of materials recycled and the benefits to Fort Hood. (Luciano)*

the lead the way in reducing its carbon footprint, becoming the first activity on Fort Hood to implement a paperless document management system for its environmental program and creating a culture where everyone strives for environmental excellence. More than 350 PM ABCT MFT employees serve as the fielding team in support of life-cycle management for the Army’s armored combat vehicle programs for all M1 Abrams tanks and M2 Bradley fighting vehicles.

“The MFT performs a total package fielding and is responsible for inspecting, repairing, issuing and maintaining vehicles so that they are ready to go,” said Stephen Spencer, PM ABCT MFT yard manager. “Our mission is to support the Soldiers and ensure they can carry out their military missions.” The team has also made its mission to support the installation’s net zero waste initiative and has become the first activity to be inducted into the Zero Boot Print challenge.

Since 2008, Fort Hood’s Environmental Compliance Assessment Team (ECAT) has recognized PM ABCT MFT in a green status. ECAT provides support to units, Garrison directorates and tenants and conducts audits to ensure environmental compliance. All facilities are accessed biannually in a red, amber or green status. Units and activities that score three consecutive green statuses, are assessed annually. “The team maintains a high environmental standard between assessments and are always looking at ways of improving,” said Dale Frederick, environmental compliance assessment team leader.

Through command emphasis, training and providing resources to employees, PM ABCT MFT has shown continuous success. “You have to have command emphasis and the support from the

Acronyms and Abbreviations	
PM ABCT MFT	Program Manager Armored Brigade Combat Team Materiel Fielding Team
ECAT	Environmental Compliance Assessment Team

leadership,” said William Mclean, a PM ABCT MFT environmental compliance officer. “You also get smart, understand the environmental policies and regulations, explain to others why it is in their best interest and also the consequences if they don’t comply. And then provide the resources for a successful program.”

PM ABCT MFT’s leadership has empowered its employees to ensure environmental standards are met, which are also tied into annual performance ratings and evaluations. To ensure compliance and training, each of the 10 sections has an environmental compliance officer who serves as an assistant recycle coordinator and also a recycle coordinator as the assistant environmental compliance officer. Also new employees receive a newcomer’s

environmental safety orientation.

“It’s important to brief new employees and walk them through their footprint to understand the environmental policies that must be followed,” said Walter Lang, a PM ABCT MFT environmental compliance officer. “The responsibility lies within those that know to educate their peers.”

Each section has recycle containers strategically placed with signs highlighting what is recyclables and have reduced the number of brown trash dumpsters with only one or two bags of trash occupying them.

Spencer highlighted that PM ABCT MFT’s successful environmental program also lies within its employees. “It has been a team effort. We reach out



# Why Would Someone from an Installation Want to be an External EPAAS Assessor?

by Martin Roberts

The Army is required to conduct external environmental compliance assessments every three years. The US Army Environmental Command (AEC) conducts these assessments for the Installation Management Command (IMCOM) and others, as requested. A team performing a site visit normally consists of six to eight in-house and installation subject-matter experts. Upon conclusion of this period, AEC offers its assistance in addressing any shortcomings – the extra A in EPAAS is for customer-focused Assistance.


AEC sees significant opportunity for the volunteer assessor and their installation.

- Learn how others with your basic job description do their job. You get to cross-fertilize and exchange ideas with other installation personnel.
- Challenge yourself. It's one thing to do your job, it's another to assess how others do theirs, requiring a more in-depth knowledge of governing regulations.
- Work as part of a highly-trained team ensuring the Army is doing its best from an environmental compliance standpoint.
- Participating as an assessor at other

*(continued from previous page)*

to each other for assistance and work together as environmental stewards to support the installation's environmental initiatives, said Spencer. "Be part of the solution, not part of the problem."

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installations will help you better prepare your installation for its next Environmental Performance Assessment & Assistance System (EPAAS) assessment.

Tera Hill, who manages the Air Emissions, Hazardous Materials, Environmental Management System, and Pollution Prevention programs for Rock Island Arsenal (RIA), has been participating in EPAAS alongside AEC as an Air Emissions assessor since 2010. She answered some questions for us here.

AEC: How were you able to sell your participation in EPAAS to your supervisor and Garrison leadership?

Tera Hill: I work for the group that used to run the external EPAAS assessments for AMC Headquarters. They feel that the EPAAS assessments are beneficial to both the installation and the assessor.

AEC: Have you been able to bring back any lessons learned for programs that you manage at RIA?

TH: Yes, I brought presentation ideas that Fort Hood uses in their AER [annual emissions report] and incorporated these into my AER. I have also used several ODC [Ozone Depleting Chemicals] program management ideas from installations that have a better ODC tracking system than RIA.

AEC: Do you believe EPAAS better prepares you and RIA for inspections conducted by EPA or state regulatory agencies?

TH: Yes, because I bring back the mind set of inspection criteria and not just the everyday gathering of information. There's a need to constantly observe the physical aspects of the program and not become overly focused on the spreadsheets and number crunching.

AEC: If you could tell other installation personnel one thing relating to EPAAS what would it be?

Acronyms and Abbreviations	
AEC	Army Environmental Command
AER	Annual Emissions Report
EPA	Environmental Protection Agency
EPAAS	Environmental Performance Assessment & Assistance System
IMCOM	Installation Management Command
ODC	Ozone Depleting Chemicals
RIA	Rock Island Arsenal

TH: EPAAS presents a great opportunity for communication and exchange of installation knowledge.

If you currently work on an installation environmental staff and this sounds like something you'd like to be a part of here are some details that might interest you.


AEC:

- Pays for all travel and per diem.
- Needs a commitment to participate on at least three or four audits per year to ensure that volunteers remain fluent in EPAAS processes and software.

We can't:

- Provide travel comp time for volunteers (most travel occurs on Sunday).
- Provide regular comp time. We expect an eight-hour day focused on EPAAS. Your other duties are between you and your boss.
- Provide technical training for your area of expertise.
- Let you hand-pick the installations you want to visit, but we will do our best to ensure you get into the flow with other AEC assessors.

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Martin Roberts is a member of the EPAAS Program Management Team with the U.S. Army Environmental Command. 



# IMCOM DPW's Easy Steps for Successful Advance Metering of Buildings

by Jesse Marzette

**H**istory. The original Army Metering Implementation Strategy was developed in response to the Energy Policy Act of 2005 (EPAAct 2005) requiring all federal facilities to be metered with advanced meters for electrical consumption by 1 October 2012 where economically practicable. The Energy Independence and Security Act of 2007 (EISA 2007) established a FY16 deadline for metering of all utilities (including natural gas, and steam) serving federal facilities. To meet requirements set forth by the EPAAct 2005, EISA 2007, and relevant Department of Defense (DOD) guidelines, the Assistant Chief of Staff for Installation Management (ACSIM) and Installation Management Command (IMCOM) assigned the U.S. Army Corps of Engineers, Huntsville Center (CEHNC) to plan and execute an Army Metering Program (AMP) across all garrisons/centers for active Army, Army Reserve (USAR), and National Guard (ARNG) regions worldwide.

**Goals** The Army's planned implementation of advanced electric, water, natural gas, and steam meters will result in the direct measurement of the facilities selected for metering under the centrally funded metering program are those that are economically justified in accordance with the DOE and OSD implementing guidance.

- **For Electricity:** Installations to install sufficient advance meters on individual buildings with to accurately capture a minimum of 60 percent of electricity use with a goal of 85 percent use at the installations by the end of FY 2020.

- **Natural Gas:** Install, sufficient advance meters on individual buildings to accurately capture a minimum of 60 percent of natural gas use with a goal of 85 percent use at the installations by the

end of FY 2020.

- **Steam:** Install sufficient advance meters on facilities connected to district steam systems to accurately identify individual facility steam use and system losses by the end of FY 2020.

- **Potable and Non-Potable Water:** Install shall install advance meters on all water intensive facilities by the end of FY 2020. At a minimum, facilities include, district heat and chiller plants, barracks, galleys/kitchens, dining facilities, swimming pools, gyms, docks, vehicle wash stations, industrial facilities, hospitals, water intensive laboratories, and landscaping systems. Additionally, installations shall include leak detection on devices on distribution systems to effectively identify system losses by the end of FY 2020.

- **Installations with Privatized Utilities:** Partner with distribution system owners to share meter data or negotiate acceptable terms for new meter installation and cost sharing. Additionally, each installation shall have the capability to monitor the base-wide energy and water use through an advanced meter shadowing the utility meter or through a data sharing agreement with the utility.

Data from advanced electric meters are reported hourly; advanced mechanical (natural gas, water, and steam) meters report data daily. In addition to the metering executed by the Army Central Meter Program (ACMP), Army policy is for Army Commands (ACOM) to fund additional metering where and when economically justified including expansion of the cyber secure meter network infrastructure. Building metering efforts shall be coordinated with the CEHNC.

**Step 1. Prepare a Building List for Advance Metering:** Create a preliminary list of your candidate buildings identified for advance meters.

Acronyms and Abbreviations	
ACMP	Army Central Meter Program
ACOM	Army Commands
ACSIM	Assistant Chief of Staff for Installation Management
AMP	Army Metering Program
ARNG	U.S. Army National Guard
CEHNC	U.S. Army Corps of Engineers, Huntsville Center
DOD	Department of Defense
DPW	Directorate of Public Works
EISA	Energy Independence and Security Act
EPAAct	Energy Policy Act
IMCOM	Installation Management Command
USAR	U.S. Army Reserve

**Step 2. Survey Buildings for Advance Meters:** Perform a physical survey of the buildings.

**Step 3. Validate Your Building List for Advance Meter Installation:** Validate your list of candidate buildings using the Army's building criteria for advance

**Step 4. Identify garrison DPW Advance Meter Program Central Point of Contact for Advance Meters:** DPW should appoint an Advance Meter Program Point of Contact.

**Step 5. Advance Meter Deliverables for Acceptance and Financial Closeout:** Advance Meter training will be provided by the contractor after the completion and acceptance of the advance meters installed.

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*Jesse Marzette, III, is a general engineer with the Energy and Utilities Branch in the Directorate of Public Works at Fort Sam Houston, San Antonio, Texas.* 🌻



# Working Toward Energy and Water Conservation Goals Using QUTM

by Simon Muench

The Army’s operations and maintenance activities are budgeted under a general pot of funds referred to as OMA - Operations & Maintenance Army. These funds are further apportioned into two basic sub-activity groups: Base Operation Support (BOS) and Sustainment, Restoration and Modernization (SRM). QUTM is not an acronym but rather an accounting label for a special subset of SRM funds set aside for government-owned utilities modernization and energy and water efficiency projects. These funds help Garrisons meet conservation and renewable energy goals specified in the many policy documents and requirements (e.g., EPAAct 05, EISA 07, EO 13514, etc.) issued by the Federal Government, the Department of Defense and Department of the Army. QUTM is not a substitute for routine utility infrastructure maintenance that should be planned and programmed into the Garrison Annual Work Plan (AWP) within its local SRM budget.

QUTM funds are an excellent way to help your Garrison implement key action items of the IMCOM Energy Strategy including execution of Low Cost/No Cost (LCNC) energy and water efficiency projects. Currently IMCOM Garrisons are achieving only 73 percent compliance with this element of the Strategy. Submitting LCNC projects through the QUTM program is one way to increase compliance with this part of the Strategy and meet conservation goals. QUTM can also be used to execute the garrison’s exterior night lighting reduction plan (OPORD 13-181), another area of Command emphasis and to implement the ASA (IE&E) Exterior Lighting Technologies Policy.

IMCOM directed all Garrisons to submit projects for the FY15 QUTM project call through Memorandum:

“IMCOM Interim FY 15 Guidance to the Army Facility Investment Strategy (AFIS)” dated 31 July 2014.

- All projects must be submitted in the Project Prioritization System (PPS) based on the QUTM business rules available at: <https://www.us.army.mil/suite/doc/43358879>.
- The Federal Energy Management Program (FEMP) provides on-line life cycle costing training at: [http://apps1.eere.energy.gov/femp/training/course\\_detail\\_ondemand.cfm/CourseId=2190](http://apps1.eere.energy.gov/femp/training/course_detail_ondemand.cfm/CourseId=2190). FEMP also has available Building Life Cycle Cost Analysis (BLCC) software that can aid in performing LCCAs and will output an LCCA document at: <http://energy.gov/eere/femp/articles/converted-building-life-cycle-cost-programs>.

The total amount of funding in the QUTM budget can vary widely. Continuously developing a backlog of QUTM projects and updating them throughout the year is the best way to be prepared when data calls are issued for QUTM projects. This also assists IMCOM and higher headquarters staff to successfully program QUTM funds for out years, justify budgets and develop the annual program objective memorandum (POM).


Become familiar with the strategy driving the Installation Management Command’s energy and utilities funding efforts. The IMCOM Energy Strategy is explained in detail in OPORD 13-174 available at: <https://www.us.army.mil/suite/files/42668548>. The Strategy places emphasis on energy and utilities projects with high Garrison and Region priorities, projects with a simple payback of less than 10 years, and LCNC projects. A complete list of LCNC ECMs is available at: <https://www.us.army.mil/suite/>

Acronyms and Abbreviations	
AFIS	Army Facility Investment Strategy
ASA (IE&E)	Assistant Secretary of the Army – Installations, Energy and Environment
AWP	Annual Work Plan
BLCC	Building Life Cycle Cost
BOS	Base Operation Support
EISA	Energy Independence and Security Act
EO	Executive Order
EPAAct	Energy Policy Act
FEMP	Federal Energy Management Program
IMCOM	Installation Management Command
LCCA	Life Cycle Cost Analysis
LCNC	Low Cost No Cost
OMA	Operations & Maintenance Army
OPORD	Operations Order
QUTM	Accounting label for a special subset of SRM funds
POM	Program Objective Memorandum
SRM	Sustainment, Restoration and Modernization

doc/42668554.

Simple checks should be made to ensure your projects pass initial screenings. For example, if the reported “Current Working Estimate” divided by the “Estimated Annual Savings” does not equal the “Simple Payback Years” then your project will receive additional scrutiny or may be given a lower priority. If a project number is changed after the initial submittal, it becomes difficult to track and therefore may be overlooked. Project narratives must be sufficient to fully evaluate the project and must clarify any unusual or special circumstances.

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Simon Muench is a supervisor with the Energy Projects and Alternative Financing Branch in the Energy and Utilities Division at the Directorate of Public Works at Fort Sam Houston, San Antonio, Texas. 



# Marching Toward Energy Reduction

by Bryan M. McClure

The President, Congress and Department of Defense have mandated that energy and water consumption be reduced. To help meet these requirements, the Army Energy Security Implementation Strategy was developed to include directives to reduce energy demands, increase energy supplies, and create an organizational culture shift that seeks to optimize energy and water resources. Addressing energy and water consumption, including associated costs, security and sustainability is operationally necessary, financially prudent and essential to mission success.

The Army Metering Program was created in response to the Energy Policy Act of 2005, which requires federal facilities to be metered with advanced meters where practical. Most military installations were originally designed to measure electricity, gas and potable water only at master meters where the utility is purchased from the utility industry at the installation boundary. Resource managers and policy makers have long desired individual buildings to have meters, like those utility companies have provided for homes and businesses for over a century.

The Army chose the U.S. Army Corps of Engineers, Engineering and Support Center, Huntsville to manage the Army Metering Program, install metering systems and ensure that they report securely. To accomplish this, USACE developed an enterprise Meter Data Management System. MDMS is being implemented across Army locations and has already identified opportunities for energy savings.

The installation of advanced electric meters started in FY08 on facilities consuming an estimated \$35,000 annually in energy costs; those facilities were deemed economically justified for metering according to Office of the Secretary of Defense criteria. For Army planning and budgeting purposes, the \$35,000 per year electrical cost equates to buildings of 29,000 square feet and larger.

MDMS is a force multiplier. The system receives, stores and organizes meter data, and provides analytics and reporting tools so that energy managers can make sense of it all and take action. Armed with aggregated and organized meter data, the energy manager has a "virtual" magnifying glass to view usage patterns and trends,

Acronyms and Abbreviations	
DOD	Department of Defense
MDMS	Meter Data Management System
USACE	U.S. Army Corps of Engineers

compare building performance within an installation or the performance of similar building types across multiple installations while accounting for differing climates and local weather factors.

MDMS pulls meter data from the installation metering systems (some known as Energy Enterprise Data Reporting Systems), typically in 15-minute increments, and securely transmits the data to a DOD Information Assurance Certification and Accreditation Process-accredited enterprise platform using the Army's Non-classified Internet Protocol Router Network. The data are stored in a secure environment indefinitely so users can access via their office computer with a Common Access Card, providing energy managers with the tools needed to identify anomalies and manage energy and water waste. This provides near real-time data and analysis to help achieve Army energy and water management goals.

As of June 25, 5,291 building-level meters were reporting to MDMS, and MDMS is receiving meter data from more than 75 sites. By the end of the year more than an additional 1,000 meters are scheduled to be reporting to the enterprise, and by the end of AMP Phase 1, more than 8,500 electric meters will be reporting to MDMS and more than 10,000 in total. As USACE moves the Army into the future, legacy metering systems and other non-AMP metering systems will report to MDMS.

To help installation energy managers understand MDMS, Huntsville Center is hosting and distributing information on MDMS via periodic webinars to all Army user groups. To attend a webinar, schedule fielding at your location, or receive an

US Army Meter Data Management System	
Organization	Total Meters
<b>HQDA</b>	<b>5291</b>
IMCOM	4622
<i>Atlantic Region</i>	1663
<i>Central Region</i>	2959
USARC	188
<i>81st Regional Support Command</i>	188
NGB	99
<i>ARNG</i>	99
MEDCOM	382
<i>Southern Regional Medical Command</i>	216
<i>Northern Regional Medical Command</i>	6
<i>Western Regional Medical Command</i>	160

As of June 25, there are 5,291 meters deployed across the Army



# Giving Credit Where Credit is Due: Calculating Solar Water Heater Output

by Jared Denning and Eric Mucklow

With the passage of the Energy Independence and Security Act of 2007 (EISA 2007), the Federal government established specific Renewable Energy goals and committed to increase its use of solar energy and, in particular, to supply 30 percent of the hot water demand in new and renovated buildings by means of solar water heating (to the extent life-cycle cost effective). Since then, many Army installations have been harvesting solar energy to generate electricity with Photovoltaic (PV) systems, heat building air with Transpired Solar Collectors (TSC), and create hot water with Solar Water Heaters (SWH).

PV panels convert solar energy into electricity, which is easy to measure with a meter attached to the system to allow reporting of the electrical energy being generated. In contrast, TSCs and SWHs collect radiant heat energy from the sun to raise the temperature of air or water somewhat, but typically require an additional heating source to meet the total heating demand. Often meters are not installed on smaller systems as there

is no single point to measure solar energy delivered directly. This poses a problem with reporting our annual energy savings. Indeed, the Army Audit Agency recently found that a number of facilities are using SWHs without properly reporting the amount of solar energy harvested annually in the Army Energy and Water Reporting System (AEWARS).

Because of the overall simplicity of solar water heaters, calculating the energy production can be done by taking just three factors into account: average incoming water temperature ( $T_{in}$ ), average outgoing water temperature ( $T_{out}$ ), and the mass of water heated. The mass of the water heated can be estimated from the volume ( $V$ ) of water heated, which is easier to determine.

Temperature of water entering the system ( $T_{in}$ ) needs to be logged before the water enters the solar collectors. The second variable, temperature of outgoing water ( $T_{out}$ ) from the solar water heating panels, should be logged after leaving the collectors, but prior to entering a storage tank or conventional water heater. The temperature readings logged are then averaged over a period of time (ideally a year for AEWARS reporting) to find  $T_{in}$  and  $T_{out}$ .

Acronyms and Abbreviations	
AEWARS	Army Energy and Water Reporting System
BTU	British Thermal Units
DHW	Domestic Hot Water
EISA	Energy Independence and Security Act
ft <sup>3</sup>	Cubic Feet (0.133681 ft <sup>3</sup> /gallon)
PV	Photovoltaic
SWH	Solar Water Heater
$T_{in}$	Average temperature of water coming into SWH
$T_{out}$	Average temperature of water going out of the SWH
TSC	Transpired Solar Collector ("Solar Wall")

The last variable needed is the mass of water being heated in pounds. Since measuring the Volume ( $V$ ) of water in either gallons or cubic feet is more feasible, we can multiply it by the approximate density of fresh water (62.42 lbs/ft<sup>3</sup>) to estimate the mass of water heated.

To determine the Volume ( $V$ ) of water heated, we need to distinguish between Open-Loop and Closed-Loop systems. In an Open-Loop system, the water that is heated through the solar collector is the same water that feeds directly into the Domestic Hot Water (DHW) supply and comes out the tap. These systems include "Drain-Back" systems to drain the solar collectors in the winter because they are susceptible to freezing at night. A water meter on either the incoming or outgoing water line can measure the gallons of water heated.

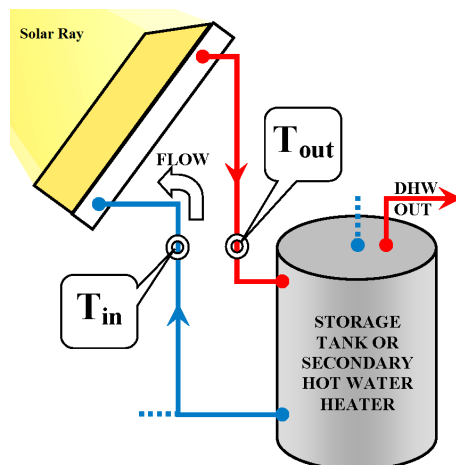
A Closed-Loop system consists of a coil of tubing in the storage tank or "heat exchanger" to transfer heat from the water heated by the solar collector to the DHW supply. The water in a Closed-Loop system is mixed with an antifreeze solution to prevent the collector from freezing at night and therefore does not need to be drained. It requires a pump or a thermosiphon to circulate the water/antifreeze solution between the collector

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MDMS account, please see <https://mdms.army.mil> to request access to MDMS. You may also reach us via the MDMS help desk at 703-797-8555 or by email at [support@mdms.army.mil](mailto:support@mdms.army.mil). MDMS is an evolving program that continues to grow, and as that growth continues, the Army's ability to manage and reduce energy consumption grows as well.

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Bryan M. McClure, P.E., is the program manager for the Meter Data Management System for the U.S. Army Corps of Engineers, Engineering and Support Center in Huntsville, Alabama.



Average Temperature Measuring Points



# Leaders Support Clean Energy at Red Rock Hydroelectric Project Groundbreaking

by Samantha Heilig

The second-largest hydroelectric plant in Iowa is officially under construction after a ceremonial groundbreaking Aug. 13 at Red Rock Dam near Pella, Iowa. Representatives from the Missouri River Energy Services (MRES) hosted the event to showcase plans for the new facility which is scheduled to be completed in spring 2018.

The groundbreaking featured remarks from Iowa Lieutenant Governor Kim Reynolds; Iowa Congressman Dave Loebsack, and Assistant Secretary of the Army (Civil Works) Jo-Ellen Darcy as well as other local leaders.



Iowa Lieutenant Governor Kim Reynolds, Iowa Congressman Dave Loebsack, Rock Island District Commander Col. Mark Deschenes and Assistant Secretary of the Army (Civil Works) Jo-Ellen Darcy break ground for the new Red Rock Hydroelectric Project.

Lake Red Rock, Iowa's largest lake, is primarily used for flood control and recreation however the holding capacity of the reservoir, 15,600 acres of water, makes it a prime candidate for energy production. The Red Rock Hydroelectric Project (RRHP) will involve retrofitting the dam with a turbine and generators to produce an average of 36.4 megawatts of electricity on a regular basis and up to 55 megawatts during peak season. According to MRES the average energy produced by this project annually will provide enough clean and affordable energy for approximately 18,000 homes.

MRES plans for construction involve building the RRHP facilities adjacent to the existing spillway on the Lake Red Rock Dam. The approach channel and intake structure will be located upstream of the dam. Two penstocks, large tubes that carry water, will run from the intake structure through the dam to the powerhouse. A tailrace channel will then extend from the downstream end of the powerhouse to the existing spillway tailrace which flows back into the Des Moines River.

Darcy said getting this project completed was high on the priority list for President Barack Obama's climate change plan, and the Army Corps of Engineers is proud to contribute.

"This project is on that list because

use of these calculations, you can give the Army credit where credit is due and report the energy savings yielded from un-metered SHW systems.

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Acronyms and Abbreviations	
MRES	Missouri River Energy Services
RRHP	Red Rock Hydroelectric Project

of the fact that climate change is having an impact in a variety of ways on all our natural resources and we have to be ready with water resources and planning and management alternatives in the face of climate change, and hydroelectric power is one way that we can meet that challenge," Darcy said.

One major advantage to the RRHP is that during the time of the year when demand for electricity is high, March through August, flow rates at Red Rock Dam are also typically at their highest. This will enable MRES to produce larger amounts of electricity and meet the needs of their customers while using a resource that is readily available.

"It is great to be here to celebrate the construction of a reliable, affordable, and environmentally sustainable source of power for this community," said Darcy. "President Obama's plan to improve upon our permitting and review processes for infrastructure projects highlighted this Red Rock Hydroelectric plant. Today is a big step for this country's hydropower efforts."

Brett Call, operations manager for Lake Red Rock said he is happy that the RRHP has reached the construction phase. Members of his staff along with people from the District office have spent countless hours working through the preparatory phase of this project.

Call said, "We are now very excited to see the work put in place and look forward to working through the next few years of construction."

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Samantha Heilig is a public affairs specialist with the U.S. Army Corps of Engineers, Rock Island District.

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and the tank. Since the loop is closed and isolated from the DHW, its volume is fixed.

By definition, the energy to raise one pound of water by one degree Fahrenheit is equal to one BTU. Knowing this, calculating amount of energy produced can be done by multiplying mass (in pounds) of water being heated, by the difference of those incoming and outgoing temperatures. Through the





# HQ IMCOM CUP Explores Energy Cost Reduction Opportunities

by Ernesto Ortiz

The Commercial Utilities Program (CUP), Army's utility and regulatory experts, assist the Army in the acquisition of reliable utility services at the most favorable rates and helps garrisons resell their utilities to tenant activities.

In FY13 CUP surveyed electric utilities for 10 installations to identify and determine whether the installations were receiving utility at the most favorable rates available. Installations surveyed are as followed:

1. Presidio of Monterey,
2. Fort Polk,
3. Carlise Barracks,
4. Fort Rucker,
5. Rock Island,
6. Fort Meade,
7. Picatinny Arsenal
8. Dugway Proving Ground,
9. Natick Soldier System Center,
10. Fort McNair

CUP's annual electric service studies continue to uncover opportunities that reduce cost, improve efficiencies and capture savings. Recent follow-up of past electric studies identified that some installations that have implemented utilities studies recommendations have saved energy costs and recaptured lost dollars. According to current and past studies, reimbursable tenants, Utility Management Evaluations (billing errors), administrative functions, and utility provider program opportunities are four areas where revenues continue to be missed.

Scarce resources, decreased funding, and continuing rate increases are becoming a challenge for Army installation to subsidize reimbursable customers. Installation utility managers need to re-energize their utility resale program

to ensure all reimbursable tenants are accounted for and are charged a fair share for the cost of utilities. Utility managers need to review their utility resale memorandum of Agreements, Installation Service Support Agreements at least once a year as a method to re-energize and improve utilities reimbursable opportunities.

Utility suppliers billing may not be accurate. Utility managers must ensure the consumption, the rate, and other cost components are correctly applied. CUP has identified a significant number of billing errors such as incorrect charges, incorrect meter readings, and administrative errors in utility invoices. Utility managers should address these errors to mitigate added cost to our energy consumed. Identifying billing errors can be very beneficial.

CUP has found that administrative functions lengthy process can be reduced from days to hours in reviewing, validating invoices, and coordinating with resource managers to mitigate delays in the payment of utilities. Latest follow-up studies identified that a total of \$3,228,600.00 could have been avoided if study recommendations had been implemented. CUP has identified that management methodologies, proper coordination, and timely data input are beneficial and long term preventing unnecessary energy costs.

Utility suppliers offer energy program opportunities for customers as incentives to reduce energy costs. CUP has identified that several installations are already formally and informally participating in demand response programs. The installation curtails its consumption on a self limiting basis or as requested by the utility supplier to allow for grid reliability during peak times, hence, reducing cost and energy consumption. Utility suppliers proposed rate increases impact not only


Acronyms and Abbreviations	
ARLO	Army Regulatory Law Office
CUP	Commercial Utilities Program
HQ IMCOM	Head Quarters Installation Management Command

the Army but surrounding communities as well. HQ IMCOM, CUP, and Army Regulatory Law Office (ARLO) are the Army's fire wall in mitigating significant impacts to electric energy costs.

Utility managers play an important role in taking timely action to notifying the HQ IMCOM CUP POC of upcoming rate increases. Timely notification is critical for the preparation and a successful outcome in rate interventions. The benefits of a successful rate intervention have a long duration and a positive effect to all utility customers. Utility managers are the front line of defense against unnecessary utility costs. Utility managers must ensure the timely implementation of electric study recommendations, ensure that administrative functions are efficient, that utility bills are thoroughly reviewed, and that involvement with utility suppliers is as frequent as possible to better understand rate applications and improve customer supplier relationships.

Energy Managers and Utility Sales Officers are encouraged to contact your HQ IMCOM POC, Ernesto Ortiz, for coordinating installation utility studies and questions regarding CUP ongoing support and initiatives.

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Ernesto Ortiz is the Commercial Utilities Program Manager in the Energy and Utilities Division, HQ IMCOM. 



## USACE Galveston District Implements Energy Efficient Measures to Reduce Costs

by Sandra Arnold

While all new permanent facilities constructed by the U.S. Army Corps of Engineers Galveston District require Leadership in Energy and Environment Design (LEED) Silver certification standards to be incorporated into design plans, existing buildings do not – which often creates challenges in meeting sustainability and energy efficient goals for those districts that maintain aging infrastructure such as the Galveston District’s Jadwin Building.

“Achieving energy efficiency is an integral step toward achieving sustainability in facilities as it not only helps control rising energy costs but it reduces environmental footprints,” said Joe King, chief of the Engineering Branch. “The Jadwin Building, constructed in 1992, was built using materials that weren’t energy efficient. What we’re doing now is identifying the most effective solutions and measures we can take to help reduce energy costs and we’ve made a lot of progress over the last 24 months.”

Analyzing the building’s existing energy usage during a 2012 energy audit, King

implemented 12 out of 16 energy-savings recommendations including replacing boilers and insulation as well as negotiating utility rates.

“We’re operating in an environment of limited resources,” said King. “Sustainability is about using the resources we have at our disposal in the most efficient manner possible while balancing the organization’s needs for the future. There were four other identified solutions that we chose not to implement due to the life cycle/cost payback ratio or because they were not compatible with our systems.”

While King acknowledges that there is still work to be done, he says these combined investments in energy-saving measures will save approximately \$113,000 taxpayer dollars annually.

“Using a baseline of energy consumption averaged during 2008-2011, we saw an energy intensity reduction of 24.6 percent in 2013 and anticipate meeting the 30 percent reduction metric this year,” said King. “We’ll continue to seek cost-effective measures to reduce our energy consumption, maximize our sustainability

### Acronyms and Abbreviations

LEED	Leadership in Energy and Environment Design
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efforts and will remain committed to being good environmental stewards.”

Whether it be renovating older facilities to bring them up to current standards or building new, the district continues to implement innovative sustainable building practices to deliver quality projects for our nation and Armed Forces.

The USACE Galveston District was established in 1880 as the first engineer district in Texas to oversee river and harbor improvements. The district is directly responsible for maintaining more than 1,000 miles of channel, including 250 miles of deep draft and 750 miles of shallow draft as well as the Colorado River Locks and Brazos River Floodgates.

Learn more about the USACE sustainability/energy initiatives at [http://www.usace.army.mil/Portals/2/docs/Sustainability/Scorecard/OMB\\_Scorecard\\_2014\\_USACE.pdf](http://www.usace.army.mil/Portals/2/docs/Sustainability/Scorecard/OMB_Scorecard_2014_USACE.pdf).

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Sandra Arnold, APR+M, is the chief of Public Affairs at the U.S. Army Corps of Engineers Galveston District. 



Jadwin Building

### From the editor

Please note we are reducing the number of printed copies of the Public Works Digest once again. If the number you receive does not meet your requirements, please contact me at editor.pwdigest@usace.army.mil Thank you.

Kathye Gerrity-Milibrum  
Managing Editor



## Cost-Estimation Tool for Low-Impact Development Stormwater Best Management Practices

by Muhammad Sharif and Harold Balbach

Low impact development is an approach to managing stormwater runoff by retaining the water onsite to the degree possible. The effect is to greatly reduce the outflow of water which must be managed by receiving drainageways, and to allow as much as possible to infiltrate the soil close to the site. The principles of LID have been known for more than 20 years, but implementation has been rather slow in many sectors, including within the Army. A major reason has often been the lack of ability to prepare acceptable cost analyses to compare LID projects with conventional stormwater management techniques.

Section 438 of the Energy Independence and Security Act required that LID practices be applied to all new federally funded construction projects for which the footprint exceeded 5,000 square feet. This requirement greatly increased the need for a methodology to prepare these cost analyses. In response to these

needs, the U.S. Environmental Protection Agency and the Water Environment Research Foundation have developed a spreadsheet tool to prepare cost analyses for many of the most common LID practices. Public Works Technical Bulletin 200-1-135, Cost-Estimation Tool for Low-Impact Development Stormwater Best Management Practices, available at [http://www.wbdg.org/ccb/ARMYCOE/PWTB/pwtb\\_200\\_1\\_135.pdf](http://www.wbdg.org/ccb/ARMYCOE/PWTB/pwtb_200_1_135.pdf) provides guidance on how to apply the estimating tool to provide reliable cost comparisons for installation of different LID projects at Army installations.

Much progress has been made in areas of LID research and policy development within the Department of Defense and the Army. The Army has established policy on LID and sustainability practices, including a requirement that LID and associated costs be documented with a form DD 1391 for all projects beginning in fiscal year 2013. There are related concerns that LID

Acronyms and Abbreviations	
EISA	Energy Independence and Security Act
EPA	US Environmental Protection Agency
LID	Low Impact Development
PWTB	Public Works Technical Bulletin
WERF	Water Environment Research Foundation

practices may require both higher capital and operation and maintenance costs than conventional systems. While initial costs may be higher for some LID practices than their respective conventional controls, what remains uncertain is the magnitude of these differences and the key life-cycle factors that affect both conventional and LID costs.

The EPA-WERF tool is a series of spreadsheets which do not generally require special approval to be used on Army computer systems. They are available as a no-fee download for federal agencies after registration at the WERF website: <http://www.werf.org/bmpcost>. Each spreadsheet estimates capital costs, as well as operation and maintenance costs, to provide the user a whole-life cost estimate for a selected LID facility. The line item engineer's estimate allows the user to customize the project. For example, users may also select a level of maintenance appropriate for their project. The "Cost Summary" page summarizes annual costs for routine maintenance, corrective or infrequent maintenance, and capital costs. From this summary, the model builds a 50-year lifetime cost estimate. It is designed to produce a default planning-level cost estimate while allowing the user to enter a more specific cost value for every component where it is known. Advanced users may use this function to compare two separate sets of design options or system characteristics. Using the cost tool will result in consistent cost data so that users can determine the cost of each component of the LID project, both for materials

### Design & Maintenance Options

WATERSHED CHARACTERISTICS	Unit	Model Default	User	Chosen option
Drainage Area (DA)	ac	50.00	50.00	50.00
Drainage Area Impervious Cover (IC)*	pct	40%		40%
Watershed Land Use Type ("R"-Residential; "C"-Commercial; "Ro"-Roads; "I"-Industrial)		R		R

FACILITY STORAGE VOLUME	Unit	Model Default	User	Chosen Option
Water Quality Volume (WQV)*	ft <sup>3</sup>	90,750		90,750
Permanent Pool Volume as Ratio of Water Quality Volume**	ratio	1.00		1.00
Permanent Pool Volume	ft <sup>3</sup>	90,750	90,750	90,750
Flood Detention/Attenuation Volume	ft <sup>3</sup>			0
Channel Protection/Erosion Control Volume***	ft <sup>3</sup>			0
Other Volume (e.g., Recharge Volume)	ft <sup>3</sup>			0
TOTAL FACILITY STORAGE VOLUME	ft <sup>3</sup>		90,750	90,750

DESIGN & MAINTENANCE OPTIONS	Unit	Model Default	User	Chosen Option
Choose Level of Maintenance ("H"=high; "M"=medium; "L"=low)	-	M		M
Forebay Size (Pct. of Total Pool) [Enter 0% if no forebay or if not maintained separately from main pool]*	pct	0%		0%
Forebay Volume	yd <sup>3</sup>	0		0
Main Pool Volume	yd <sup>3</sup>	3,361		3,361
Pct. Full when sediment removed from Forebay/Main Pool**	pct	25%		25%
Quantity of Sediment Removed from Forebay	yd <sup>3</sup>	0		0
Quantity of Sediment Removed from Main Pool	yd <sup>3</sup>	840		840

Spreadsheet example for a Retention Pond



# Challenges Presented in Managing Tank Trails: Bulletin Provides Guidance

by Muhammad Sharif and Harold Balbach

For tracked vehicles, tank trails provide critical access to firing ranges and training areas that support military training missions. However, they present severe management challenges. Degraded and gullied tank trails may present formidable problems with troop safety, vehicle downtime, fugitive dust, surface erosion, and sediment discharge into downstream woodlands and surface waters. Public Works Technical Bulletin 200-1-124, Environmental Considerations of Stabilizing Treatments for Tank Trails, available at [http://www.wbdg.org/ccb/ARMYCOE/PWTB/pwtb\\_200\\_1\\_124.pdf](http://www.wbdg.org/ccb/ARMYCOE/PWTB/pwtb_200_1_124.pdf) answers some of the many questions about trail maintenance concerns and mitigation of environmental problems resulting from poor trail management.

Currently no Army policy specifically directs management of tank trails. However, there is Army guidance closely



Example of grid filled with high quality material, in this case crushed rock, which will support heavy loads and allow drainage. (Presto Geosystems)

related to the subject. PWTB 200-1-124 follows guidelines specified in Technical Manual 5-626 “Unsurfaced Road Maintenance Management”, TM 5-822-12 “Design of Aggregate Surfaced Roads and Airfields”, and TM 5-822-5 “Pavement Design for Roads, Streets, Walks, and Open Surfaces.” Another recent PWTB, 200-1-117, “Mitigation of Environmental Impacts from Unsurfaced Roads,” provides both general guidance and examples of specific techniques to minimize soil loss and the resultant impacts to water bodies on an installation. The basic principles suggested for unpaved roads apply here as well. It does not, however, directly address the severe conditions found on tank trails.

Tracked vehicles are an integral part of most Army installations’ training missions. Their weight and the action of the tracks cause severe damage to paved roads, so an alternate network of improved, but unpaved trails is constructed for access to firing points and training areas. Over the years, many installations have found that it is not adequate in the long run to simply dozer out a route across the landscape. The trails require continual repair and regrading, and are sometimes impassable and unsafe. In the absence of specific guidance as to how to build and maintain trails, a wide variety of ad-hoc responses have been used. Is there any experience or technology which could help training area and public works road maintenance planners to create a reliable trail system?

The basic principles of roadway

(continued from previous page)

and for planning and design. In addition to cost estimates, design concepts are presented in each model and this feature provides factors to consider during planning stages of an LID project. The consistent format allows a better understanding of the benefits of LID

use and better decision-making for LID applications.

The appendices in the PWTB summarize LID background and benefits, explain different cost-estimation tools, and present practical guidelines for using this suite of cost-estimation spreadsheets.

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Acronyms and Abbreviations	
ERDC	Engineer Research and Development Center
GEOGRID™	Trade name of a brand of supporting soil grid used in the Fort Bragg study.
PWTB	Public Works Technical Bulletin

engineering apply to tank trails. Among these are the necessity of creating a sound base layer before placing pavement, and assuring that surface and groundwater are carried away. Paved or unpaved, these rules still need to be followed. The photo shows an example of poor grading practices, where the accumulated soil mounds will not allow water to drain from the surface of the trail.

More than 15 years ago, Fort Bragg, North Carolina, undertook a then-experimental rebuilding of an important tank trail. In addition to implementing better practices in grading the surfaces, several sections of the trail were improved through placement of a GeoGrid™ subsurface support system. Originally developed by pavement engineers from the Engineer Research and Development Center in Vicksburg, Mississippi, variations of this system have been used in many places around the world where a trafficable surface is needed, and pavement is not an alternative.

More than 10 years after the Fort Bragg improvements had been installed, the results were reviewed. In the places where high-quality material, such as

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# CERL Helps National Cemetery Achieve National Register Status

by Dana Finney

On April 11, Arlington National Cemetery (ANC) was listed on the National Register of Historic Places (NRHP) thanks to meticulous work by cultural resources experts at the Construction Engineering Research Laboratory. Adam Smith, Megan Tooker, and Dr. Susan Ensore prepared the nomination which was signed by Mr. Hershell (Hew) E. Wolfe, Deputy Assistant Secretary of the Army (Environment, Safety & Occupational Health) and Army Federal Preservation Officer in February 2014. The work was funded by the cemetery through the Norfolk District.

The NHRP is the official list of the Nation's historic places worthy of preservation. Authorized by the National Historic Preservation Act of 1966, the National Park Service's NHRP is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archeological resources.

Given the cemetery's wide recognition as a national treasure, it could be asked why ANC is just now being entered on the NRHP. The answer may be in the complexity of documenting the wide range of historic features – everything from landscape topography and roadways,



*Arlington conducts multiple funerals and burials each day including such traditions as a riderless horse. (ERDC)*

to structures such as monuments, to buildings such as the Memorial Amphitheater, to the symmetrical layout of headstones. More than 400,000 service men and women, 4,000 former slaves, and


5,000 unknowns are interred at ANC. Among other notable features are the Kennedy gravesite, Arlington Memorial Bridge, Tomb of the Unknowns, the Memorial Amphitheater, graves of people such as Robert Todd Lincoln and William Howard Taft, and many others

*(continued from previous page)*

crushed rock, was available to fill the grids, virtually no degradation of the surface was found, even where it was clear that tracked vehicles were making locked track turns. Coarse sand is also suitable if other fills are not available. It is best, however, not to fill with organic soil or topsoil from the site. This will not support the weight of the tracked vehicles, and will deform relatively rapidly. The appendices in the PWTB describe the tank trail study in detail,

and include a bibliography and contract design specifications for the trail improvement.

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“When we evaluate properties for listing on NRHP, usually they only involve one or two main focus areas,” said Ensore. “But Arlington has multiple features that required assessment for their significance. It includes properties defined in the five major categories of NHRP – buildings, historic districts, objects, sites, and structures.”

ANC is located on a large portion of what previously was the estate of Mary Custis Lee (great granddaughter of



# Fort Benning is not Parking on Advancing Sustainable Design

by Mark Fincher and Tannis Danley

**P**residential Executive Orders 13423 (2007) and 13514 (2009) mandate sustainability and energy reduction construction requirements across the Federal Government. In FY08, the Army adopted the Leadership in Energy and Environmental Design (LEED) building criteria on all new construction and renovation projects. The LEED rating system is a point-based rating tool that uses objective, measureable criteria to promote energy conservation, water efficiency, and environmental and occupant deference to both indoor and outdoor materials and design. The designer or construction/renovation contractor must earn a specified number of credits/points in order to comply with federal requirements and achieve LEED certification. In accordance with United States Army Corp of Engineers (USACE) LEED Implementation Policy and the USACE Center of Standards

Guide, the construction process requires LEED point accumulation.

Assistant Secretary of the Army Katherine Hammack's Sustainable Design and Development Policy update, dated 27 October 2010, requires all FY13 and later military construction projects achieve LEED Silver or higher certification. The levels in ascending order are Silver, Gold, and Platinum. Since FY08, Fort Benning has actively pursued achieving FY 13 Assistant Secretary of the Army (Installations, Energy and Environment) LEED certification guidance. Over 50 Fort Benning facilities have received Silver certifications using the LEED point system.

The Low Emitting and Fuel Efficient Vehicle and Car/Van Pool preferred parking LEED point criterion was used in numerous projects. Preferred parking spaces are those closest to a project's

Acronyms and Abbreviations	
DD	Department of Defense form
FY	Fiscal Year
LEED	Leadership in Energy and Environmental Design
MCoE	Maneuver Center of Excellence
USACE	United States Army Corp of Engineers

main entrance exclusive of handicapped designated spaces. Low-emitting and fuel-efficient vehicles are those classified as Zero Emission Vehicles by the California Air Resources Board or that have achieved an American Council for an Energy Efficient Economy annual vehicle rating guide minimum green score of 40. A car pool is two or more vehicle drivers who, at least 60 percent of the time (12 days per month), take turns driving while the others are passengers thereby limiting vehicle miles on one or more vehicles. A vanpool is six or more persons who limit vehicle miles by traveling together ➤

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Martha Washington) and her husband, Gen. Robert E. Lee., Mary lived at Arlington House for 30 years. The Union Army occupied the mansion during the Civil War and, in 1864, the government turned the property into a national military cemetery, with Pvt. William Henry Christman the first Soldier to be buried at the site.

According to Smith, "As a cemetery landscape, ANC is one of the country's preeminent examples of picturesque design with its curving streets affording views of the cemetery, Arlington House, and the capital city across the Potomac."

In the evaluations of ANC's property, Smith, Tooker, and Ensore identified 63 "contributing" features that would meet criteria for registration on NRHP. Whether or not the feature meets these

criteria depends on determination of the historical significance of ANC in terms of historical trends, important individuals, and design attributes of cemetery elements.


Cultural Resource Manager Rebecca Stevens, AIA, stated: "I am thrilled with CERL's high level of professionalism in researching, analyzing, and writing the nomination for ANC's inclusion on the National Register. The team's product is a useful tool now and for the future management of the cemetery. CERL helped us achieve a milestone goal of getting the cemetery formally recognized as a special place in American history and to the American people."

One of the little known facts about ANC is that a Supreme Court ruling in 1882 could have resulted in the exhumation of 17,000 graves. More than a decade after Lee's death, the Supreme

Court ruled that the U.S. government had seized his estate without due process and ordered it returned to his family in the same condition as when it was illegally confiscated. If followed, the ruling could have required the exhumation of all of Arlington's dead, but instead Lee's son officially sold the property to Congress for \$150,000 in 1883.

Listing on the NHRP will ensure that the national cemetery is preserved for all future generations of Americans. To see the complete nomination, go to <http://www.cr.nps.gov/nr/feature/places/14000146.htm>

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to and from work in a shared van. Both these vehicle categories can earn a point toward LEED certification. This cost effective point credit requires that designated parking spaces be no less than 5 percent of the total available spaces. Post wide there are over 600 LEED designated parking spaces.

Since there is no statutory requirement to observe the preferred parking, our Chief of Staff established a policy that enforces preferred parking thereby ensuring this measure's cost effectiveness. The preferred parking designated spaces are intended to encourage multiple occupant vehicles, reduce installation vehicle congestion and reduce the installation's carbon footprint. Designated

signage is, by far, one of the most economical LEED points to achieve.

The Garrison Commander determines which preferred parking spaces are authorized pursuant to MCoE Regulation 210-5, Garrison Regulation, and MCoE Regulation 190-5, Fort Benning Motor Vehicle Regulation. The DPW Environmental Division issues carpool, vanpool, and low emission vehicle preferred parking decals to authorized individuals. Preferred parking authorization decal and tag applications are located on the Fort Benning website at: <http://www.benning.army.mil/garrison/sustainability/>. The US Auto Council Guide annually publishes the American Council for Energy Efficient Economy's designated low-emission and fuel-efficient


vehicle list.

The Fort Benning Public Affairs Office conducted an extensive publicity campaign before preferred parking policy implementation. The policy was published weekly in the Benning Bulletin, the The Bayonet (post newspaper) on two occasions, and on the Fort Benning website. The policy memorandum was also staffed with installation units/activities, and while there were over 30 responses, none were non-concurrences.

The Military Police began enforcing the preferred parking policy on 12 November 2012. Vehicles were cited if they did not have the appropriate decal visibly displayed while parked in a Low Emitting and High Efficiency and Car and Van pooling space. Policy offenders receive a DD Form 1408 Armed Forces Traffic Ticket. If the individual becomes a repeat offender, the Provost Marshal Office can tow the vehicle after three occurrences within six months. We have not seen any abuses once the individuals understand the motivation behind the policy and procedure.

Currently, not all leaders fully understand the LEED/Net zero philosophy. This gap may partly be explained because it is not directly in their area of responsibility. We believe that issuing the policy, along with continued publicity and outreach; will help educate our Soldiers on the Army's Net-zero philosophy and sustainability and resource efficiency commitment.

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*Samples of car and vanpool decals*



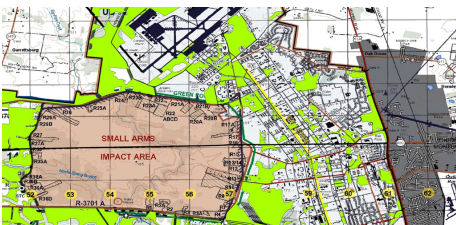
# Planning for Renewable Energies on Installations - Utilizing GIS Technology for Renewable Energy Planning

by James Russ and Nicole Sikula

The U.S. Army Environmental Command (USAEC) provides geospatial services for a variety of operations and organizations throughout the Army. Among those are the geospatial analyses and customized mapping support that USAEC contributes to the Energy Initiatives Task Force's (EITF) effort to meet its goal of 25 percent of all energy consumed on Army installations to be from renewable energy sources by 2025.

The Office of the Assistant Secretary of the Army for Installations, Energy and Environment requested USAEC geospatial services to support EITF in identifying Army lands that may be available for the renewable energy projects. USAEC developed a "clear parcels" methodology that analyzed installation geospatial data nationwide. The goal of the analysis was to identify areas on installations that were both suitable for renewable energy projects and that were not excluded due to a variety of mission-related factors. The factors chosen were partially determined by the availability of geospatial data for installations that is maintained in Army Mapper, the Army's official geospatial database of record, and the relevance of the factor in eliminating sites from consideration.

Fort Campbell, Kentucky was one of many installations that USAEC analyzed for "clear parcels." The factors used in the first stage of the "clear parcels" analysis were:



Map from the Sustainable Range Program was used to determine training exclusion areas

Training Exclusion – firing ranges, drop zones, impact areas, UXO areas, etc.

Wetlands and Water Exclusion – surface water area, wetlands, streams, etc.

Protected Lands Exclusion – federal lands, easements, land restriction areas, etc.

Roads Exclusion – a buffered distance around all roads, railroads and tank trails

Existing Structures Exclusion – existing structures, open storage areas, golf courses, etc.

T&E Exclusion – threatened and endangered species management areas, critical habitat, etc.

Cultural Resource Exclusion – areas restricted due to the existence of cultural/historic resources

At the end of the first stage of the analysis, all excluded areas were merged together into a single layer and overlaid on aerial imagery for quality control. Visible areas of structures, roads, and surface water not already removed from consideration were manually edited to eliminate them from the study. In some instances, especially those where little geospatial data was available from the installation, a map from the Sustainable Range Program (SRP) was georeferenced and used to determine training exclusion areas on the installation.

Topography plays an important role in determining suitability for construction projects; thus, the second stage of the analysis involved a collection of 10 meter digital elevation models obtained from the U.S. Geological Survey (USGS) to determine the percentage of slope, or change in elevation over a specified distance, and eliminating those areas greater than 20 percent slope from consideration.

The final output from the "clear parcels" analysis was used in custom maps created

Acronyms and Abbreviations	
EITF	Energy Initiatives Task Force
GIS	Geographic Information Systems
SRP	Sustainable Range Program
T&E	Threatened and Endangered
USAEC	U.S. Army Environmental Command
USGS	U.S. Geological Survey
UXO	Unexploded Ordnance

for EITF personnel to develop a general understanding of the areas potentially available for renewable energy projects. The accuracy of the final output was strongly influenced by the amount and quality of data available in Army Mapper. After the geospatial analysis was conducted, each collection of clear parcels was assigned a qualitative uncertainty level based on the installation's data layers that were available in Army Mapper.

Regardless of the uncertainty, the analyses proved useful in providing a starting point for discussions between EITF personnel and installation subject matter experts. Those discussions were further enhanced by continued mapping support from USAEC when additional or updated data were provided by installation staff. This large scale geospatial analysis may be the first of its kind to illustrate the utility of Army Mapper in linking Army installations with headquarters requirements for more detailed site analyses. The same kind of large scale analysis can be used in the future for similar projects, reducing costs and saving time while providing reasonably accurate and timely information to decision makers.

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# HQ IMCOM Energy Awareness and Conservation Assessments

by Ralph Totorica

Each year, the Headquarters, Installation Management Command (IMCOM), centrally funds energy awareness and conservation assessments at IMCOM installations. The assessments help IMCOM garrisons identify no-cost and low-cost energy savings opportunities and provide energy conservation awareness training for the garrison leadership and community. The intent is to capture quick wins through energy savings opportunities that the garrison can execute immediately with little to no investment costs.

The assessment is a valuable tool available to garrisons to evaluate their current energy consumption patterns and increase energy awareness throughout the installation community. In addition, the

assessments assist garrisons with meeting the requirement to perform energy audits on 25 percent of covered facilities each year. HQ IMCOM conducts these assessments at each IMCOM garrison on a four-year rotating cycle.

The assessment consists of a one-week site visit by a representative from IMCOM and an energy consultant under contract for technical support. The week starts with introductory meetings with the Garrison Commander and DPW. Following discussion with the installation energy manager to discuss objectives and expectations, the contractor reviews utility cost and consumption data and identifies buildings to be surveyed in coordination with the energy manager. The contractor then conducts four days of building

Acronyms and Abbreviations	
DPW	Directorate of Public Works
HQ	Headquarters
IMCOM	Installation Management Command
O&M	Operations and Maintenance


surveys, including a night assessment, looking for energy saving opportunities with a focus on low-cost measures and O&M improvements that can be easily implemented with in-house resources.

Following the building surveys, the contractor prepares site-specific presentations with details of the surveys and presents observations at training sessions for building energy monitors, commanders and staff, and DPW personnel. A good turnout from the installation community at the presentations is key to success of the effort.

In addition to identifying specific energy conservation measures, the assessment also offers a great opportunity for the energy manager to increase energy awareness through their Public Affairs Office. The energy awareness and conservation assessment concludes with an out-brief to the Garrison Commander and Directors.

The assessments are conducted at no cost to the installation; however, the host installation must provide support to escort the contractor and provide access to facilities to be surveyed. To obtain additional information or to request an energy awareness and conservation assessment for your installation please contact the author.

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A common example of energy waste found during an assessment is inner and outer vestibule doors propped open.



## The Army Civilian Competency Management Enterprise

by Lerone Brown

The Army's Competency Management Enterprise is a paradigm shift in how the Army recruits, hires, and develops its Civilian workforce. The driving force behind this change is the 2010 National Defense Authorization Act (NDAA). The Act requires the Department of Defense (DOD) to develop and implement a Strategic Workforce Plan (SWP), that outlines the deliberate initiatives taken to close the Federal Civilian workforce's strategic competency and skill gaps. The Army revamped its Campaign Plan because of the SWP. The Campaign Plan describes the Army's long-term investment in the Civilian Corps and commitment to developing and acquiring Civilian employees to meet the future needs of the Army. The Army's Competency Management Enterprise qualifies as an initiative to the Army's part of DOD's SWP.

So, what is the Army's Competency Management Enterprise? It is a platform that uses a competency-based lifecycle management model to support the Army's professional Civilian human capital talent workforce management plan by getting

the right people, in the right positions, at the right time.

In the past decade, civilians' roles have changed significantly in the technical, professional and leadership roles. Historically, development of Army civilians was not viewed in an integrated or enterprise manner.

The Army's competency-based lifecycle management model is used to close the strategic competency and skill gaps in the Army's Civilian Workforce of over 300,000 employees. Under this model all Army Civilian employees will be aligned in one of the Army's 31 Career Programs. To meet the 2010 NDAA and DOD's SWP requirement, the Army has implemented a dual plan of "processes and systems."

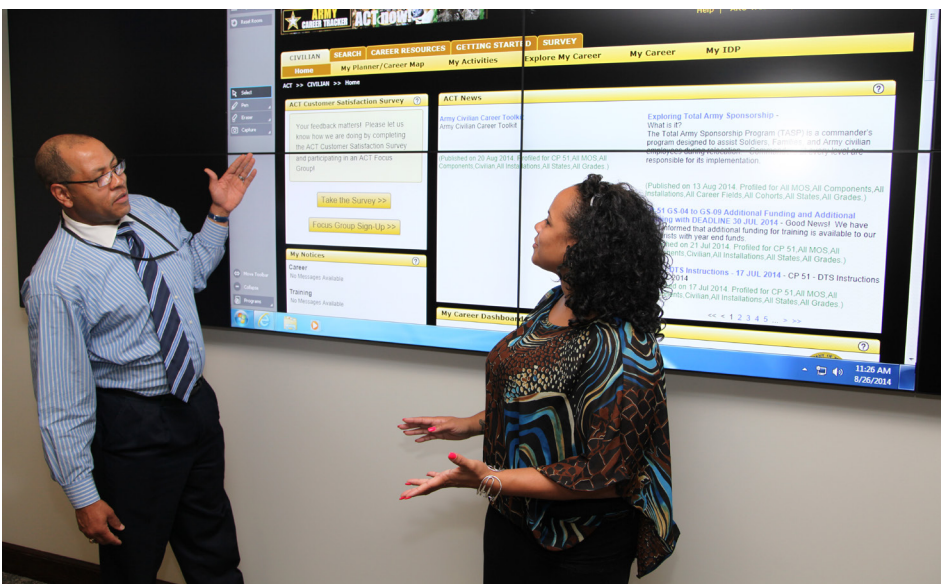
The main pillars of the Army's competency-based lifecycle dual plan is the Civilian Competency-based Development System (CCDS), the Army Civilian Training Education Development System (ACTEDS) as described in AR 690-950, Civilian Personnel Career Management (which is currently under revision), the Army Career Tracker, the

Acronyms and Abbreviations	
ACT	Army Career Tracker
ACTEDS	Army Career Training Education and Development System
AR	Army Regulation
CCDS	Civilian Competency Development System
CSM	Competency Management System
CP	Career Program
DOD	Department of Defense
FCR	Functional Chief Representative
FOC	Full Operating Capacity
IDP	Individual Development Plan
IOC	Initial Operating Capacity
MCO	Mission Critical Occupation
NDAA	National Defense Authorization Act
SF	Standard Form
SWP	Strategic Work-force Plan

GoArmyED on-line system, and the Army Career Program (CP) pronopency offices. These pillars are design to educate, train, cultivate and support the management of all Army Civilian Human Capital Talent that ensures a deliberate planned succession of the Army's Civilian positions.

The CCDS is the Army's foundational system for deriving competency-based training requirements, competency-driven career planning, and employee development plans. The employees and their supervisors will use CCDS to complete competency gap assessments for the employee's career Individual Development Plan (IDP) and identify proposals to reduce the competency gaps for their position.

The Army Civilian Training Education and Development System (ACTEDS) is a requirements-based system that ensures planned development of civilians through a blending of progressive and sequential work assignments, formal training, educational courses and self-development for individuals as they progress from entry level to key positions. The Master Training Plan and Master Intern



Lerone Brown is answering questions from Beverly Dickens about the Army Career Tracker (Moore)



Training Plan are part of ACTEDS and are further described in AR 690-950. ACTEDS also includes information about the Senior Enterprise Talent Management and the Talent Management processes.

The Army Career Tracker (ACT) is a leader development tool that integrates training, education and experiential learning into one personalized and easy-to-use interface. ACT provides users with what Army Career Program they are assigned to; a more efficient and effective way to monitor their career development while allowing leaders to track, manage and advise subordinates on their career development. GoArmyEd is the one-stop location to request training, source it, and manage the education, training, and professional development for Army civilians using the Standard Form (SF) 182s.

The Army Career Program Proponency Offices executes the Enterprise solutions as directed by the Army's Occupational Field Functional Chief Representative (s) (FCRs). This includes but, is not limited to, developing and implementing strategies to address the identified Civilian workforce skill and competency gaps, and establishing lines of effort (to include business cases) in reducing and closing competency gaps. Annually communicating with commands/installations about their requirements, surveying program careerists by assessing functional skill and career map issues, and workforce trends that negatively impact the life-cycle management readiness of civilians in their occupational field in support of Army missions are also strategies used.


As Army's Competency Management

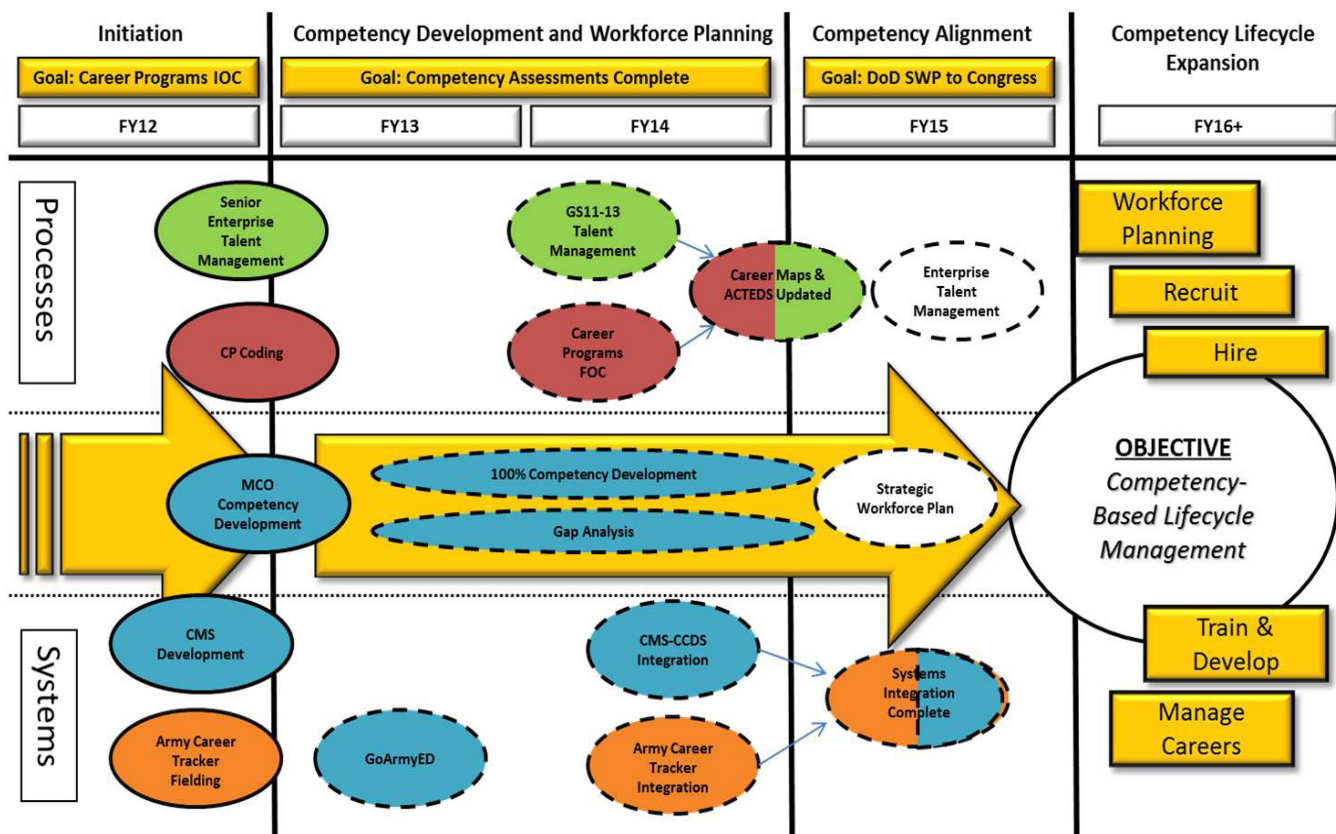
Enterprise continues to march forward and evolve, the leadership and technology enterprise solutions will enable each Army Civilian to have an active input in forging competency self-development which directly supports the Life-cycle career management of all Army civilians to meet the Army's future mission requirements.

References:

1. US Army Civilian Career Management Dictionary of Terms (Version 1.0 March 2014)
2. US Army Functional Chief Representative and Career Program Offices Competency Reference Guide (Draft Version 3.0 March 2014)
3. Assistant Secretary of the Army (Manpower and Reserve Affairs) memorandum 21 Apr 2011.

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The Army's Processes and Systems Competency Lifecycle Management

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