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A fuel tanker is cleaned at Fort Hood's Purge Facility, a closed loop system that uses recycled water to clean fuel tanks, one of the many successful pollution prevention projects that helped Fort Hood win two Army and two Department of Defense environmental awards. Photo by Christine Luciano. Pages 16-17

This Issue:
Environment and Sustainability

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Will we sustain our sustainability journey?

by Gregory G. Bean

Most Soldiers aren't old enough to remember that training was almost halted at Fort Bragg, N.C., in 1990 when the U.S. Fish and Wildlife Service issued a jeopardy biological opinion on the protection of the red-cockaded woodpecker. Some were not even born when the infamous white bands were painted on the longleaf pine trees in the training areas. These same Soldiers grew up recycling and turning off the water when brushing their teeth.

Today's private first class was in grade school when leaders at Fort Bragg worried that environmental concerns could directly impact our ability to train and deploy forces. He or she may have been learning to ride a bike when we were learning about a new way of thinking called "sustainability." When we signed a pledge with the local community to operate in a manner today that will not compromise the ability of future generations to live, work and train on Fort Bragg, we were thinking of that PFC and his or her future Family.

And while that Soldier-to-be was graduating high school, we were celebrating the recovery of the same bird that once threatened to end training at the center of the military universe. Those same concepts that changed the fate of a species were applied to everything we do — how we handle waste, how we use resources like water and energy, how and what we procure, and the way we design, build and maintain facilities.

That PFC entered the Army when its Net Zero Program was standard operating procedure. Blue bins for recycling were in every office, and lights in hallways were turned off on peak energy days. The sustainability culture was ingrained in garrison operations the same way that the ethos was developed in today's young Soldiers. It's inextricably linked to our shared Army values.

We developed the Green Boot program to formalize directorate, tenant and unit commitment to sustainability goals. We

Gregory G. Bean
Photo courtesy of Fort Bragg

encouraged our staff to become Leadership in Energy and Environmental Design-accredited professionals. We expanded our Qualified Recycling Program from a shoestring budget to nearly $2 million a year. Our First Sergeant's Barracks Program conducted preventive maintenance to protect our multi-billion dollar investment in new facilities, ensuring our facilities will operate efficiently for years to come and improving the quality of life for Soldiers. We invested heavily in energy conservation and retro-commissioning projects to realize energy savings. And our Environmental Program led the region and the Army in sustainability.

Our concerns for building sustainability ethos haven't materialized to the extent we thought we'd encounter, because our new Soldiers and Family members already understand the value of sustainability and bring process improvements and suggestions for greening our operations.

What we didn't plan for was how to say no; how to explain why we are making decisions that run contrary to what we planned and preached for decades; and why we are breaking our promises and our commitment to the community.

As we prepare for the upcoming U.S. Forces Command and Installation Management Command rehearsal of concept, or ROC, drill, I am concerned about the Army's commitment to sustainability as we strive to reduce the size and cost of Army garrisons. Despite dramatic increases in both real property and supported population, our fiscal 2013 table of distribution and allowances and program budget guidance reflect devastating decreases. Immediate impacts and casualties to our integrated sustainability program include the FSBP, resource and building energy managers, recycling, forestry, environmental and natural resource law enforcement, and preventative maintenance, as well as our Green Boot and other sustainable outreach programs.

Acronyms and Abbreviations	
DPW	Directorate of Public Works
FSBP	First Sergeants Barracks Program
PFC	private first class

Today's Soldier knows that it's more economical and more sustainable to conduct preventive maintenance and keep a facility running in peak condition. Retirees and Civilians at Fort Bragg expect to see the smoke of controlled burns that protect our endangered species. Family members that arrive on post ask for their recycle bins and actively participate in household hazardous waste drives.

We've convinced our community that sustainable decisions are better for the quadruple bottom line: mission, community, economics and environment. The PFC that grew up while we were learning these same lessons arrived on post more savvy on environmental issues than we could ever imagine. Why aren't we celebrating the full integration of sustainability ethos in our community? We are exactly where we planned to be, but we are finding ourselves going backwards … one cut at a time.

Our fear now is the same as it was when that PFC was born: Will we be able to make decisions that will allow future generations to live, work and train on Fort Bragg? How long will it be before we are repainting the white bands on trees or conducting rolling blackouts? ➤

Achieving energy independence through sustainable design, construction

by Col. Jeff Hall

Environmental sustainability is not new to the U.S. Army Corps of Engineers; it forms a part of everything we do from improving navigation and supplying hydropower to constructing facilities for Soldiers, Airmen and their Families. Recently, the Army and the Department of Defense have become heavily involved in reducing energy consumption and finding renewable and alternative forms of energy.

As a key player in this effort, the Corps' Savannah District partners with other federal entities in search of innovative ways to help conserve energy, optimize efficiencies and make the best use of the nation's clean energy resources and innovations. Federal legislation drives many of these actions. Laws such as the Energy Policy Act of 2005 and the Energy Independence and Security Act of 2007 set minimum, escalating standards for reducing fossil fuels across the nation.

Through the Southeast Energy Initiative, a partnership we've forged with the Department of Energy, the Savannah River National Laboratory and other federal entities, we are proactively addressing ways to deliver renewable energies such as biomass, solar and waste-to-energy generation at the best value. The partnership aims to attract private industry development of these technologies on federal land with federal customers.

EISA requirements particularly impact the Military Construction arena where the Corps is making great strides. As the design and construction agent for the Army, the Corps builds efficient and sustainable facilities to meet future missions and support Soldiers and Families.

Col. Jeff Hall
Photo coutesy of Savannah District

One way we accomplish this is through centers of standardization. The Savannah District is one of the largest COS districts in the Corps. We develop and maintain design standards for facilities such as brigade and battalion headquarters, company operations, and command and control facilities, to name a few. These centers allow us to develop working designs that maximize energy efficiencies in a building's mechanical and electrical systems, eliminate gaps in insulation and increase the building's thermal barrier, making the building envelope air tight.

Base Realignment and Closure provided an unprecedented opportunity to implement some of our processes. From fiscal years 2006 to 2011, the Savannah District constructed 60 projects valued at $1.8 billion. All of these projects were constructed using eco-friendly practices and met the minimum criteria of Leadership in Energy and Environmental Design Silver, as mandated by the Army in 2008.

One very notable renewable energy BRAC project is the $302 million combined headquarters for the U.S. Army Forces Command and U.S. Army Reserve Command at Fort Bragg, N.C. The 631,000-square-foot facility was designed and constructed with sustainability in mind. The building's air distribution system was installed under raised floors to improve ventilation efficiency, reduce energy use and increase comfort by allowing occupants to control air flow. The raised floor also allows for flexibility for reconfiguring walls.

Acronyms and Abbreviations	
BRAC	Base Realignment and Closure
COS	Center of Standardization
EISA	Energy Independence and Security Act

In general, we incorporate recycled building materials, such as wood doors, carpet and wall tiles, recycled structural steel and metal roofing into our projects. In addition, local suppliers provide most of the building materials, which reduces the amount of energy used to transport them.

Another project, the $2.6 million Fort Bragg Community Emergency Services Station, includes features such as low-flow water fixtures and a catchment system to collect rainwater for washing fire engines and flushing toilets, reducing potable water consumption by 83 percent. The facility also includes a solar water heater to offset at least 7.5 percent of total building energy costs, high-efficiency heat pumps, occupancy light sensors and an energy-efficient roof.

Facilities at Fort Bragg and other military installations are also being constructed with future flexibility and growth in mind. In the long run, this saves money and valuable resources.

Projects such as these will have a lasting impact on the environment, reduce facility life-cycle costs and will help us accomplish our ultimate goal of energy independence.

Col. Jeff Hall is the commander, Savannah District, U.S. Army Corps of Engineers.

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We've made great strides over the last 10 years to operationalize sustainability. Our successes laid the groundwork for the Army to seek net-zero energy, water and waste. The DPW community is committed to continuing that journey, but to do so, the Army must recognize that investments in sustainability are essential to achieving the resource savings the Army and the nation require.

Gregory G. Bean, PE, is the director of Public Works, Fort Bragg, N.C.

Fort Bragg's sustainability journey

by Jonelle Kimbrough

More than a decade ago, Fort Bragg, N.C., faced environmental challenges that threatened to compromise its military mission. These challenges included incompatible growth that constrained training exercises, aging infrastructure and a failure to comply with increasingly stringent federal environmental policies. To address these issues, Fort Bragg became the first Army installation to incorporate sustainable concepts into comprehensive strategic planning. Ten years later, Fort Bragg has become, and will continue to be, a template for operational sustainability

Fort Bragg's sustainability program evolved cyclically. At the 2001 Environmental Sustainability Executive Conference, installation and community leaders identified environmental concerns and created goals, which they defined in the *Fort Bragg Strategic Sustainability Plan.*

The Fort Bragg sustainability program was eventually integrated into the garrison strategic plan. In 2006, the garrison command adopted an integrated, cross-functional approach to strategic goals that would require a unified effort and investment by garrison leaders and the Fort Bragg population. Garrison Goal One is a sustainable community meeting the needs of the Soldier today, tomorrow and forever.

"A program once billed as 'environmental' is now fully integrated across the installation," explained garrison commander Col. Stephen Sicinski. "Conservation is the responsibility of everyone who lives and works on Fort Bragg. Our directorates are actively engaged, and our Civilian employees have voluntarily supported the cause and have entrenched these practices in their work places. Our Soldiers are increasingly aware of the holistic approach required to sustain Fort Bragg and our mission."

Acronyms and Abbreviations	
FY	fiscal year
LEED	Leadership in Energy and Environmental Design
QRP	Qualified Recycling Program

Fort Bragg's environmental program served as the basis for the *Army Strategy for the Environment* and set the standard for Army sustainability values in the Installation Management Command Campaign Plan, the *Department of Defense Strategic Sustainability Performance Plan and the Army Sustainability Campaign Plan.*

Fort Bragg applies these concepts to installation operations to meet federal, state and Army objectives, including executive orders and the Army's net-zero initiative. Sustainability is functionally incorporated into garrison directorates in land use, materials, utilities, transportation and facilities.

Land use initiatives create and enhance sustainable training lands and urban areas to ensure military readiness and promote compatible growth in Fort Bragg's surrounding communities. These initiatives include land reclamation, sustainable landscaping and urban forestry.

Among the many successes, the Installation Restoration Program returned 650 acres to the real property inventory by identifying landfills that required "no further action." Through the Integrated Training Area Management program, 34 acres of training lands were restored when Fort Bragg identified excess firebreaks and trails to be naturalized and rehabilitated. Perhaps the most important land reclamation success occurred when Fort Bragg eased or eliminated training restrictions upon the recovery of the endangered red cockaded woodpecker.

The sustainable **materials** programs strive to achieve net-zero waste through the acquisition and management of commodities that, throughout their life cycles, create no additional waste and require no resources for their disposal. These targets are met through sustainable procurement, municipal solid waste diversion, construction and demolition diversion, the Recycling Incentives Program and the Qualified Recycling Program.

Restriction signs like this one are now all but obsolete on Fort Bragg due to the endangered red cockaded woodpecker recovery efforts that resulted in eased training limitations in the woodpecker's habitat. Photo courtesy of Public Affairs, Fort Bragg

The QRP, a major accomplishment, reclaims materials from the solid waste stream, sells these materials as commodities and retains the revenues for reinvestment in the installation. Since 2008, the QRP has funded numerous projects on Fort Bragg. QRP revenues in fiscal 2011 reached $2 million.

Sustainable **utilities** are also integral to the environmental program. Fort Bragg strives to achieve net-zero energy by reducing consumption and improving efficiency through efforts such as the utility monitoring and control system, metering, central energy plants, thermal energy storage, retro-commissioning, renewable energy and an assertive energy conservation campaign.

In FY 2011, the energy team executed $45 million in projects. Based on a 2003 standard, Fort Bragg's energy consumption in FY 2011 decreased by 23.25 percent. In addition, Fort Bragg manages and maintains water on the installation with conservation practices, low-impact development techniques, storm-water management technologies and water ➤

Planning for energy and water savings – together

by Elisabeth Jenicek

Army installations can save water and energy, and make the best use of limited manpower, by planning for energy and water savings together.

Water efficiency projects typically do not garner favorable payback periods, because water is priced based on the cost to extract without considering scarcity or supply-demand dynamics. Prioritizing projects that save both energy and water is a win-win situation; one project supports two programs, and greater resource savings leads to a shorter project payback. Furthermore, reducing water and energy supports greenhouse gas planning. Additional savings are often possible through reduced operations and maintenance costs.

Water use in the energy cycle

Water is required for the extraction, transformation and delivery of energy. Some of water's energy-related end uses include pumping crude oil, removing exhaust gas pollutants, generating steam, flushing away the combustion residue of fossil fuels and thermoelectric cooling.

Not all of the water extracted for energy is consumed. In the United States, about 3 percent of thermoelectric cooling water is consumptive, that is, lost to evaporation or leakage. However, large quantities of cooling water are required for conventional electricity generation. Simply reducing electrical energy consumption saves water.

Water is also required for many renewable energy technologies. Hydropower, biofuel feedstock, biofuel production, geothermal power and concentrating solar power demand water. Some concentrating solar power plants consume more water per unit of electricity than the average coal plant. Even photovoltaics require some amount of water to clean solar cells. Installations planning to adopt renewable energy technologies should investigate the full resource burden of each technology before choosing the best option for their region.

Acronyms and Abbreviations	
FEMP	Federal Energy Management Program

The potential for water loss in central energy plants and equipment is enormous. Leakage in energy systems occurs via steam, hot water and chilled water systems. Sources of loss include leakage, evaporation, blowdown and make-up water. This water is invariably energy intensive due to embedded chemical treatment, heating and pumping energy.

Installations can reduce central plant water demands by maintaining aggressive water chemistry and leak detection programs. Monitoring water through submeters is a surefire method for identifying loss.

Several of the best management practices developed by the Department of Energy's Federal Energy Management Program after Executive Order 13423 was signed provide water savings in energy systems. These include:

- #3 Distribution System Audits, ➤

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quality regulation. The installation's water use declined from about 155 million gallons per month in FY 2009 to 135 million gallons per month in FY 2011.

Sustainable **transportation** endeavors provide seamless transition among multiple modes of travel and further support the net-zero initiative. The alternative fueling station, alternative fuel vehicles, proposed pedestrian corridors and bicycle routes, and the sustainable shuttle mass transit system reduce emissions and dependence on petroleum. For example, the shuttle fleet's hybrid buses reduce petroleum use by 66 percent and carbon dioxide emissions by 13.32 pounds per gallon when compared to traditional buses.

Sustainable **facilities** incorporate many objectives, including native plantings, recycling programs, storm-water reuse, renewable energy technologies and alternative transportation. These features contribute to Fort Bragg successes in Leadership in Energy and Environmental Design. In fact, all Military Construction as of FY 2010 has met or exceeded the LEED Silver standard.

To achieve its environmental objectives, Fort Bragg must also create a **culture** that fosters a sustainable lifestyle to enhance the quality of life on the installation. A consistent media presence, community events, educational opportunities and partnerships are vital components of a sustainable culture.

Sustainable Fort Bragg outreach programs include National Public Lands Day, America Recycles Day, Arbor Day and Earth Day. The Green Boot Program empowers the workforce to identify opportunities to conserve resources and incorporate conservation practices into daily operations.

Sustainable Fort Bragg will continue to apply its principles to secure the viability of the military objectives and maintain a functional post for future generations of warfighters, a Civilian support force and their Families.

"Through the inevitable trials, our commitment to become a sustainable community has not wavered," said Sicinski. "By integrating sustainability into strategic plans, Fort Bragg has successfully combined the mission focus, resource stewardship, sound economic principles and quality of life to achieve the intent of the Army Triple Bottom of mission, community and environment — the right way, the green way, all the way."

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- #8 Boiler/Steam Systems,
- #9 Single-Pass Cooling Equipment, and
- #10 Cooling Tower Management.

Cooling tower make-up water is one of the highest demands in many Army buildings. Water is lost to evaporation and blowdown, a process used to control the concentration of dissolved solids.

The need for make-up water can be reduced by reducing or eliminating drift, monitoring and controlling blowdown, using alternate water sources such as rainwater or condensate from air handling units for make-up water and by verifying operation of floats and valves. For example, a project that captures air handling unit condensate for reuse in adjacent cooling towers at the Environmental Protection Agency Science and Ecosystem Support Division in Athens, Ga., reported a payback of less than six years.

Energy use in the water cycle

Energy is required throughout the water cycle, from extraction and conveyance to treatment and distribution. Installations can affect the amount of embedded energy in source water — and also the cost of that water — by selecting water sources that use less energy.

Groundwater is typically 30 percent more energy intensive than surface water, and desalinated water can be seven times more energy intensive than groundwater. This variable is unique to each water source and depends in part on the water type, the distance the water is conveyed and the water quality. Pumping efficiencies and system losses are additional factors.

Both water treatment and wastewater treatment have a wide range of energy intensities. Energy demand for drinking and wastewater services is estimated at 3 to 4 percent of national energy use although energy demands of individual systems vary by location. For wastewater treatment the main variables are treatment plant size and treatment process. Advanced wastewater treatment systems are more energy intensive, while larger plants use less electricity per gallon of treated effluent. Optimizing equipment and operations can provide significant energy reductions.

About 80 percent of the energy in water is embedded by the end user. This percentage includes energy to heat, cool, pressurize or purify water. Army installations have the most potential to reduce embedded energy in the end uses of water. Residential water uses carry a range of energy intensities. The intensity varies with the percentage of hot water used and the efficiency and cost of the heating source.

FEMP best management practices that provide energy savings in water systems include:

- #7 Faucets and Showerheads,
- #11 Commercial Kitchen Equipment,
- #12 Laboratory/Medical Equipment, and
- #14 Alternate Water Sources.

Water Awareness Programs, best management practice #2, are effective for reducing wasted water in all categories, from "household" uses to operations and maintenance actions.

Estimated Hot Water Requirements and Energy Intensity of Residential End Use

Water Use Category	Hot Water	Energy Intensity (kWh/MG)
Bath	78.2%	159,215
Clothes Washers	27.8%	56,600
Dishwasher	100%	203,600
Faucet	72.7%	148,017
Leaks	26.8%	54,565
Shower	73.1%	148,832
Toilet	0%	0
Landscape Irrigation	0%	0

The energy intensity of residential end uses documented by the River Network includes many that take place on Army installations in nonresidential buildings. Graphic by River Network

The energy-water nexus draws attention to the lasting negative effects of designing systems in stovepipes. Optimizing energy and water systems and components is the only way to achieve net-zero installations.

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Environmental practitioners wanted

by Candice Walters

As a slightly different twist on the old "U.S. Army Wants You" poster, it's now the U.S. Army Corps of Engineers Environmental Community of Practice that is looking for "new recruits," specifically from Army installations and the National Guard.

This "recruiting campaign" is focusing on sharing information, lessons learned, building skills and competencies, and on developing best practices within the Army's environmental community. It's an effort to build upon the communities of practice concept the Corps of Engineers initiated for its employees more than a decade ago.

What is a CoP? One definition can be found in Army Regulation 25-1:

"… a group of people who regularly interact to collectively learn, solve problems, build skills and competencies, and develop best practices around a shared concern, goal, mission, set of problems, or work practice. CoPs cut across formal organizational structures and increase individual and organizational agility and responsiveness by enabling faster learning, problem solving, and competence building; greater reach to expertise across the force; and quicker development and diffusion of best practices. CoP structures range from informal to formal and may also be referred to as structured professional forums, knowledge networks, or collaborative environments."

This graphic symbolizes the USACE ECoP, which is widening its membership by reaching out to all Army environmental practitioners. Graphic by Amy Sue Bunting, Headquarters USACE

The CoP concept breaks down the traditional "stovepipe" structure. And one way to cut across stovepipes is to have people share information and best practices across the entire Army, USACE senior leaders said.

"In this time of constrained resources, we need to pull together as an Army community to come up with shared solutions," said Robert Slockbower, director of Military Programs. "Opening up our ECoP beyond our traditional USACE members will facilitate greater knowledge transfer among our Army partners and leverage the best expertise wherever it resides across the enterprise."

The ECoP is open to anyone interested in USACE environmental activities, including those outside USACE who can access the ECoP portal on Engineering Knowledge Online using their common access cards or their Army Knowledge Online passwords.

"The key is that the ECoP provides a forum for its members to talk with one another, build better communication bridges both internally and externally, access environmental lessons learned, share successes and learn about the smart ideas that others are already implementing," said Christine Godfrey, deputy chief, USACE Environmental Division.

Through the ECoP, members can learn more about specific focus areas, such as sustainability, environmental awards, environmental competency and career paths, training, webinars, regional workshops and community-based conferences.

The biggest value, Godfrey said, comes from sharing lessons learned from the general environmental areas of interest — climate change, sustainability, energy and waste efficiency, Leadership in Energy and Environmental Design, green remediation — that cross functional areas and are applicable to all areas within USACE and the Army as a whole.

Acronyms and Abbreviations	
CoP	community of practice
ECoP	Environmental Community of Practice
EKO	Engineering Knowledge Online
USACE	U.S. Army Corps of Engineers

CoPs exist in every organization with passion, commitment and identification to the chosen knowledge area serving as the glue that holds them together.

The Army's broad environmental mission makes imperative the need to rely more on one another to ensure consistency and be able to take advantage of innovation in one program or project and quickly institute it in other programs or projects — better synchronization and communication, USACE leaders said.

"[The ECoP is] a resource for anyone inside or outside the Army family and anywhere environmental solutions are sought," Godfrey said. "We have resident expertise where we can leverage skills and core competencies of the USACE team worldwide to enable institutions and organizations to succeed in executing their mission, whether that is to provide realistic training, enable quality installations or support our warfighters in the field."

The ECoP encourages focused environmental communities with ties to specific areas of interest, such as abandoned mine lands, water quality and water control management, military munitions support services and environmental compliance and cleanup, just to name a few.

"All Army environmental practitioners are invited to join so we can expand our Environmental Community of Practice to truly reflect the environmental work being done throughout the Army," Godfrey said.

For more information on the ECoP or to sign up as a member, access the ECoP portal on EKO at *https://eko.usace.army.mil/usacecop/environmental/*. Click on "My Page" in the banner just below the EKO logo and from the menu, choose "My Subscriptions." ➤

U.S., German reps meet to discuss sustainability challenges

by Carol E. Davis

The U.S. Army Corps of Engineers' Europe District and Landesbetrieb Liegenschafts– und Baubetreuung Neiderlassung Landau, a German construction ministry that oversees all construction in Germany, co-hosted representatives from the German state and federal ministries and various regional German construction offices at a Feb. 22-23 partnering workshop in Bad Dürkheim.

The annual workshop is an opportunity to cultivate partnerships with the *bauamts,* which are German construction firms, introduce new district and ministry employees and honor those retiring. This year, the workshop addressed the issues of sustainability and energy conservation.

During a breakout session, 16 U.S. and *bauamt* representatives gathered to discuss everything green from contracting for an expert in Leadership in Energy and Environment Design to finding common solutions for U.S. LEED standards and German energy standards.

Rich Gifaldi, a Europe District sustainability engineering manager, said the breakout session gave participants an opportunity to share new LEED requirements and to discuss challenges, concerns and fears about using the rating system. Until recently, a majority of the German effort was focused on the energy savings portion of a project. The construction market is starting to recognize the value of a green building certification, whether it is LEED or one of the other rating standards.

"They [German *bauamts*] are a lot like us when it comes to construction," Gifaldi said. "They are recognizing the value of sustainability and taking into account other factors like indoor air quality, sourcing of materials and building methods of the projects."

Matthias Stöhr, a Landesbetrieb Liegenschafts– und Baubetreuung Kaiserslautern program manager, said his company is just starting to use the LEED process, but there are challenges.

"Sustainability is more and more playing an important role in the design and construction process," Stöhr said. "However, there are different national approaches to the issue."

Rich Gifaldi (upper left) facilitates the sustainability breakout session during the U.S. and German partnering workshop. Photo by John Rice, USACE

He attended the breakout session to get input on the LEED process.

"Since this is the first time we are using LEED, everything is relatively new to us," Stöhr said. "It was very important for me to listen to the experiences of others but also to make suggestions and give ideas."

In some of its current projects, the company is trying to achieve higher sustainability using the LEED certification process, he said, but the problem is that LEED is based on U.S. regulations and models that are not part of the German design and building process.

Acronyms and Abbreviations	
LEED	Leadership in Energy and Environmental Design
USACE	U.S. Army Corps of Engineers

"Our biggest challenge is actually two-fold," Stöhr said. "First, how can we integrate the LEED requirements into the heavily regulated German design and building process? Second, how to create a contract which resembles the LEED process and is in accordance with German contract law."

One solution discussed is to hire a LEED consultant who understands American and German standards and could guide the design team and the contractor through the LEED process, letting each know if pieces are missing, Gifaldi explained. Then, a project could incorporate the German standards and the American standards without being over designed.

"In the past we've had projects where we tried combining the two and designing to both standards," Gifaldi said. "The result was a project that was over designed and really expensive. So, we're trying to find solutions that eliminate cost and still meet all of our sustainability requirements."

It was not expected that all the challenges would be solved during the workshop, Stöhr said. The most important part was the opportunity to understand each other's possibilities and limitations.

"Sometimes the German-U.S. cooperation is still marked by some form of 'cultural clash,'" Stöhr said. "But, it's important to keep in mind, there are good people working on each side of the table trying their best. After all, our projects' foundations are the people working on them."

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Installation Management Command net-zero waste initiative

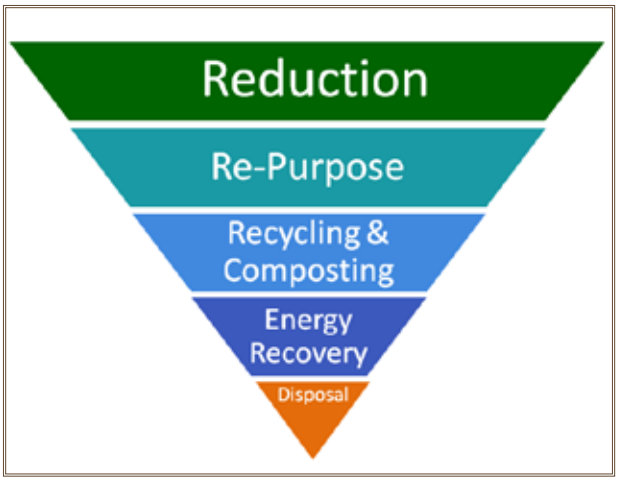
by Michael Andres

A net-zero waste installation is an installation that reduces, reuses and recovers waste streams, converting them to resource values with zero landfill over the course of a year. Net-zero waste is about establishing goals and setting processes to change how resources are used and preventing waste from being produced in the first place.

The net-zero waste vision is becoming the norm. While some claim it to be an unachievable target, the reality of net-zero waste exists in everything used or consumed. Although one contractor by itself may not be able to eliminate waste, with planning and coordination, its waste can be used by another contractor.

Net-zero waste hierarchy

The net-zero waste hierarchy is an upside down pyramid. The widest part, at the top, represents the most substantial and environmentally friendly options, like reducing the amount of packaging materials and reusing the materials. The tapering lower part illustrates that other options should follow in order of diminishing importance, like waste incineration. The idea is to do more at the top of the pyramid.



Net-zero hierarchy
Graphic courtesy of Ali Achmar

Army approach

The Army net-zero approach comprises five interrelated steps:

- reduction,
- repurposing,
- recycling and composting,
- energy recovery, and
- disposal.

Each step is a link toward achieving net-zero waste. Reduction, or waste prevention, involves altering the design, manufacture or use of products and materials to reduce the amount and toxicity of what gets thrown away. Practices such as two-sided paper copying and reducing packaging will yield substantial benefits.

Repurposing diverts waste to secondary use with limited processes. It is about figuring out how to use what is available to fulfill what is needed now.

Recycling diverts items such as paper, glass, plastic and metals from the waste stream. These materials are sorted, collected and processed and then manufactured, sold and bought as new products. Composting is the decomposition of organic waste such as food scraps and yard trimmings with a micro-organism that produces a soil-like substance.

Energy recovery occurs from converting unusable waste into energy.

Disposal is the final step and the last resort after all other waste mitigation strategies have been fully exercised.

Net-zero waste and sustainability

Resource availability is at the center of sustainability issues. Using resources and not losing them from the system starts with product design. Whether the product will be used for construction or for office work, it is important to buy products designed to minimize waste, and the byproduct or waste must be properly managed. A material that normally goes to the landfill can be turned into a usable product.

Recycling is an important step in sustainability; however its impact on the growing trend of waste generation is slowly decreasing. Priorities should be concentrated on areas with the greatest need and potential to achieve effective improvement in the management of solid waste.

A substantial change to how Army installation managers think about resources and waste is needed with emphasis placed on the entire life cycle. This cultural shift will require behavior changes on everyone's part.

The net-zero waste initiative can have a large impact on sustainability, and, if properly applied, it will make a substantial contribution toward resolving several environmental problems. Thinking of things thrown away as valuable resources instead of waste and recycling only the viable materials that cannot be reused are the ways to start changing our waste culture. Landfills will be required for several more years, but now is the time to prepare for and aggressively accelerate the closure of Army-owned landfills so that those sites that remain will become mainly repositories for inert materials.

The current fiscal reality will impact the funds available for these initiatives. However, now is the time to improve processes, make current practices more efficient and tap the resources that are being offered by other federal and state agencies and within the surrounding communities.

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Army investigating microgrids, thermal clustering

by James P. Miller

Achieving the Army's energy security and net-zero goals will require multiple, complex strategies that will need to be integrated with the overall installation net-zero goals, which include water and waste. Microgrids and thermal clustering offer two opportunities for installations to maximize energy security and move toward net-zero energy.

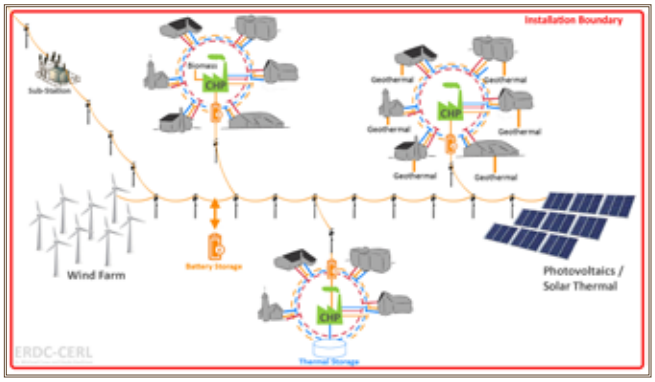
At the request of the assistant secretary of the Army for installations, energy and environment, the U.S. Army Engineer Research and Development Center is evaluating potential use of these strategies at nine net-zero pilot installations. The Army's charge is to assure energy security and reach its goal of achieving net-zero energy installations by 2020.

With respect to energy security, the objective is to ensure that Army installations will be able to sustain mission-critical operations in the event of any contingency for up to six months. For net-zero energy, the goal is to enable Army installations to produce as much energy on site as they consume.

These two goals are extremely ambitious and technically challenging. In some ways, they are synergistic, and in others, they may actually be competitive.

For example, achieving energy security for critical operations requires that electricity, water, sanitation and other needed utility supports be available under any possible scenarios. Currently, many critical functions at Army installations have dedicated emergency diesel, natural gas or propane-powered generators in place to support those functions in case of utility power outages. Dedicated emergency generators are often oversized and typically operate at very low efficiencies. They also give installation commanders little flexibility to reprioritize delivery of electrical power to other functions in response to changing mission requirements.

Integrating these emergency generation assets into an on-post microgrid would potentially allow the installation to sustain critical operations in an "island mode," independent of the local electric utility grid for longer periods with greater reliability and increased flexibility for commanders to prioritize which loads to support.



A conceptual system architecture is designed to meet both energy security and net-zero energy goals.Graphic by Construction Engineering Research Laboratory

Many Army posts use central utility plants to generate and distribute thermal energy to loads throughout the installation. In recent years, many have migrated away from central thermal utility systems toward decentralized thermal utility support. This approach avoids the high costs of upgrading or replacing aging central heating and cooling plants and distribution systems and improves energy efficiency compared to the older, inefficient central systems being replaced. However, it also increases maintenance requirements and, over the equipment lifetime, usually increases overall costs. Decentralized thermal systems may also make it more difficult to move installations toward net-zero energy.

To achieve net-zero energy, installations will need to integrate renewable energy sources into their energy supply portfolio. It is more practical and cost-effective to incorporate renewable energy sources — e.g., photovoltaics, solar thermal, wind energy, biomass — en masse at a central plant than to attempt to add renewable sources on a facility-by-facility basis. Centralized renewable energy systems can take advantage of economies of scale and are expected to be more cost effective to operate and maintain than distributed renewable energy systems.

Both energy security and net-zero energy objectives benefit from maximizing the energy efficiency of the supported loads. Minimizing electrical and thermal loads to their lowest practical levels by incorporating all cost-effective energy conservation measures into Army facilities and processes makes it easier and less costly to reach both energy security and net-zero energy goals. Fewer renewable energy resources will be required to satisfy the utility support demands of highly efficient facilities and processes. Reduced utility support requirements of mission-critical operations result in an ability to improve energy security for longer periods at lower cost.

The nine sites being investigated for opportunities to implement microgrids and thermal clustering are: Fort Carson, Colo.; Kwajalein Atoll, Marshall Islands; Fort Detrick, Md.; U.S. Military Academy at West Point, N.Y.; Oregon National Guard; Sierra Army Depot, Calif.; Fort Hunter Liggett, Calif.; Fort Bliss, Texas; and Parks Reserve Forces Training Area, Calif.

Site visits are being conducted to these installations to identify critical operations, existing emergency generation assets and opportunities for thermal clustering. A report documenting the results of this study is planned for September.

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Army showcases environmental awards

by Cathy Kropp

The Secretary of the Army's nine *Environmental Awards* winners for 2011 are presented in this Public Works Digest section. These Army awardees went on to compete with the other military services' honorees in the *Secretary of Defense Environmental Awards* Program.

The Army captured five of the nine *Secretary of Defense Environmental* Awards for 2012. **Fort Hood**, Texas, won both the installation and team categories for Environmental Quality; **Scranton Army Ammunition Plant**, Pa., won the industrial installation Sustainability award; the **Oahu Army Natural Resource Team** from U.S. Army Garrison Hawaii won the team award for Natural Resources Conservation; and the **Stryker Brigade Combat Team**, based in Warren, Mich., won the team award for Environmental Excellence in Weapon System Acquisition.

The competition recognizes individuals, teams and installations for outstanding achievements in conserving and sustaining the natural and cultural resources of the Department of Defense. Winners will receive their awards at a Pentagon ceremony in June.

Cathy Kropp is an environmental public affairs specialist, U.S. Army Environmental Command.

Environmental Restoration – Installation

Fort Stewart-Hunter Airfield uses teamwork to expedite restoration

by Kristina Curley

When duty calls, the Immediate Ready Company Soldiers of Fort Stewart, Ga.'s 3rd Infantry Division can deploy from Hunter Army Airfield within 22 hours to any area of the globe. The brigade combat team can do the same within 72 hours. Fort Stewart and Hunter Army Airfield together form the Army's premier training and power projection platform on the Atlantic Coast, and restoration challenges need careful handling to ensure they don't interfere with rapid capabilities.

"Because our Soldiers need to be ready at a moment's notice, we need to make sure the areas where they train also are readily available," said Tressa Rutland, FS-HAAF prevention and compliance chief. "Our goal has been to work with regulators and the community to quickly identify and implement remediation solutions and prevent any interference with the training mission."

Soil contaminated by an underground storage tank is removed during construction of a tactical equipment shop and parking area as part of remediation efforts that also required treatment of the groundwater. Photos courtesy of FS-HAAF

The FS-HAAF Directorate of Public Works' Environmental Division found one sure way of achieving its restoration goals: teamwork. Environmental Division staff members formed an alliance with the Environmental Protection Agency Region IV and the Georgia Environmental Protection Division through participation in quarterly Tier I and II meetings.

Acronyms and Abbreviations	
DPW	Directorate of Public Works
FS-HAAF	Fort Stewart-Hunter Army Airfield
FY	fiscal year

At Tier I meetings, attendees discussed changing technologies and possible expedited remedial activities on both installations. These meetings determined which courses of actions were working and which actions needed fine-tuning.

Tier II meetings provided brief summaries of cleanup activities and discussions of impasses affecting work on other Department of Defense installations. Installation participants collaborated on solutions with representatives from EPA, the Army and other services, the U.S. Army Environmental Command and the U.S. Army Corps of Engineers.

"Being able to discuss items at ➤

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these meetings that could have delayed remediation and get solutions during the planning stages has helped us complete our restoration efforts on schedule," Algeana Stevenson, Restoration Section leader said.

The majority of the Installation Restoration Program's 127 identified sites needed cleanup due to motor pool fueling operations. After accelerating investigations and taking corrective actions, the installation now has only 16 remaining sites. Of those, 11 are "response complete," and five have remedial actions in progress.

FS-HAAF also identified 11 transferred or transferrable ranges eligible as Military Munitions Response sites. Between 2007 and 2010, FS-HAAF performed site inspections to determine if the sites contained any munitions or explosive constituents of concern. The historical records review identified 516.5 acres requiring field sampling. After site inspection, only 111.5 acres were determined to require further investigation. This determination returned 405 acres to usable real property and reduced remediation from a projected $17 million to $4 million. Similar investigative actions in the cantonment area returned 2,614 acres to usable real property.

FS-HAAF's Installation Restoration Program met Defense Environmental Restoration Program requirements to ensure remedies are in place for medium-risk sites as of fiscal 2011, and low-risk sites will be started by the end of FY 2014.

Throughout these efforts, the Environmental Division ensured the remediation alternatives would cause minimal disruption to training and flight operations. Keeping these areas available for the Army mission was and is top priority. Restoration personnel work closely with Base Operations and Range Control to coordinate remediation actions in areas that could impact the mission.

The Environmental Division also works closely with the DPW Base Master Planning Division, assessing future construction projects to strategically plan and incorporate remediation projects.

"Knowing areas designated for construction in advance allows our staff to coordinate with contractors and avoid delays in current remedial actions or future Military Construction projects," Thomas Fry, Environmental Division chief, said. "Having construction and remediation conducted congruently assures we will achieve both our restoration and training missions."

Eosine, fluorescein and rhodamine solutions are injected from 21,000-gallon tanks into the deeper zone of a trichloroethylene plume to trace the dispersion radius during a corrective actions feasibility study at Fort Stewart.

Using innovative technology and serving as a test site for technology demonstrations also reduces cleanup time and leverages limited resources, according to Fry. Techniques piloted at petroleum-contaminated sites rapidly decrease the overall area and concentration of contamination and reduce restoration costs.

Using chemical oxidation for groundwater remediation is another relatively new technology being used at FS-HAAF cleanup sites. The process, which converts hazardous contaminants to nonhazardous or makes them less toxic, is fast and economical. It generally does not require installation of a costly fixed-based remediation system and, unlike biological treatments, does not depend upon viable populations of micro-organisms but on contact between the oxidant and intended contaminant.

"We're also using innovative technology to make the cleanup process more green." Stevenson said. "We've implemented a pilot-scale product recovery treatment system to take petroleum-impacted water used during remediation efforts through a process that allowed what would otherwise have required hazardous waste disposal to be recategorized as nonhazardous."

FS-HAAF environmental restoration success is built on building relationships and working with stakeholders at all levels to best prioritize and plan its program, according to Fry.

"We are restoring and reclaiming Army training lands by continuing to set and follow realistic goals and objectives, encourage pollution prevention, perpetually seek efficient cleanup technologies, share lessons learned and, most importantly, perform risk-based cleanup efforts," Fry said. "Through these efforts we will do our part to support FA-HAAF's readiness mission."

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Environmental Restoration – Individual/Team

Fort AP Hill streamlines return of land to beneficial use

by Kristina Curley

Returning 100 acres to mission-related and recreational use in about half the time usually required for similar restoration projects was a milestone achievement for Fort A.P. Hill's Facility Lead Team.

FAPH was the first Department of Defense and only Army facility to participate in the Environmental Protection Agency's Facility Lead Program, which is designed to streamline and expedite the corrective action process. The installation entered into a facility lead agreement with EPA Region III that allowed FAPH to take the lead on establishing corrective action schedules and activities and use more streamlined methods to investigate 26 sites on the installation, take appropriate actions, including implementation of a final site-wide remedy, and achieve both short-term and long-term objectives more quickly.

"Region III offered the Facility Lead program to a select few facilities by invitation only," said Terry Banks, chief, Environmental and Natural Resources Division, Directorate of Public Works. "Our team worked with EPA to develop an agreed-upon work plan and reporting templates, so we investigated and reported on all sites during a single phase of work. This increased efficiency and saved approximately $1.5 million compared to costs for usual Resource Conservation and Recovery Act Compliance site closeout and will save another $2 million over the next 10 years in long-term management."

The facility lead approach to environmental restoration used a streamlined, tiered-risk screening process to evaluate each of FAPH's sites to determine if there was a risk to human health or the environment. One benefit of this method was quick identification and elimination of sites not requiring further action. The remaining sites were subjected to supplementary screening to identify the need for additional risk assessment or actions. Following this process eliminated time-consuming and costly risk assessments for each site.

Acronyms and Abbreviations	
DPW	Directorate of Public Works
FAPH	Fort A.P. Hill's

A backhoe removes explosives residue, petroleum hydrocarbon contamination and solid waste debris as an interim measure to streamline and accelerate the cleanup process at a Fort A.P. Hill former fire training pit site. Photo courtesy of FAPH

"We used the streamlined risk screening process exclusively at 25 of 26 sites and performed one baseline human health risk assessment for groundwater at the remaining site," said Sergio Sergi, chief, Compliance Branch, Environmental and Natural Resources Division, DPW. "As a result all nonlandfill sites can now be used for mission-related activities."

The facility lead approach supported FAPH's training mission by allowing 10 previously unused wash point facility sites to be used for bivouacking, parking and reverse osmosis drinking water purification training. It also helped identify the previously unknown limits of waste at old landfills, which allowed for optimal use of surrounding areas for training, including the siting of a new forward operating training base and improved use of a former fire training area

The installation is a regional collective training center supporting active and Reserve Army components, joint force, interagency, and federal and local law enforcement training, and it is a regional hub for Army Special Forces training. With an annual throughput in excess of 90,000 personnel, FAPH offers 48,000 acres of maneuver training and a 28,000-acre live-fire range complex with training facilities accommodating combined arms live-fire exercises.

"It feels great to know the teams' successful completion of the Facility Lead Program has benefited that installation," Banks said. "And being recognized by the Secretary of the Army — we have received other recognition for this program, but this is the top environmental award in the Army — it is a true honor."

The FAPH team looks forward to sharing lessons learned, strategies, methods and experiences with others in the Department of Defense.

"We've already shared the program's successful risk-based approach developed for the Facility Lead Program to assess landfills and sites with waste in place with the Radford Army Ammunition Plant, Va.," Banks said. "This resulted in no further action decisions beyond institutional controls for a landfill site and no further action for four other sites with a cost savings of $1 million. We're also sharing our strategies with other restoration managers in the region and through Army Corps of Engineers and U.S. Army Environmental Command, so they can be applied to other environmental restoration programs."

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Cultural Resources Management – Installation

Pennsylvania Guard preserves historic legacies

by Barry R. Napp

Fort Indiantown Gap's stellar Cultural Resources Management program blends architectural and archaeological resources, regulatory and community partnerships, and extensive community outreach to protect precious cultural resources in Pennsylvania.

The only live-fire, maneuver military training facility in the state covers more than 17,000-acres and supports the 56th Stryker Brigade Combat and the 28th Infantry Division, the largest and most deployed units of their kind in the Army and Air Guard.

When cultural resources manager Rita Meneses first arrived 10 years ago to begin balancing cultural resources preservation at Fort Indiantown Gap with its important training mission, she settled in to her new job and started to establish contacts.

"My first priority was to get to know everyone and let them know I was working with them and not against them," Meneses said. "No one knew what a cultural resources manager was or what they did, what the laws were and the trouble our installation could get into if we didn't do the right thing with our precious legacy and resources here at Fort Indiantown Gap. It's worked out well for us."

All of the activities on the installation are designed to enhance the quality of training lands, not only for environmental resources but for Soldier training as well. The CRM program's success is accomplished through proactive and early planning with other installation team members and is fully described in the *Installation Cultural Resource Management Plan.*

The newly restored Area 13 at Fort Indiantown Gap features historic block structures and 21 World War II-era wooden barracks. Photos courtesy of Pennsylvania Army National Guard

National Guard, Army Reserve, active Army, Navy and Marine units, and law enforcement as well as Air Force Guard units swell the number of training lands and facilities users to more than 230,000 each year. More than $150 million in construction has been executed over the past several years, and partnership and coordination with regulators is a key component of the CRM program. Partnerships leverage funding and expertise, expand the program's capacities and have been a great part of the program's success.

The CRM program achieved several milestones over the past two years:

- completion of the historic Range House renovation with donated resources,
- rehabilitation and adaptive reuse of 21 World War II-era barracks,
- renovation and preservation of a monument to Soldiers fallen in Iraq,
- protection of excessed armories,
- support of a large-scale former munitions range remediation,
- development of a regulatory memorandum of agreement guiding conveyance, and
- employment of university student interns.

Fort Indiantown Gap's Range House stands completely renovated at a cost of less than $2,000 thanks to CRM program.

The Pennsylvania Army National Guard's CRM program directly supports its mission by ensuring all projects and training are coordinated and conducted in accordance with applicable laws and regulations, Meneses said. Whether it is site compliance issues or public outreach programs, the team strives to demonstrate environmental stewardship to on- and off-post audiences. Fort Indiantown Gap not only makes history but, at the same time, preserves history every day.

"One of our biggest cultural resources program challenges is ensuring the historical sites, structures and landscapes, and Native American sites are preserved for future generations while reaching a sustainable balance between new missions," said Meneses. "This place is like a Disney World for historians. Not only is the local history interesting, but the military history is phenomenal."

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Acronyms and Abbreviations	
CRM	Cultural Resource Management (program)

Environmental Quality – Team

Fort Hood's recycling successes shine

by Cathy Kropp

At Fort Hood, Texas, recycling is a requirement, not an option, and that attitude helped it win in the 2011 Secretary of the Army *Environmental Awards* Program.

Each year, Fort Hood's Team Recycle establishes goals and objectives to continuously improve its operations, increase the amount of material recycled, seek new opportunities to grow the program and continue public education and outreach events for local communities.

"It is everyone's responsibility to think and act green and make recycling a part of their daily routine," said Jaycee Turnquist, recycle operations manager. "More recyclables means more money for Fort Hood Soldiers and support for Family events, while helping the installation work towards 'Net-Zero Waste 2020.'"

When Fort Hood initiated the program in 1992, it sold 600 tons of recyclable material. During fiscal years 2010 and 2011, the Recycle Center sold more than 17,500 tons of recyclable material, including cardboard, white paper, mixed paper, newspaper, maps, plastic, pallets, toner cartridges, cooking oil, aluminum, brass and scrap metal.

Fort Hood is always looking to expand recycling services and the program through new locations and new products to collect, process and sell. In 2003, Team Recycle took over the on-post collection program previously accomplished through a contract. After the first 90 days, the team increased the amount of material recycled from 350 tons per month to 500 tons per month. The amount of material recycled continues to grow each year.

The team expanded its collection and now receives materials from the city of Killeen's community recycling center and the city of Copperas Cove. It also coordinated with six community post offices to collect undeliverable third-class mail, each averaging about 9,500 pounds per week.

The Central Texas Sustainable Communities Partnership was established in 2009 among Fort Hood and the communities of Killeen, Copperas Cove, Harker Heights and Gatesville. These communities recently initiated a feasibility study for a regional recycling facility to maximize cost sharing and profit sharing.

Fort Hood's Recycle Program is the largest in the Army, and its success was the impetus for that initiative. Fort Hood's program is self-sustaining and supports other community events and pollution prevention projects. The partnership hosted a recycling forum last November to evaluate pay-as-you-throw, single-stream collection and new ways to collect and process recyclable material with Central Texas community members.

Jaycee Turnquist (holding bottle), recycle operations manager, and Rufus Walker (in white cap), assistant recycle manager, brief Soldiers and Civilians about the center's operations. Photo by Christine Luciano

"Our mission is to be good stewards of the environment and increase recycling beyond Fort Hood and off post through outreach and partnerships," Turnquist said. "It's all a part of Team Recycle."

Team Recycle is dedicated to supporting Fort Hood's military mission priorities and preserving natural resources through solid waste management and recycling but has also established other strong relationships outside the installation gates.

When Killeen's Independent School District was experiencing limited recycle service, Fort Hood's Team Recycle stepped in to help. In February 2011, the team and the school district formed a partnership that increased recycling efficiencies for the district and helps give back to the Fort Hood community. This partnership is so successful that it was extended to two middle and seven elementary schools, collecting more than 10 tons of recyclable material last year.

The Fort Hood Team Recycle outreach program includes: Christmas Parade floats made from Recycling Center materials; a secure shredding event for the community; a regular turn-in schedule for household hazardous waste; and annual events for Pollution Prevention Week, America Recycles Day and Earth Fest, an Earth Day event.

The team spreads the word about its programs on post at quarterly Environmental Quality Control Committee meetings, monthly Community Services Council meetings, semiannual Hood Howdy information fairs and monthly newcomer briefings.

Fort Hood's Recycle Program is a cost-efficient, profit-making, self-sustaining program used as a benchmark by others. The team has helped eight other military installations improve their qualified recycling programs, including Fort Bragg and a number of Air Force bases.

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Environmental Quality – Installation

Fort Hood's logo says it all

by Cathy Kropp

A picture of a Soldier holding a scale balancing a Bradley Fighting Vehicle on one side with the Earth on the other portrays the installation's goal to balance mission and environmental requirements. The word "scale" and the explanation beside each letter reminds those who live, work and play on the installation of their responsibilities. Stop pollution. Continue improvements. Assure compliance. Leadership is committed. Everyone is involved.

This logo and slogan isn't just a marketing tool, it's a way of life on Fort Hood, Texas, where everyone has a role in the success of the installation's environmental programs. That success was recognized in the Secretary of the Army's 2011 *Environmental Awards* Program.

"The Environmental Division has many programs that focus on enhancing mission readiness and environmental excellence on the installation," Steve Burrow, chief, Environmental Programs said. "We take advantage of opportunities to educate and engage Soldiers and their Families to take responsibility for improving their community and serving as environmental stewards."

A well-implemented and integrated environmental management system helps Soldiers, Civilians and contractors systematically identify environmental vulnerabilities, document current procedures and identify potential process improvements of benefit to the environment. When Fort Hood was selected as a net-zero waste installation in 2011, it rewrote its EMS objectives to include that initiative. Cross-functional teams were established, and again, the EMS helped manage the changes needed to accomplish the revised goals and objectives.

On an installation that supports almost 400,000 people, it takes everyone's involvement to remain green and sustainable. Environmental successes can be seen throughout the installation.

An area known as the "Environmental Corner" showcases successful pollution prevention projects like the Tanker Purge Facility, which cleans fuel and recycles water, reusing it many times before flushing, filtering and storing it in a holding tank where the oil and water is separated and reused again.

Another Environmental Corner success is the facility that enables easier cleaning of tactical kitchens and prevents more than 1.7 million gallons of polluted water from entering the sanitary sewer.

The final success highlighted in the corner is the jet propellant and antifreeze recycle center, which provides an easily accessible collection point that helps prevent petroleum, oil and lubricant products from entering the environment. It also allows for the reclamation of potable water through a water pretreatment center where three carbon filters remove pollutants in a closed loop tactical vehicle wash facility. Over the last two fiscal years, that center has generated more than $302,000 for the recycling program.

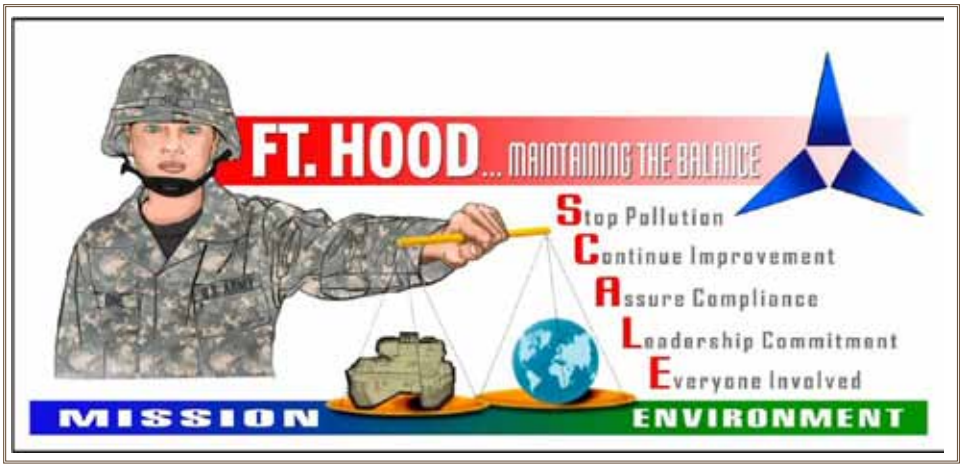
Acronyms and Abbreviations	
EMS	environmental management system

Fort Hood boasts the largest recycle program in the Army, selling more than 17,500 tons of material in the last two fiscal years.

"This honor was a team effort," Burrow said, speaking of the award. "The community works together to ensure environmental stewardship is important at all levels. Soldiers, Civilians, contractors and Families recognize that each of their actions have an impact on the environment."

Technology is leveraged to the fullest on the installation from a utility management control system that reduces energy consumption and increases energy efficiency to solar thermal water heating systems, which reduce the use of fossil fuels. Tried and true practices are used as well, such as employing nonpotable water for golf course irrigation.

All these environmentally preferred practices can be tied back to the words on Fort Hood's logo. Stop pollution. Continue improvements. Assure compliance. Leadership is committed. Everyone is involved. Fort Hood is advancing its goal of balancing the mission and the environment.



Graphic courtesy of Fort Hood

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Natural Resources Conservation – Small Installation

Illinois Guard, partners join forces to save Kickapoo Creek

by Cathy Kropp

Rain, flooding and the resulting erosion caused Kickapoo Creek to redirect itself and impact the land and wildlife around it, but partnerships between the Illinois Army National Guard, the Illinois Environmental Protection Agency and other state departments got the creek back on track for this spring.

The Marseilles Training Area's engineers provided heavy equipment and crews to excavate, haul material and grade along the creek bed. The Illinois EPA and Department of Military Affairs provided funding as did Commonwealth Edison, the local utility company. The Illinois Department of Natural Resources also contributed equipment and crews. The Illinois State Water Survey designed and supervised the installation.

Illinois EPA and DNR wanted to preserve the watershed and control the erosion that could impact the Illinois River's water quality and aquatic habitat. The bank beneath ComEd's electrical tower was in danger of collapse and needed reinforcement.

In addition to reclaiming training lands and eliminating safety concerns, the Illinois Guard looked at this as an opportunity to improve natural resource conservation and provide unique training opportunities for its Soldiers. The project directly addressed two goals in the installation's *Integrated Natural Resource Management Plan:* soil stabilization and erosion control. An additional benefit was improved community relations.

The Marseilles facility is used by the military for training and the DNR for conservation efforts. Because of joint use, everybody looked to the other person to pay the bill, said John Casebeer, chief, Environmental Branch, Illinois Department of Military Affairs.

"We've had some unsuccessful lone initiatives," Casebeer said. "Until we could actually work with the Illinois DNR and bring in the Illinois Water Survey and the Illinois EPA — that's when everybody started working better together."

Acronyms and Abbreviations	
DNR	Department of Natural Resources
ComEd	Commonwealth Edison Company

As part of an aviation training exercise, Illinois Guard Soldiers use helicopters to move concrete beams and place them in the stream. Photo by Jason P. McNamara, Marseilles Training Area

National Guard units that use the Marseilles Training Center developed annual training projects to support the creek reclamation. They constructed vehicle turnarounds; corrected, repaired and minimized erosion; ensured proper drainage to prevent future erosion; and moved concrete beams with aviation assets. Transportation units transported rock and construction material, completing training requirements while supporting the creek reclamation project.

The creek's natural bank height of 8 feet had grown to 30 feet, and its width expanded from 40 feet to 100 feet. The creek's natural high velocity flow increased the washing of soil and sediment downstream, clogging outflow culverts and impacting stream quality and water quality in the Illinois River.

Because of the creek's redirection, a former 50-foot clear water lake in a local quarry was filled in by sediment and was less than 20 feet deep. Though the lake is no longer clear enough to support fish, the hope is that the project will result in a reduced sediment load, and the lake will become clear again in time.

The agreed-upon solution was to construct a series of grade control structures called weirs that mimic natural riffles and small pools to slow the water and minimize the slope. Additional benefits provided by the structures include increased habitat, increased aquatic food supply that support fish and birds, and water aeration.

To construct the weirs, 17,000 tons of rock were required. The Illinois Guard had stockpiled concrete debris from other construction and demolition activities and reused it for this project. A local company also donated excess concrete material. Embankments were armored and reinforced to save training land from the creek's flow.

The Marseilles Training Area environmental office engages fully with the facilities, engineering, range and training staffs. This connection ensures its natural resource conservations projects are integrated into the broader installation plans and helps ensure needed support is available.

The Kickapoo Creek restoration project is a good example of creating win-win opportunities while balancing training and environmental requirements.

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Natural Resources Conservation – Team

Garrison Hawaii conserves resources while balancing mission prep

by Barry R. Napp

Change is a fact of life for the U.S. Army. Budget constraints, ongoing conflicts and the environmental challenge of protecting threatened and endangered plants and animals all jeopardize Soldiers' training opportunities. But on Oahu, even when confronted with those budget challenges, balancing and maintaining training with the island's natural beauty proved to be no match for the U.S. Army Garrison Hawaii's Natural Resources Team members.

Their hard work and resulting success recently earned the Schofield Barracks-based natural resource program one of the Army's most prestigious honors.

"Recognition by the secretary of the Army as having one of the finest natural resource programs in the Army is a public testament to the commitment, professionalism and dedication of the Natural Resource staff of U.S. Army Garrison Hawaii," said Col. Douglas Mulbury, commander, U.S. Army Garrison Hawaii. "Their work allows the Army to continue to train here and prepare for any contingency our nation requires of its Soldiers."

Engaging both internal and external partners was paramount to the Army's continuing to train and prepare for a variety of missions on Oahu, according to Michelle L. Mansker, NRT chief, Environmental Division, Directorate of Public Works,

Whether leading volunteers on a tour of facilities, monitoring the health of an endangered plant in a remote native forest of the Waianae Mountains or rappelling down Ohikilolo Ridge to check the endangered cliff-dwelling plants of Makua Valley, the staff did what was needed to preserve Hawaii's beautiful resources.

"This Natural Resource Program and our team could not have achieved success on their own," said Mansker. "It was imperative that we all work together with other land managers to conserve Hawaii's unique resources and species, because they are so rare and restricted in range."

With an annual budget of about $6 million, the Oahu NRT manages more than 60 federally listed species that inhabit more than 50,000 acres. That land includes six Army training ranges and enables roughly 20,000 Army, Air Force, Navy, Marine, National Guard and Reserve Soldiers, and law enforcement employees to conduct mission-critical training.

The NRT staff is on the go to ensure survival of unique Oahu species. Fifty-one native plants, seven kahuli tree snails, the Oahu elepaio bird, the Hawaiian hoary bat, two picture wing flies and one damselfly keep support staff, a fence crew, three resource management crews, and a nursery and seed bank management crew busy.

In one of three greenhouses on Oahu used by the NRT, team members grow common and endangered plants for reintroduction and reforestation.

What began as a small staff in 1995 has grown to more than 50 with 90 percent of the staff in the field daily. They work with rare and endangered species in remote areas across the Waianae and Koolau mountain ranges. The team also uses volunteers recruited through outreach programs.

Matt Keir, rare plant specialist, collects seeds from an endangered plant. Photos courtesy of U.S. Army Garrison Hawaii

"We have a very active volunteer service program led by two professional outreach coordinators," said Mansker. "Over the past two years, the team has leveraged more than 11,000 volunteer hours during more than 100 service trips to the field."

Major team accomplishments during that time include collection of 5,800 endangered plants for genetic storage, the out-planting and reintroduction of 8,500 endangered plants to their native habitat and the fencing of more than 1,200 acres of endangered species habitat to stop its destruction by wild goats and pigs.

"We've come so far in conserving natural resources here on Oahu, and the great strides made are largely due to the staff's combined knowledge and skills in resource management along with their shared passion for protecting Hawaii's endangered species," said Kapua Kawelo, an NRT biologist.

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Acronyms and Abbreviations	
NRT	Natural Resources Team

Environmental Excellence – Weapons System Acquisition

Stryker team shines at environmental stewardship

by Cathy Kropp

Designing the Stryker family of vehicles to go beyond environmental requirements was a challenging task. The Stryker Brigade Combat Team's Environmental Management Team met that challenge with aggressive pollution prevention, waste minimization and environmental compliance strategies.

Under the management of the Program Executive Office for Ground Combat Systems based in Warren, Mich., the team identified and used alternative environmentally preferred materials without sacrificing military readiness and capabilities, and while balancing program cost, performance and schedules.

The SBCT not only reduced the use of and exposure to hazardous materials, but it also came out with a better product, said Assistant Secretary of the Army for Installations, Energy and Environment Katherine Hammack.

"Stryker found the balance in optimizing a solution," Hammack said.

An environmental management system and environmental impact management program allowed the team to manage, track and resolve both potential and real environmental concerns.

All weapons systems must comply with environment, safety and occupational health requirements throughout their life cycles. To reduce environmental impact from fielded systems, environmental reviews begin even before acquisition and continue through production, fielding and use during the equipment's 30-year life expectancy, ending with disposal.

The Stryker environmental management system allowed the teams to more easily identify environmental vulnerabilities. Using a team with representatives that reflected the vehicle systems' entire life cycle — from material development to operation and support — helped resolve environmental issues and identify pollution prevention opportunities early in the process.

A Stryker patrols the streets in a combat theater. Photo courtesy of SBCT

"We made a concerted effort to eliminate hazardous materials from the Stryker drawings," said Terry Dean, director, Technical Management Division, SBCT. "By eliminating hazardous material call-outs from over 1,600 drawings, Stryker has been able to reduce the amount of hazardous materials per vehicle from pounds to ounces."

Elimination of hazardous material and reduction of hazardous waste generation in the development stage helps installations maintain their compliance once the vehicles are fielded. A corresponding benefit is the decreased safety and occupational health risks for the operators and maintainers.

The program management staff developed contract language that restricted the use of hazardous materials on the Stryker vehicles including all cadmium, hexavalent chromium, beryllium, mercury, asbestos, radioactive material, other highly toxic or carcinogenic material and all ozone-depleting chemicals. The contract also required government approval prior to using lead parts or lead solder.

The eradication of these hazardous materials benefited the environment during production and ensured the vehicle was sustainable and would not impact the environment later in its life. It is estimated that the number of parts containing hazardous material has been reduced by as much 80 percent per vehicle.

The vehicles were designed to have seamless lower hulls to prevent fluid leaks, such as engine oil and coolant, which could contaminate soil or water where a vehicle is used. This design change eliminated uncontrolled lower hull fluid leaks and would contain any interior vehicle fluid and fuel spills inside the hull. Drainage holes allow for controlled draining when required.

"The Stryker government and industry team works closely with General Dynamics Land Systems (the prime manufacturer) to remove and modify noncomplying parts and processes from the Stryker platform," said Dave Dopp, SBCT project manager. "We will continue to be good stewards of the environment by managing the Stryker program in accordance with all current and future required environmental standards."

The lessons learned by this team have been shared through presentations at gatherings such as the Department of Defense Vehicle Workshop, National Association of Surface Finishers Conference, Light Armored Vehicle User Nation Group and the NASA Corrosion Technology Laboratory, reaching numerous organizations from the military, academia and industry. These design enhancements can be transferred to future ground vehicle system designs.

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Acronyms and Abbreviations	
SBCT	Stryker Brigade Combat Team

Sustainability Award – Industrial Installation

Scranton Army Ammunition Plant sees sustainability as good business

by Cathy Kropp

Like many Army installations, Scranton Army Ammunition Plant, Pa., has a recycling program to minimize material disposal. Unlike most other Army installations, at SCAAP, the materials diverted include projectile casings, steel, mixed metals, scrap wood, wood pallets, lead-acid batteries, equipment, chemicals, cardboard, paper products and electronics. In addition, it uses closed loop and filtration systems to reduce total waste streams and support pollution prevention goals.

The plant produces large caliber ammunition casings that require a coating. Application of this coating can impact air quality within the plant and increase release of volatile organic compounds outside. Reducing the amount of paint and solvent required was one goal that technology could help achieve.

SCAAP procured and installed electrostatic atomizing paint guns, which improved efficiency in the coating process, reduced material waste and improved overall air quality while reducing the facility VOC emissions by 60 percent.

The plant also sought to reduce zinc phosphate in its production process to minimize discharge into sewage and waterways that lead to the Chesapeake Bay. Steel ammunition parts must be treated prior to painting to improve corrosion resistance and paint adherence. That treatment results in a zinc phosphate waste stream that requires treatment before release into the municipal sewer.

SCAAP initiated a research, development, test and evaluation initiative to evaluate alternative chemicals for replacement of the alkaline bath and zinc phosphate treatment. It is also evaluating chemicals in hopes of finding one that would not require treatment prior to discharge, allowing the plant to conserve energy and save costs.

A number of other efforts have been put in place to promote energy conservation and efficiency. Modernization of one of the rotary hearth furnaces is expected to yield a 25 percent reduction in natural gas consumption per year and will help reduce greenhouse gases.

The forge press line modernization reduces horsepower, which lowers the electrical intensity and is expected to yield a 15 percent reduction in the press line's electricity consumption. Replacing the 50-year-old Keeler boilers with more efficient boilers is expected to lower natural gas consumption by 20 percent and emissions by 30 percent, supporting goals for greenhouse gas, fuel use and energy consumption reduction.

The rehabilitated Erie 1 Rotary Hearth Furnace's burners and heat recuperators reduce the furnace's natural gas consumption by 25 percent. Photo courtesy of SCAAP

A rainwater capture system on the roof collected 2 million gallons in a single year for use as cooling water in production operations. This effort reduces the demand for city water, lessens the storm-water discharge and helps lower operational costs.

Acronyms and Abbreviations	
SCAAP	Scranton Army Ammunition Plant
VOC	volatile organic compound

A membrane ultrafiltration system recycles all wastewater from the forging operation and reuses it in the plant's noncontact cooling water system. This system also allows SCAAP to eliminate a point of discharge to the Scranton sewer system and the associated permit. The system has recycled more than 1 million gallons of oily wastewater from the forging operation.

SCAAP's operating contractor continually works to evaluate environmental aspects and impacts of its industrial mission. SCAAP's International Standards Organization-certified environmental management system ensures success in meeting its environmental goals and helps keep the plant in compliance with all requirements.

"The team strives to incorporate energy efficiency, environmental friendliness and cost savings into every modernization effort undertaken at the installation," said Richard P. Hansen, SCAAP commander's representative. "We are honored and humbled to have been chosen to receive this award."

The technology and best practices SCAAP implemented — reducing and reusing water, improving air emissions in the production facility, reducing hazardous materials by evaluating the latest technology and engaging in multiple energy efficiency projects — contributed to its sustainability success.

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Fort AP Hill: How environmental sustainability looks at a garrison

by Rick Cole and Jennifer Erickson

Environmental sustainability at Fort A.P. Hill, Va., starts with an environmental staff that is tightly integrated into mission planning and operations. Sustainability is one of FAPH's strategic goals.

FAPH uses its environmental management system to develop supporting sustainability goals, both short- and long-term. The Environmental Division chief, also the EMS management representative, serves on the Corporate Board for Strategic Planning Development. Environmental is involved in master planning and real property meetings, work order and project reviews and training, and natural resources and forestry coordination. Key environmental issues and sustainability goals are discussed in quarterly Environmental Quality Control Committee meetings.

By focusing on environmental sustainability, communication and teamwork, FAPH integrates environmental initiatives into mission operations and community outreach.

FAPH has reduced energy consumption by 42 percent since the 2003 baseline year resulting in less fossil fuel use, fewer greenhouse gas emissions and a reduction in energy funding. Energy savings free critical funding resources to sustain and support the mission.

Successful projects include the replacement of inefficient fuel-oil-fired steam boiler heating systems with highly efficient propane-fired infrared heaters. Overall fossil fuel use was reduced by 33 percent in fiscal 2011 as compared to FY 2010 and by 57 percent as compared to FY 2003. FY 2011 fuel oil use was reduced 84 percent compared to FY 2003.

Acronyms and Abbreviations	
ACUB	Army Compatible Use Buffer (program)
EMS	environmental management system
FAPH	Fort A.P. Hill
FY	fiscal year

FAPH employed the Army Compatible Use Buffer program to provide encroachment buffer zones, promote natural resource sustainability and establish wildlife conservation areas. The post's ambitious ACUB program is designed to prevent incompatible development from occurring along its boundaries, preserving its ability to conduct realistic live-fire and aviation training.

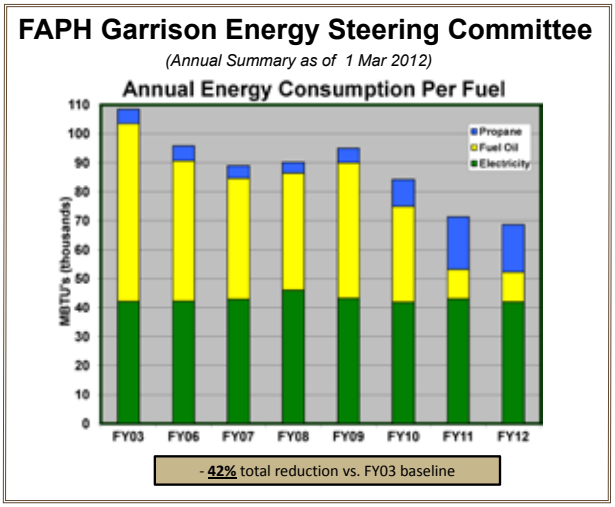
FAPH has preserved almost 10,000 acres of undeveloped lands through ACUB. The establishment of Mattaponi Wildlife Management Area, adjacent to FAPH, contributed 2,542 acres to Virginia's goal of conserving 400,000 acres, and FAPH will use about 500 acres of the area to establish one of the Army's first off-site wetlands mitigation banks.

FAPH hosted a pilot Citizen's Academy for its neighbors in October 2011. Participants learned about the process for prescribed burns to prevent wildfires, observed noise modeling and participated in simulated weapons training at the Gaming Lab.

Local citizens gained a much greater understanding of the processes garrison employees use to ensure the sustainability of the installation's facilities and land and the procedures used to ensure the safety of civilians and military on and off the installation.

FAPH further promotes engagement through public meetings during public comment and review of National Environmental Policy Act documents for projects. These meetings offer informational forums for the community and opportunities to provide input to mission projects and associated development.

FAPH coordinates sustainable building construction techniques with the U.S. Army Corps of Engineers during master planning and design of Military Construction projects to reduce facility resource consumption and minimize impacts, resulting in a greener footprint.



Graphic courtesy of Public Affairs Office, FAPH

Construction has started on a new Army Reserve center that will meet the Leadership in Energy and Environmental Design Silver standard. The site will feature natural filtration bioswales, drought-tolerant native landscaping and water-efficient plumbing fixtures.

The facility will have a high thermal performance envelope. It will use high-efficiency water-sourced geothermal heating and cooling systems that anticipate energy cost savings of 34 percent over a comparable building's systems. Other energy-saving technologies include interior and exterior LED lighting, solar shades and ultra-efficient motors.

The project team will favor materials of high recycled content and regionally sourced within the site's immediate transportation area. Finish materials such as paints, coatings, adhesives and floorings that emit low amounts or zero volatile organic compounds are specified.

FAPH implemented an innovative cleanup and closure approach to sustain range training land area by partnering with Environmental Protection ➤

Fort Hood turns on solar field, generates renewable energy

by Christine Luciano

After a year of planning and construction, Fort Hood, Texas, and Universal Services Fort Hood Inc. activated a solar field of nearly 3,000 photovoltaic panels. The four-acre solar field, near the Liberty Village community, will generate one million kWh of renewable energy annually for 300 single-Family homes.

"We are taking the first step forward and realizing how we can be energy self-sufficient," Brig. Gen. Joseph DiSalvo, deputy commanding general, III Corps and Fort Hood, said. "This is impressive — that 20 percent of the energy for Liberty Village will be provided at no cost with solar energy."

Last March, USFH, a privatized housing partner, approached Fort Hood with plans for a solar field. The Directorate of Public Works, U.S. Army Corps of Engineers' Fort Worth District and USFH explored the renewable energy opportunity. Fort Hood extended the property lease near Liberty Village, and construction began last November.

Acronyms and Abbreviations	
DPW	Directorate of Public Works
USFH	Universal Services Fort Hood

"This has been a great partnership and investment into renewable energy," Brian Dosa, director Public Works, said. "The Army and Fort Hood are moving forward towards building more sustainable facilities. When we have the opportunity to build something new or have a major renovation, we want to include energy-efficient mechanics and renewable energy as much as we can and set Fort Hood for success."

The $3 million project did not cost the Army or taxpayers anything. The contractor, USFH, is solely responsible for financing, constructing, operating and maintaining the solar array and equipment. Housing residents will consume the renewable energy without additional cost.

Thousands of panels will be fixated and tilted to the south to receive the maximum amount of sunlight. The energy will not be stored but will go directly into the grid to feed into poles tied into Liberty Village. Residents will see the energy made, sent and used within their community.

"The biggest responsibility we have is supporting initiatives like this," said DiSalvo. "After we see the benefit of this, it will open up opportunities for us to expand. At Fort Hood, we are always interested in partnering with Central Texas communities and any initiatives that help us with the right causes."

The solar panel field near Fort Hood's Liberty Village consists of 3,000 photovoltaic panels on a four-acre site that generates one million kWh annually. Photo by Christine Luciano

As part of the Army's challenge to pursue the net-zero energy goal to produce as much energy as the installation uses, the solar field is an opportunity that will bring green electricity to military Families on Fort Hood.

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Agency Region III through the Facility Lead Program at closed landfills, wash points, fire training areas and wastewater treatment plants across the 75,794-acre post. For its efforts, the post received an Army Restoration award

FAPH's garrison commander and management representatives participate in the Installation Community Council to provide information to surrounding counties on installation activities and how it can partner and support the region's economic viability and sustainability.

FAPH hosts an annual Earth Day celebration. The 2012 Earth Day drew about 900 visitors from local schools. The purpose is to educate the community and future decision makers about the environment in keeping with the theme, "Sustaining the environment for a secure future."

Youth activities included 29 environmental exhibits from federal and state agencies and private organizations, a self-guided and interactive ecology walk, and displays of military vehicles and land management equipment.

FAPH Environmental and Planning, Training, Mobilization and Security personnel participate in the local high school career day to promote employment opportunities in the science, technical, government and military fields.

These sustainability initiatives are examples of the systematic approach that integrates environmental stewardship with design, construction, installation operations and community interactions at FAPH. The result employs environmental sustainability to support the installation mission activities.

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6 partners + 3 problems = 1 multi-purpose sustainability initiative

by David Zuckerman

Strategic partners in Hawaii leveraged resources for a demonstration project that furthers Department of Defense net-zero waste and energy objectives, including lowering solid waste disposal costs, reducing expensive electricity or fossil fuel purchases and enhancing environmental stewardship.

This project involving the Army, the Navy, the Air Force, the Marine Corps, the Defense Commissary Agency and the Department of Energy is intended to validate the effectiveness of a small-scale waste-to-energy technology. The partners' key objectives are to optimize the economic and energy values in waste and divert material from the landfill while saving taxpayer dollars and freeing up military funding.

In addition to the high price of energy in Hawaii, the cost related to solid waste management is a significant issue. Waste collection and disposal is expensive, and landfill space is at a premium on the island of Oahu where only one primary landfill serves the military and local community. In 2010, the Army in Hawaii paid about $1.5 million to have its waste removed and spent more than $56 million for electricity.

The backdrop

In 2009, the Hawaii Joint Interservice Regional Support Group, which is composed of all DoD services on Oahu, established a Sustainability Working Group with representatives from each service and the City and County of Honolulu, Oahu's civilian governing body. The SWG focuses on sharing information and identifying opportunities to solve mutual solid waste and other sustainability problems.

In November 2010, Oahu's military installation commanders signed a memorandum of understanding formalizing their unified commitment to improving solid waste management and maximizing economic and environmental benefits inherent in waste materials.

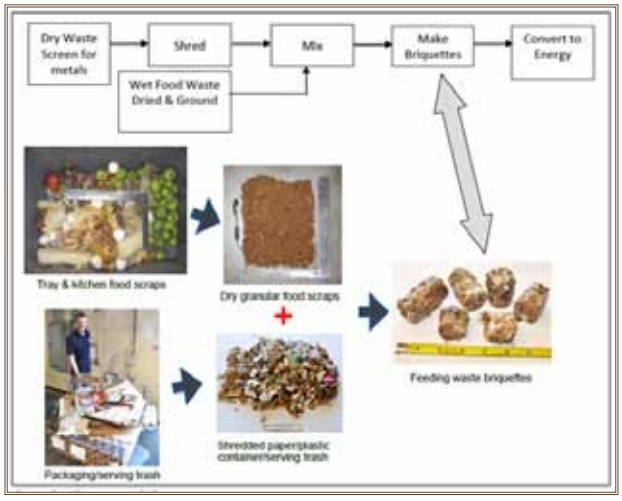
In December 2010, the SWG was approached by representatives from the Army Research Development and Engineering Command who were looking for an opportunity to field test a waste management system designed to convert encampment and food waste into energy at forward operating bases. This gasification system converts organic or carbonaceous materials into carbon monoxide, hydrogen and carbon dioxide by reacting them at high temperatures, without combustion, to produce a synthetic gas that could run a generator. Although a full scale demonstration validation, a "DEMVAL," of the technology was not in the original project scope, RDECOM offered to provide the equipment and generators if another government agency would conduct further testing.

In January 2011, the SWG was contacted by the regional DeCA Solid Waste Program manager, who was searching for ways to reduce the significant disposal costs for out-of-date food wastes. On Oahu, DeCA pays more than $500,000 a year to dispose of these wastes, because they cannot go into the landfill. Although it is critical for DeCA to reduce disposal and operation costs, the agency is not budgeted to conduct testing of alternative disposal technologies. Because the wastes from encampments and those from the commissaries are similar in nature, the SWG suggested DeCA conduct a DEMVAL at a commissary using the RDECOM technology to see if it could address DeCA's problem.

RDECOM, DeCA and SWG developed a preliminary business case for testing the technology at the Hickam Commissary on Joint Base Pearl Harbor-Hickam. Initial findings suggest the process could cost-effectively convert almost 90 percent of the commissary's waste stream — cardboard, cartons, pallets, plastic and food wastes — while offsetting up to 70 percent of the facility's energy needs. With this positive business case in hand, the SWG began a quest to find the additional funding necessary to support a potential waste management-to-energy DEMVAL.

Acronyms and Abbreviations	
DeCA	Defense Commissary Agency
DEMVAL	demonstration validation
DoD	Department of Defense
NREL	National Renewable Energy Laboratory
RDECOM	Army Research Development and Engineering Command
SWG	Sustainability Working Group

Following an intense search for resources, the SWG was contacted in September by representatives from the Department of Energy's National Renewable Energy Laboratory and Naval Facilities Engineering Command Pacific looking for candidate projects to demonstrate new or leading-edge commercial energy technologies. Because the SWG-proposed project met the primary program criteria and had equipment readily available and the local commands' support, it was selected for inclusion in the program. ➤



The waste-to-energy process to be tested in Hawaii converts waste to briquettes to be gasified for energy. Graphics by Community Power Corporation

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RDECOM will provide the equipment. NREL will provide the resources for operation, technical assistance and project management. DeCA will provide the site, waste stream and on-site support.

The project

The project will demonstrate Community Power Corporation's BioMax High Energy Density Waste-to-Energy Convertor over a 12-month period. The contractor will install, operate and maintain the system and provide utility-grade electricity to the commissary using pre-consumer food waste and other waste streams.

Operating and financial data will be collected during the demonstration, and system performance and economics will be evaluated relative to energy security needs and the ability to displace diesel fuel in standard Army diesel engine generator sets. The effectiveness of multiple wastes streams to support energy security requirements using various available feed stocks will also be evaluated.

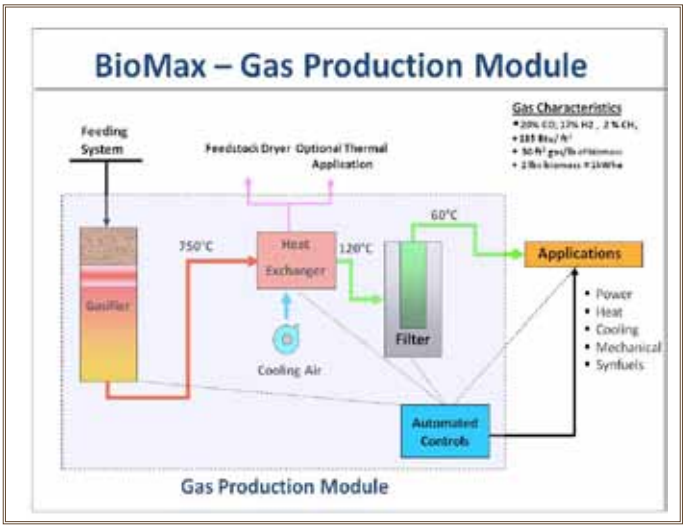
The waste-to-energy system is a combined heat and power generating system that converts dry and wet wastes — cardboard, cartons, pallets, some plastic and food waste — to on-site electricity and heat for commissaries, exchanges and feeding operations. The system uses sealed gasification with no air emissions to generate a pristine clean syngas — H2, CO, CH4 — that can be used as a renewable fuel. It can convert up to 4,800 pounds of bone dry mixed waste per day to about 2 MWh per day of utility grade electricity and about 400,000 Btu per hour of heat.

The only system byproduct is ash, certified as nonhazardous by local regulatory agencies. The system does not use water scrubbers and produces no smoke, smell, toxic effluents and only minimal noise.

The benefits

Potential benefits are both monetary and programmatic. Monetary benefits will be realized from landfill fee cost avoidance, more cost-effective waste management, reduced energy costs and increased energy security.

Successful validation of this waste-to-energy system will lead to the commercialization of a tool to help installations reduce costs by optimizing the resource values in waste. This technology could be especially useful at other commissaries with similar disposal issues or in remote locations such as Kwajalein Atoll, which depends almost entirely on diesel fuel for power and incinerates its solid waste.



The waste-to-energy system at the Hickam Commissary will use sealed gasification to generate fuel.

Savings from lower operating costs will also translate to DeCA customers at the register. Future application of this technology at forward operating bases could help reduce the costly logistics tail with down-range energy production and environmentally friendly waste management as part of a zero footprint camp concept.

Programmatic lessons learned are especially important to development of tools and processes to better manage limited resources. With limited funds, understanding how to create strategic partnerships and multifunctional projects is essential.

This DEMVAL is already helping to identify technical and management issues that challenge current air permitting and recycling policies. The Environmental Protection Agency defines gasification of wastes as a form of incineration for regulatory purposes. A successful gasification demonstration project will support efforts to clarify these definitions and make it easier to use similar systems across DoD.

Of no less importance is DeCA's willingness to modify its policy to recycle cardboard and let it be used as a feedstock for energy production with a potentially higher monetary return to the government.

Learning how to manage waste and energy issues on installations in a comprehensive fashion that integrates waste management, renewable energy production and environmental stewardship is vital for effective operation and management. Although each of these stakeholders is independently pursuing solutions to the problems of waste and energy management, this project represents a significant step forward for all the partners. Successful demonstration and validation will enable future implementations in direct support of net-zero waste and energy goals.

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Fort Carson opens doors at its 1st sustainably renovated facility

by Susan C. Galentine

Directorate of Public Works and U.S. Army Corps of Engineers staff, the new occupants of the sustainably renovated Building 1219 on Fort Carson, Colo., were greeted by energy- and water-efficient features and more as 165 people moved in to the facility in December.

"We are testing some features in Building 1219 that we hope to replicate in future building renovation," said Hal Alguire, director of Public Works.

The building, a 1950s barracks, was a good choice for the project.

"The building had good bones," said Kelly Hanna, DPW Engineering Division lead architect for the renovation. "It was basically selected due to its central location in the cantonment area and, because we knew we had a lot of similar barracks across the Army, we knew this type of renovation could be easily duplicated here and at other installations."

The facility will be the first Leadership in Energy and Environmental Design Silver-level renovated facility on Fort Carson if the certification paperwork, currently under review by the U.S. Green Building Council, is approved.

LEED certification means the building includes sustainable features that ensure the facility is energy efficient, constructed with recycled-content materials and provides for the occupants' comfort and well being. Standout features include the two gas-fired condensing boilers that produce hot water pumped through a mile-long network of pipes to heat the building.

The boilers heat 264 gallons of water to 120 F instead of the normal 180 F found in most buildings and are, therefore, much less energy intensive and expensive to run, said Mike Henderson, the DPW Engineering Division mechanical engineer technician who designed 1219's plumbing, heating and cooling systems.

Acronyms and Abbreviations	
DPW	Directorate of Public Works
LEED	Leadership in Energy and Environmental Design

Most of the "waste energy" generated by the boilers is captured and fed back into the system bumping the boilers' efficiency to 97 percent. Traditional boilers are about 80 percent efficient. In addition, two-inch thick pipe insulation keeps the water temperature constant to heat the entire building.

"Traditional heating makes up 70 percent of total energy cost in a Colorado building," said Hanna. "This system will reduce the 'energy bill' approximately 40 percent for the building."

Domestic hot water for the sinks and showers comes courtesy of the sun. Five 25-square-foot solar panels perch on the roof.

Chilled water flowing through a separate insulated pipe system, similar to the heat system, cools the building. This system requires about 25 percent less energy compared to cooling in similar size buildings, Henderson said.

The installation's first green roof, on a roof section that covers the former barracks' dining facility, is planted with native grasses and plants.

"It acts as a test garden for Fort Carson to test out different native plants to figure out just how maintenance free they are," said Hanna. The data collected from the green roof will help determine the best plants and grasses to use in Colorado's semi-arid climate.

Meeting the Army's guidance on space flexibility was a focus. The second and third floors have areas that can be used for cubicles or classroom space, and all office spaces are similar. These design elements accommodate layout changes without incurring additional renovation costs.

The tab for a building constructed to the same specifications would have been $20 million. The renovation cost a little over $5.1 million. The cost savings underscore the value of such projects in a budget-conscious era.

Data collected from Building 1219's green roof will help determine Fort Carson's best use of plants and grasses. Photo by Susan C. Galentine

Of equal importance are the attitudes of the buildings' new residents.

"Our DPW team has really bought into a new way of occupying a building," said Engineering Division chief, Joe Wyka. "Sharing printers, copiers and coffee pots is a way to build teamwork as well as save energy."

The DPW staff is realizing the new location's benefits. Before the move, staff members travelled from one of its four old buildings to another to get the job done. Now, they can attend meetings and see the individuals they need to in one location.

"We had an idea of a centralized customer service campus in this area to consolidate the functions," said Tom Wiersma, Master Planning Division planner. "If the majority of garrison support activities are consolidated into a centralized area, we can offer better and more efficient services to our customers. The customer can interact with several agencies in one trip rather than needing to travel all over the installation."

The DPW plans to renovate one building per year similar of what was accomplished at 1219. The next in line is the education center, which is slated for 2013.

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New Jersey Guard is winning the battle of energy savings

by JoAnne Castagna

Last spring, the U.S. Army Corps of Engineers' New York District completed the construction of a solar power project to provide energy to the New Jersey Army National Guard Regional Training Center known as the "Battle Lab." The project supports a facility that prepares Soldiers for battle and helps save their lives as it saves the National Guard and taxpayers' considerable money and energy.

Located at Joint Base McGuire-Dix-Lakehurst, the Battle Lab is a one-of-a-kind, high-profile, state-of-the-art facility where up to 20,000 personnel from all armed forces agencies around the country come annually to be trained for battle.

"This is where Soldiers are trained for all types of missions, including stateside missions, like the rescue operations during Hurricane Katrina," said John Hastings, Energy Program manager at the New Jersey Department of Veterans Affairs.

The Soldiers are trained on high tech training simulators that include live shooting ranges, Iraqi town mockups and vehicle rollover trainers. According to Hastings, this technology uses 1,833,800 kW annually.

Two years ago, the New Jersey Army National Guard asked the Corps to construct a solar power project similiar to previous projects. In May 2011, the Corps completed the solar project with the assistance of contractor P&S Construction of Lowell, Mass.

The project consists of a solar photovoltaic power panel array mounted on the roof of the 128,000 square foot Battle Lab. The new array covers about 71,000 square feet of the roof and was placed next to an existing array.

The arrays are composed of modules made up of several solar cells or photovoltaic cells that absorb sunlight to produce electricity. The larger the panel, the more electricity is produced. The solar panel's direct current is fed into an inverter that transforms it into alternating current at a higher voltage, and the alternating current power is then sent to the building's main transformers where it can be used by the building for its energy needs.

Solar panels cover about 71,000 square feet of roof surface at the New Jersey Guard's Battle Lab. Photo by Master Sgt. Mark C. Olsen, U.S. Air Force

"This new array along with the pre-existing array is doubling the amount of energy that is being produced for the lab," said Jose Diaz, New York District's project manager. "Together, they are providing nearly 30 percent of the lab's annual energy needs and saving the National Guard and taxpayers' approximately $118,000 annually."

This project is also tied to the public power grid so that excess energy can be shared. In addition, the project is part of the State of New Jersey's Solar Renewable Energy Certificate Program. Under this program, solar system owners that generate more than 1,000 kW of electricity per year that's connected to the public power grid receive certificates. These certificates are publicly sold and traded to New Jersey businesses and individuals, enabling them to receive solar power benefits without building a solar power system themselves. The revenue is returned to the solar system owners.

The New Jersey National Guard expects to generate from $100,000 to $140,000 annually in income from this facility and, like in the past, will reinvest this money to fund energy-reducing projects at other New Jersey Army National Guard locations.

"I enjoyed working on this project, because it makes me feel a sense of pride knowing that these projects will reduce our dependency on foreign oil and will help our country to achieve energy independence, as well as the benefits to our environment," Diaz said.

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More solar capability coming

This fall, the U.S. Army Corps of Engineers' New York District will complete the New Jersey Army National Guard's seventh solar power project. It is constructing a roof-mounted project on the New Jersey Homeland Security Center of Excellence in Lawrenceville, N.J., headquarters of the New Jersey Department of Military and Veterans Affairs. The New Jersey Guard's seven solar power systems will generate a combined 1.7 mW of power with an annual cost savings of $325,000.

Garrison Hawaii puts spotlight on sustainability successes

by Chantal Leonard

Located on Oahu, an island in the middle of the Pacific Ocean, U.S. Army Garrison Hawaii faces unique environmental and sustainability challenges. The scarcity of land, the high population density, the legendary natural beauty of the island as a premium tourist destination, the more than 100 endangered species on Army land and the rich Hawaiian culture have made the delicate balance between mission, environment, community and economy increasingly more prevalent.

In the Hawaiian language, *Ho'okahi Kakou* means "We are One," and USAG Hawaii is finding ways to live up to this adage by educating its workforce to perform everyday duties in a *pono* — righteous — manner and to perpetuate a harmonious balance with Hawaii's unique economic, natural and cultural resources.

Embracing sustainability

The garrison can tout several sustainable practice successes. Among them, USAG Hawaii expects that its performance in diverting solid waste from landfills will continue to rise along with its Qualified Recycling Program revenue. Moneys generated are used to pay for capital improvements identified as part of the program's long-term planning strategy.

Another sustainability success is in the maintenance of tactical vehicles and equipment arena. For example, the 71st Chemical Company, 8th Military Police Brigade, 8th Theater Sustainment Command, avoided $20,000 in battery procurement costs during a 12-month period. The unit implemented a sound Battery Management and Maintenance program, replacing through attrition its conventional flooded-cell, lead acid batteries with absorbed glass mat-type batteries. The change provided greener, longer-lasting and better-performing battery technology.

Acronyms and Abbreviations	
AGM	absorbed glass mat
DPW	Directorate of Public Works
USAG	U.S. Army Garrison

The company had been purchasing more than 100 batteries annually before instituting this program. The "bad" batteries were being replaced and turned in prematurely for recycling, instead of being recharged and returned to service. Since implementing its battery life-cycle management practices, the company has recovered and returned to service 100 percent of its AGM batteries. It eliminated money spent on replacement batteries and allowed mechanics to be more productive in performing mechanical troubleshooting and repairs, instead of transporting, turning in and completing the associated paperwork.

The 2nd Brigade Combat Team, 25th Infantry Division, implemented a similar battery management program. In just one month, the brigade recovered more than 30 AGM batteries, resulting in $12,000 in procurement cost avoidance.

2nd Brigade Soldiers showcased their sustainable tactical vehicle maintenance during April Earth Month activities. The Soldiers hosted a demonstration and incorporated use of military specification-approved, bio-based products in replacement of traditional petroleum, oil and lubricant products that are normally used for tactical vehicle maintenance.

Boosting recycling capacity

Significant accomplishments improve the recycling center's infrastructure and equipment. USAG Hawaii recognized that to increase solid waste diversion and recycling performance on post an improvement project was imperative.

The garrison invested more than $1 million of Sustainment, Restoration and Modernization funds to renovate and expand its recycling center. The renovation project was completed earlier this year and included a cardboard bailer and additional covered space to increase the storage and processing capacity of recyclable items.

Earth Day exhibits on Schofield Barracks are powered in part with a mobile solar array.Photo by Alvin Char

Through close analysis of its recyclables and waste generation trends, USAG Hawaii identified that the quantity, volume and potential profit for cardboard products warranted additional improvements, especially in the collection method. The garrison included provisions to increase the number and size of covered vehicles for cardboard pickups to three trucks, as part of its contract renewal with Goodwill Hawaii, the operator of the recycling center. Goodwill Hawaii added two personnel to the recycling center staff, doubled pickup frequency and made recycling easier for post customers.

The recycling program changes resulted in a 73-ton increase in the installation's annual tonnage of recyclables.

Engaging community

April was Earth Month at USAG Hawaii. The DPW's Environmental Division, with privatized housing operator Island Palm Communities and the U.S. Army Reserve creatively engaged the Army community throughout the month. Events raised awareness about pollution prevention and conserving the Earth's natural resources.

At the Schofield Barracks combined Fun Fest and Earth Day Festival, thousands of Soldiers, Family members, Civilians and contractors learned about environmental sustainability through exciting interactive exhibits. In keeping with the month's ➤

Fort Riley sends used mattresses to local jail for recycling

by Pamela Redford

The Directorate of Public Works is recycling old mattresses from the barracks at Fort Riley, Kan., and saving a bundle in the process.

The directorate began the project last August after research showed it could save about $4,426 a year through a community partnership with a correctional facility in Hutchinson, Kan., according to Steve Milton, Unaccompanied Personnel Housing and First Sergeants Barracks Program Branch chief. Fort Riley's barracks hold about 7,200 mattresses.

"While the manufacturer says the life cycle is about five to seven years, Soldiers usually go through them much quicker," Milton explained. "Up until we started this program, the mattresses hadn't been switched out in we don't know how long."

The old procedure was to rent roll-off equipment from waste management contractors at a cost of $265 for 40 mattresses and take them to a landfill, incurring additional disposal fees. The new procedure allows the Furnishings Management Office's shop to load about 100 mattresses at a time and haul them directly to Hutchison to be recycled. Prisoners in the Hutchinson Correctional Facility unload the mattresses, strip the cloth and take out the springs — completely refurbishing them before the recycle process is completed.

Instead of spending about $7,000 a year and creating more waste in landfills, the Fort Riley DPW cut that cost to $2,518 a year through the new partnership.

The good news is, in addition to being good community partners, DPW is being smarter about how it does business by reducing costs and waste in landfills, Milton said.

"By doing this, what we've realized is, we can reduce the amount of money it costs, reduce the footprint, and it's also a great recycle initiative for Fort Riley," he said. "Not only is this the right thing to do, but we can also reduce our impact on the environment."

In the last eight months, the new program has recycled 1,000 mattresses, Milton said. The plan is to take out about 1,000 old mattresses and put in the same amount every year, so Fort Riley will be on a seven-year cycle.

Hector Figueroa, Fort Riley, loads a mattress into a truck for transport to a local jail where it will be refurbished and recycled. Photo by Rosemary Loucks, Fort Riley

DPW is working with the Housing and Environmental divisions to develop best practices on the matter.

"At the end of the seven years, we will have realized a savings of almost $40,000," Milton said. "It's a win-win for us; it's a win-win for Hutchinson … Ultimately, it will probably come back to us when we order mattresses through the prison system. The bottom line is, it doesn't end up in landfill. It gets put back into the system."

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Acronyms and Abbreviations	
DPW	Directorate of Public Works
FSPB	First Sergeants Barracks Program
UPH	Unaccompanied Personnel Housing

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theme, "Give back – Do something for the Earth," the Army Hawaii community also participated in a number of beach and bike path cleanups and shoreline restorations throughout the island.

The month-long awareness campaign focused on the three tenets of waste reduction: reduce, reuse and recycle. The campaign included "dumpster diving" excursions by DPW Environmental Division staff to illustrate the potential earnings from what is literally thrown away as trash on post. Environmental teams also visited offices and industrial operations to help occupants make their workspaces greener. Staff helped set up recycling containers, adjusted printer settings and recommended sustainable products and ways to conserve energy.

Shoppers at the Exchange on Schofield Barracks were reminded of Earth Month by a large banner that was prominently displayed at the store's entrance. As an added bonus, the Exchange offered shoppers with reusable bags a discount on items purchased Earth Day weekend, April 20-22.

Celebrations continued through April including another Earth Day festival at Fort Shafter Flats.

Informing the masses

USAG Hawaii's strong commitment to long-range environmental stewardship is being widely disseminated to installation personnel. The garrison regularly updates its sustainability and environmental management website and frequently briefs leaders about sustainable practices.

At the USAG Hawaii website, *http://www.garrison.Hawaii.army.mil/default.htm*, users can readily access environmental program policies and documents, as well as an online A-to-Z practical guide that answers common environmental management questions.

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Fort Wainwright works with local community on joint land use

by Kate Siftar

The Base Realignment and Closure process made it all too clear that incompatible land development adjacent to military installations is a major factor leading to an installation's closure. Development next to installation fences creates conflict like encroachment and noise complaints.

Encroachment on Fort Wainwright, Alaska's roughly1.6 million acres of training lands takes various forms — recreational access without permits, cutting holes in security fences, constructing unauthorized hunting camp shelters or expanding the backyards of privately owned residences onto Army land. The installation, in the spirit of community, is forced to adjust its training schedules to minimize noise-generating activities, for example, curtailing flying or shooting after dark, on the weekends or early in the morning.

Fort Wainwright participates in a sustainability effort with the local community of Fairbanks North Star Borough. Called the Joint Land Use Study, the effort's objective is to encourage compatible land development that supports the military mission's successful continuation and the surrounding community's economic sustainability and growth. The process has been intense, rewarding and eye-opening.

The city of Fairbanks (left of the red line) is relatively small in 1949. Graphics by Jim Blizzard, master planner, Fort Wainwright

By 2007, the city has expanded to partially surround the post.

The JLUS identified compatibility tools that could be used by the post and the community to sustain the local economy, protect property rights, continue recreational access to military land, support the Army mission and protect everyone's health, safety and quality of life. Fort Wainwright successfully implemented 12 recommended compatibility tools. Two of the more notable tools are the pursuit of funding for land purchases through the Army Compatible Use Buffer program, and increased participation and input at borough planning meetings.

ACUB is a powerful sustainability tool that enables the military to contribute funds to a partner who purchases properties that are an encroachment threat to an installation. The partner preserves the land as high-value habitat and also limits incompatible use.

Acronyms and Abbreviations	
ACUB	Army Compatible Use Buffer
JLUS	Joint Land Use Study

Fort Wainwright identified several potential land parcels adjacent to the airfield and small arms range totaling about 6,000 acres. About 311 acres surround a subdivision at the end of the runway and along the installation's eastern boundary. The only access to this subdivision is through the installation's gates, a situation that caused quite a problem in September 2001 when residents were unable to access their homes.

At a recent planning board meeting, Fort Wainwright contributed comments regarding the Department of Transportation's proposal to build an alternative access road to this subdivision. If the new access road is constructed, it would eliminate the obvious security concerns, but the road would promote residential development along the installation's boundary and create encroachment issues.

To better communicate the installation's major encroachment issues, Fort Wainwright entertained the JLUS Technical Committee, composed of various local planners, with a post tour. The visit was educational for participants and a turning point for the committee.

After driving past the airfield and through the unique subdivision and the small arms range, the committee members saw that the most challenging issues lie ahead. How do you deny adjacent land owners the opportunity to incompatibly develop their properties in the way they want?

The committee's first effort involved presentations to the Fairbanks North Star Borough Assembly, the Fairbanks City Council and the City Council of North Pole, a neighboring town. The garrison commander, the borough mayor and the commander of nearby Eielson Air Force Base presented updates of their JLUS implementations. The political bodies ➤

Fort Hood facilities reduction project earns environmental award

by James Campbell

A Facilities Reduction Program project managed by the U.S. Army Engineering and Support Center, Huntsville, shared the spotlight with Boston-based contractor Charter Environmental Inc. and U.S. Army Corps of Engineers' Fort Worth District Quality Assurance in receiving the 2012 *National Demolition Association Environmental Excellence Award* March 13 in San Antonio. The project that earned this recognition involved abatement and demolition of the 60-year old Prichard Stadium Sports Complex to make room for a new hospital at Fort Hood, Texas.

A significant accomplishment was the recycling and reuse of 99.56 percent of the debris, said Thad Stripling, who was Huntsville Center's FRP manager during this project.

"The demolition of the Prichard Stadium Sports Complex at Fort Hood, Texas, is one of our most successful FRP projects," said Bob Delhome, president of Charter Environmental. "The sports complex sat on a 60-acre site and included a 5,500 seat stadium with concrete bleachers, running track, parking lots, site and stadium lighting, utilities, fencing, a baseball complex and underground utilities."

Work was completed in October 2010, and a flat, graded site was ready for Fort Hood officials to hold a ceremonial groundbreaking for the new $534 million Carl R. Darnell Army Medical Center just two months later.

It may be hard to imagine how a collection of recovered debris from demolition of an old sports complex could be reused, but the site was ripe for recovery due to the durable nature of the materials, Stripling said.

Contractors demolish the Prichard Sports Complex at Fort Hood, Texas. Photo courtesy of Charter Environmental

The innovative reuse of materials cited in the award included stockpiling crushed concrete on site for future construction, salvaging lighting fixtures for use in the new stadium, reusing telephone poles on a firing range, saving chain link fence for future use, using revenue from recycled metals to fund community events for Army Families, and saving plaques and memorials for placement at a new sports venue.

"The Army standard is 50 percent landfill reduction by weight, and the program average is 72 percent," Stripling said. "This project is an example of finding ways to go well above that average.

"It's also good to see recognition from outside organizations for this project," he said.

The National Demolition Association represents more than 1,000 U.S. and Canadian companies that offer standard and full-range demolition-related services and products. The association also promotes environmental education and stewardship.

The Huntsville Center's FRP eliminates excess facilities and structures to reduce fixed installation costs and achieve energy savings. The program has eliminated more than 15 million square feet of excess facility inventory for various government customers since 2004.

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Acronyms and Abbreviations	
FRP	Facilities Reduction Program

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are now more familiar with information to consider when making decisions that accommodate growth, maintain regional economic sustainability and support the military mission.

Next on the JLUS calendar is the start of the Natural Resource Working Group. This group is one of the 13 local jurisdiction recommendations suggested as a compatibility tool the borough can use to address issues of recreational access and resource management. It includes stakeholder organizations that have an interest in hunting, fishing, recreation access and habitat management on military training ranges.

Urbanization around Fort Wainwright has continued since its beginning as Ladd Field in 1939. The local community is and has always been very supportive and welcoming of its military neighbors. An estimated 38 percent of the borough's economy is related to the military presence. About 19 percent of the borough population is military.

Fortunately for Fort Wainwright, mission-stopping land use conflicts are fairly limited at this time. However, growth is inevitable, and JLUS will play a critical role in planning for long term compatible development and economic growth for a sustainable future.

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Fort Bragg cashes in with recycling

by Jonelle Kimbrough

Fort Bragg, N.C., turns its trash into cash with the Bragg about Recycling program. The installation's Qualified Recycling Program and Recycling Incentives Program are two elements of Bragg about Recycling.

"The program epitomizes environmental stewardship at Fort Bragg by aggressively reclaiming valuable materials from the solid waste stream, extending the life of infrastructure, turning wastes from liabilities into assets and minimizing solid waste disposal costs for the entire installation," said QRP manager Tim Nance.

QRP

The QRP is a federally recognized program. Its goals are to reclaim materials from the solid waste stream and to retain revenues for reinvestment in additional diversion technologies and in installation improvement initiatives. As a result, the Fort Bragg community enjoys financial, environmental and cultural benefits.

The QRP collects and sells a variety of items. These materials include construction and demolition wastes, hazardous wastes, metals and municipal solid wastes.

Program activities are governed by a committee that gathers every quarter. The committee comprises the garrison commander and representatives of:

- Directorate of Public Works;
- Directorate of Family and Morale, Welfare and Recreation;
- Directorate of Plans, Training, Mobilization and Security;
- Directorate of Logistics;
- Directorate of Emergency Services;
- Installation Safety Office;
- Network Enterprise Center;
- Womack Army Medical Center;
- U.S. Army Special Operations Command;
- Department of Defense Schools;
- Army and Air Force Exchange Services;
- Defense Commissary Agency;
- Theater Sustainment Command;
- 82nd Airborne Division;
- 440th Airlift Wing;
- Public Affairs;
- Resource Management; and
- Staff Judge Advocate.

Acronyms and Abbreviations	
FMWR	Family and Morale, Welfare and Recreation
FY	fiscal year
QRP	Qualified Recycling Program

Expended shells are ready for the Fort Bragg QRP's first sale of deformed brass, which totaled $192,797. Photo by Jonelle Kimbrough

The QRP committee votes on program budget considerations, which include both required expenditures and revenue use. Revenues from the direct sale of recyclables finance QRP operations and provide a vital source of funding for initiatives such as bicycle racks, a native plant nursery and a skate park. Fort Bragg's Fourth of July festival receives $45,000 from the QRP annually.

Incentives

In addition, the QRP's Recycling Incentives Program — a partnership among installation units and directorates, the QRP and FMWR — allows the Fort Bragg community to directly reap the monetary benefits of recycling. Participating organizations collect plastic bottles, aluminum cans, cardboard and bins of office paper. They transfer their recyclables to the Fort Bragg Recycling Center where the materials are weighed and recorded. The recorded weights are translated into set monetary values, which are issued quarterly as vouchers that may be used for participating FMWR lodging, recreation and dining facilities.

More than 300 organizations participate in the Recycling Incentives Program. FMWR vouchers issued in fiscal 2011 totaled $63,300. In the first quarter of FY 2012, the program issued $18,500 in FMWR vouchers. An estimated 1,088,154 pounds of recyclables have been diverted from the waste stream since the program's inception.

"The Recycling Incentives Program is a win-win-win situation," said Mindy Love-Stanley, environmental education and outreach manager. "Through the program, the QRP receives the recyclables required to meet diversion mandates and compliance regulations. Participating organizations receive FMWR vouchers to reward them for recycling, and FMWR receives business."

Bragg about Recycling

The QRP provides environmental benefits to Fort Bragg, too. About 160,800 tons of solid wastes were recycled in FY 2011. Diverting recyclables reduces solid waste, pollution, potentially hazardous substances and the associated health threats. According to the Environmental Protection Agency, preventing pollution is one of the best ways to protect the Earth, its people and its resources.

The recycling program is also a major component of Fort Bragg's community ➤

Aviano parachute shop awarded 1st Army LEED Gold in Italy

by Anna Ciccotti

The Airborne Equipment Parachute Repair Shop at Aviano Air Base, Italy, has been awarded Gold Leadership in Energy and Environmental Design certification under the strict standards developed by the U.S. Green Building Council. Exceeding the requirement to achieve LEED Silver, the AEPRS is the first Army facility to achieve Gold certification in Italy and stands as a tangible example of the U.S. Army Garrison Vicenza's efforts to support environmentally sustainable best building practices.

"We have many reasons to be proud of the AEPRS," said Robert Fitzsimmons, architect and Transformation Construction Management Office project manager for the Aviano projects that are in direct support of the 173rd Airborne Brigade Combat Team's deployment capability. "The project fulfilled the functional requirements for the parachute riggers and also met the Air Force architectural compatibility criteria for the Aviano Air Base.

"We are also particularly proud of the Gold certification, and this building is a prime example that Gold can be pursued without adding to the costs."

The accomplishment is an affirmation of the innovative thinking and hard work of everyone connected to the project. In particular, the Gold rating can be attributed to the thoroughness of the design team and the contractor who, with diligence and perseverance, made a very coordinated effort to analyze the requirements and incorporate additional features to reach LEED Gold at no additional cost.

"We are very glad to have worked with Army and the U.S. Naval Facilities Engineering Command," said Jennifer Massing, architect and project designer at SKE-Vittadello Group, the design-build contractor.

Even with the challenges posed by simultaneous design and construction along with changes in government managerial personnel, a steady teamwork developed among all parties allowing for a smooth construction period that met the contract completion date, Massing said.

In the Aviano AEPRS Airborne Equipment Parachute Repair Shop, hundreds of parachutes returned from the field await inspection, repair and repacking. Photo by Anna Ciccotti

The team exceeded contract requirements without an overall cost increase by keeping a mindset of achieving Gold and concentrating on areas that were more easily achievable, such as credits based on location and materials or on documentation instead of additional costs for installing certain equipment, she said. The lesson learned was to include the LEED procedures from the beginning of the design phase and to inform all parties involved of LEED's importance and the procedures that must be followed to document credits during both design and construction.

Acronyms and Abbreviations	
AEPRS	Airborne Equipment Parachute Repair Shop
LEED	Leadership in Energy and Environmental Design
NAVFAC	U.S. naval Facilities Engineering Command

Insisting on design excellence and innovation, the project team emphasized siting, design and construction considerations such as water and energy use, construction materials and indoor environmental quality. Key strategies included a heat recovery system in the parachute drying tower and the use of storm water for irrigation and plumbing, which helped achieve 30 percent savings in both energy and water use.

The AEPRS earned an even distribution of additional credits from each of the vetted categories. Relevant credits included the use of recycled content from demolition debris, certified materials supplied by local vendors, daylighting and low-emitting materials.

On time and on budget, NAVFAC delivered the $8.1 million project in June 2011. The project included demolition of an existing building and construction of a 40,000-square-foot, one-story facility ➤

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relations. Aside from funding quality-of-life programs, Bragg about Recycling hosts a public recycling drive every quarter to encourage environmental preservation practices. Bragg about Recycling is involved in social media, and the program also supports educational events and activities such as Earth Day, America Recycles Day, Pollution Prevention Week, National Public Health Week and other campaigns in an effort to preserve Fort Bragg for future generations.

"Recycling is the first step in changing the culture of an environment toward environmentally preferable practices," Nance remarked. "Implementation of recycling often leads to other sustainable business practices that exemplify the installation's passionate commitment to the Triple Bottom Line of mission, community and environment, and our garrison goals."

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Fort Bragg historic structures earn LEED Silver certification

by Rob Harris

The Army's Sustainable Design and Development Policy of Oct. 27, 2010, requires all comprehensive building renovations to achieve Leadership in Energy and Environmental Design for New Construction and Major Renovation Silver certification or higher, beginning with fiscal 2013-funded projects. But, why wait till FY 2013?

Fort Bragg, N.C., decided to charge ahead, applying high-performance building concepts to the renovation of two historic facilities funded in FY 2010. The structures were earmarked to support the advance staff for the combined U.S. Army Forces Command and U.S. Army Reserve Command headquarters, relocated from Fort McPherson, Ga., to Fort Bragg by Base Realignment and Closure.

Constructed in 1934 and located within the Old Post Historic District, the twin brick administrative annex buildings are about 2,500 square feet each. Flanking each end of the post's old Quartermaster Corps Building, they form a courtyard bounded on the fourth side by a brick and iron fence.

The Old Post Historic District is eligible for the National Register of Historic Properties, and construction or repairs made within the area must be approved by state and federal agencies. All work on this project complied with Fort Bragg's historic district design guidelines, which were developed and approved by the North Carolina State Historic Preservation Office and the Fort Bragg Cultural Resources Management Program.

The twin buildings that underwent renovation at Fort Bragg form two sides of a courtyard. Photo by John Kahler, Directorate of Public Works, Fort Bragg

Renovating historic buildings presents unique challenges. Applying new technologies and incorporating cutting-edge materials can often conflict with historic preservation, even though reusing older buildings is the ultimate in recycling.

On a national level, preservationists have said that LEED does not adequately consider the cultural value and embedded energy of historical construction. Conversely, many LEED proponents feel the Secretary of the Interior's *Standards for the Treatment of Historic Properties* are outdated and should be revised to reflect growing emphasis on energy efficiency and sustainability. The difficulty lies in incorporating green practices without destroying the historic integrity of a building.

Both the U.S. Green Building Council and the State Historic Preservation Office agreed that Fort Bragg did exactly that. The key was following whole-building design concepts and involving cultural resource managers throughout the renovation project life cycle.

Prior to the Old Post Historic District designation, the buildings went through decades of changing occupants, different uses and repair techniques that varied with funds availability and the technologies of the day. Consequently, multiple layers of retrofits had to be considered during development of the renovation scope so as to restore the buildings to their original condition as much as possible.

Lost architectural details such as door and window openings and the roof parapet were reestablished in the project. Investigation of installation archival photos and careful removal of previous renovation materials were crucial to achieving the desired outcome. Items that contributed to the interior identity of the old buildings were restored or retained as much as post-renovation use would allow.

As a "comprehensive renovation," the project was tracked under LEED for New Construction v 2.2. To attain Silver, 33-38 points were needed; the project generated 36. This project is only the second historic renovation to be LEED certified in the Army and the first one executed by a Directorate of Public Works alone without Corps of Engineers' support.

The site-related credit points were attained in the areas of Site Selection and Development, Alternative ➤

Acronyms and Abbreviations	
FY	fiscal year
LEED	Leadership in Energy and Environmental Design
MILCON	Military Construction

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with a parachute drying tower and a packing, repair and secure storage area. The facility also features parking, core administrative and conference areas.

The AEPRS completed the Military Construction-funded projects supporting Army deployment requirements at Aviano. A heavy drop rigging facility and a personal alert holding area had been delivered in 2008. All three projects were managed by NAVFAC, delivered on time and on budget, and all are LEED certified.

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Fort Bragg's warriors in transition get shade, power in 1 project

by Paul Hora

On an obscure Thursday morning, with very little attention, a switch was flipped on a major milestone for Fort Bragg, N.C. Moments later, electrons started to flow on the largest solar power site on Fort Bragg. The system, designed and installed by FLS Energy, produces 100 percent clean renewable energy.

The 223 kW system will produce about 330,000 kWh annually. This output equals about what 16 average homes would use in North Carolina. The photovoltaic array serves another purpose as well. Since this PV system is raised above the front parking lot of the new Warriors in Transition facility, it shades vehicles as well as produces power.

The PV installation was a bit of an afterthought, said Robert Fleming, the Directorate of Public Works project manager. Once Fleming found funding for a solar array, all he needed to do was find a place to put it.

As the plans progressed, the PV array was moved to two other sites before it was finally settled on the front parking lot. This sequence of events may sound like the project was not well planned, but the truth is quite the contrary.

Each time the PV array was moved during the planning phase, it became a better install and grew in size, Fleming said. Ideally, a PV array should have full exposure to the sun for the maximum time possible throughout the day. The original plan was to have it on the roof of the facility or the new parking garage, but those orientations were limiting.

Acronyms and Abbreviations	
PV	photovoltaic

"We finally agreed on the current location, which ends up being the best place possible for such an array" said Fleming. The parking lot location allows for 816 panels, and it is elevated and angled such that it does not obscure the look or aesthetic features of the Warriors in Transition facility.

From the road, a viewer hardly notices that the structure is not just a simple parking shelter. The slight angle of the panels was a key attribute to optimization of the PV system. ➤

A PV array shades the Fort Bragg Warriors in Transition complex parking area. Photo by Paul Hora

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Transportation, Storm Water Design and Heat Island Effects. All available points supporting water conservation — Water Efficient Landscaping, Innovative Wastewater Technologies and a 30 percent Water Use Reduction — were earned. Under the critical energy category, Energy Performance improvement exceeded 21 percent compared to the required baseline. In addition to the obvious Adaptive Reuse credits received when working with historical buildings, the project attained the Waste Management, Recycled Content of Materials and Regional Materials credits. The high quality of the indoor environment is assured through the Outdoor Air Delivery, Low-Emitting Materials, Controlling Chemicals and Pollutants, Thermal Controllability and Daylighting credits. Three credits in the Innovative Design area were also gained. Across all these credit categories, the project team remained attentive to preserving the cultural value of the buildings.

Historically, most LEED-certified building projects have been new construction, but as of December, the total square footage of certified existing buildings now exceeds new construction. As Army MILCON budgets shrink and greater emphasis is placed on adaptive reuse — see the Assistant Chief of Staff for Installation Management *Master Planning Policy Guidance* of Nov. 23, 2011 — the Army will contribute to that certification shift by converting much of its existing inventory.

The Army owns thousands of functional historic buildings, and, despite the challenges, green renovation practices and historic resource preservation are not mutually exclusive. With care and planning, sustainable efficiencies can be gained without sacrificing historical and cultural integrity. Fort Bragg was successful; your post can be too.

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Army Reserve: Environment, sustainability hand in hand for success

by Steve Patarcity

Imagine managing the environmental and sustainability issues for an "installation" encompassing from seven to 18 states, with tenants ranging from seven to 11 general officer commands plus upwards of 400 subordinate elements from other commands not based on your installation. Picture also, along with the responsibility for an installation infrastructure where the average building age is 39-plus years, that your higher headquarters just completed its most sweeping reorganization in the past 50 years that includes downsizing from 10 regional readiness commands to four regional support commands that serve as virtual installations for a geographic area without major increases in manpower resources and that you just executed Base Realignment and Closure actions entailing the construction of 125 facilities while closing 176 older ones —— all in the middle of the longest war ever fought by your nation and with extensive use of the capability your supported tenants bring to the battlefield.

A fantasy, you say, or perhaps the wild imaginings of a notable science fiction writer. Not at all. That's the environment that Army Reserve environmental and sustainability personnel have lived with and excelled in for the past six years.

Setting the stage

The conclusion of BRAC 2005 in September 2011 realized one of three key components of the biggest Army Reserve reorganization since World War II. Operation Millennium Transformation, the Reserve's reorganization plan, was designed on three enabling efforts to change the Reserves from a strategic force to an operational force. BRAC 2005 was the last effort of this operation to be completed.

This photovoltaic array at the Arden Hills, Minn., Reserve Center is one of the Army Reserve's projects to reduce energy use in a sustainable way. Photo courtesy of U.S. Army Corps of Engineers

OMT was not designed with environmental concerns or sustainability actions in mind; however, it showcased the capability of the Reserve's environmental and sustainability personnel to:

- change from a technically focused force-in-reserve to a learning organization that provides trained and ready "inactive-duty" Soldiers poised and available for active service;
- streamline command and control;
- leverage BRAC actions to transform multi-functional installations to enhance unit readiness;
- increase training opportunities and generate operational efficiencies;
- reduce substandard and undersized facilities;
- better position Reserve forces to enhance anti-terrorism and force protection capabilities; and
- maintain a high level of support and service to Reserve Soldiers, units and the communities in which they reside.

Acronyms and Abbreviations	
BRAC	Base Realignment and Closure
OMT	Operation Millennium Transformation

Accomplishing the mission

Among the OMT tasks to be concluded by 2011, one had major impact on both environmental and sustainability programs. This task — to construct 125 armed forces reserve centers and close 176 Army Reserve centers — enabled the Army Reserve to divest itself of old infrastructure, streamline its footprint in the community, and design and construct facilities that are more supportive of Soldiers, Civilians, Families and communities as well as being more environmentally and economically friendly and sustainable.

Throughout the process, environmental and sustainability personnel of the Army Reserve Installation Management Directorate worked closely with the Military Construction project managers at the Corps of Engineers' Louisville District in a mutually supporting ➤

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"Since power costs more in the summer, we designed this system to produce the most energy during that time." Fleming said.

Solar power is not new to Fort Bragg. The Energy Team had developed several pilot projects that show the viability of solar power, but these systems are much smaller in scale. Military Construction projects are also incorporating PV into their designs.

This PV system is the largest on Fort Bragg, and yet, it supplies only a very small portion of power used on a daily basis. The system will produce less than one half of 1 percent of daily power needs. However, it is a start and a significant step forward.

The PV system at the Warriors in Transition facility is a primer project, well planned and installed by a team of people committed to bringing clean power supply as well as greater energy independence and security to Fort Bragg.

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Paul Hora is the energy awareness manager, Fort Bragg.

Fort Riley assists local community with flood warning system

by Alan Hynek

The evening of June 1, 2011, started out with a typical Kansas late spring rain event. The forecast was for moderate to heavy rain with the potential for thunder and lightning. The outlook was not particularly severe by Kansas standards, but that all changed by 12:30 a.m. when heavy rains began to cause roads to be closed and traffic to be rerouted. By 3:30 a.m., law enforcement and emergency management officials were knocking on doors to evacuate citizens who were in imminent danger of flooding, including Fort Riley's military and civilian Families.

From 2:15 a.m. to 5:50 a.m., Wildcat Creek rose nearly 15 feet and topped the bridge at one of the major traffic arteries between Fort Riley and Manhattan, Kan. By daybreak, the flood waters had peaked and were quickly receding, leaving well over $1 million in damage. The overnight rainfall registered from 3 to 5 inches from Manhattan to Fort Riley, with even higher amounts to the west.

Although such heavy rainfall is not common in Kansas, it is certainly not unprecedented. Rather, the recent spike in flood events along Wildcat Creek has officials looking at the other side of the flood risk equation — the landscape upon which it falls. To address the flooding issue, a work group made up of representatives from Riley County, Manhattan, Fort Riley and various state and federal agencies was formed soon after that June 2011 event.

The Wildcat Creek watershed covers about 99.5 square miles and drains southeast to the Kansas River. About one-third of the total acreage belongs to Fort Riley. Further downstream, Manhattan encompasses about 8 square miles. Situated on the lower end of the watershed, the city must endure all of the runoff that falls above it.

Over the last few years, a substantial amount of urban development has occurred within the Wildcat Creek watershed in Manhattan. Every house, parking lot or structure that has been built in the watershed contributes to the amount and intensity of flood waters.

The work group is concentrating on two main focal points — mitigating future flooding and providing for an early warning system. There are numerous ways to mitigate flood events. Unfortunately, these efforts are generally very expensive both to the government and to private land owners. Mitigation will likely be a controversial process that may take years to implement.

On the other hand, improving the early warning system is relatively easy and noncontroversial. Recently, the U.S. Army Corps of Engineers provided grant funding for two stream gauges near Manhattan. In cooperative fashion, Fort Riley responded by installing an additional gauge upstream at the bridge over Wildcat Creek near Keats, Kan.

A flooded Wildcat Creek flows just under Scenic Drive near Fort Riley. Photo by Rob Ott, city engineer, Manhattan, Kan.

"Operation Good Neighbor," as it is called, will provide critical real-time stream gauging for the National Weather Service to issue advance warnings to military and civilian Families who live in Manhattan.

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relationship. This cooperative effort was critical to success, as the Army Reserve is inextricably linked to local communities where Reserve centers are located and where Soldiers and Families live, work and play.

The Army Reserve's sustainability and environmental goals supported its own mission and also supported the communities' similar efforts. The result was 125 new facilities — all Leadership in Energy and Environmental Design Silver certified eligible — that increased efficiency via more sustainable methods, equaling more resources available for training, deployment and supporting our communities during catastrophic emergencies.

The four regional support commands were, are and continue to be the main effort behind the Reserve's environmental and sustainability programs. Functioning as virtual installations for geographic areas of the continental United States, these organizations retain environmental and sustainability stewardship of Army Reserve property in their respective areas.

This task is exceptionally difficult. Geographic span of control, differing regional environmental and climactic factors, disparate local and state regulations and other constraints affect the environmental and sustainability programs. Cooperation, frequent communication and exchange of ideas and methods among these four commands and the headquarters have permitted the Army Reserve to execute its programs to standard.

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Hydraulic fracturing for groundwater cleanup

by Charles Coyle, Jeff Skog, Jean Chytil and Delma Stoner

A process involving hydraulic fracturing being used by a team from the U.S. Army Corps of Engineers' Omaha District is proving successful at reducing or stabilizing trichloroethylene in groundwater in six test wells at the former F.E. Warren Atlas Missile Site 12 near Windsor, Colo.

The team is using the hydraulic fracturing process to create new fractures in consolidated, water-bearing formations and to deliver substantial volumes of amendments that are used to promote groundwater remediation. Interest in the innovative use of hydraulic fracturing is considerable since it has rarely been used for groundwater remediation on Department of Defense sites.

The work at the Atlas 12 site was done under a performance-based contract with North Wind Inc. as the prime contractor and Frac Rite Environmental Ltd. as the subcontractor.

The contaminated groundwater zone lies within a sandstone and siltstone formation. A pilot test in April and May 2009 determined that fracturing would be feasible, and the team assessed the radius of influence that could be obtained through fracturing. Post-pilot test data indicated that TCE concentrations were reduced by about 80 percent where the test was performed. During the test, surface tiltmeter geophysics were used to assess the orientation and extent of the fractures.

The fracturing process entailed high pressure injection of a slurried amendment that included potable water, plant-based cellulose material and micro-scale zero-valent iron, and a protein gel. The micro-scale zero-valent iron amendment is designed to facilitate chemical reduction — abiotic TCE dechlorination, and the organic carbon amendment facilitates biotic anaerobic reductive dechlorination of TCE.

Acronyms and Abbreviations	
TCE	trichloroethylene
DCE	dichloroethylene

The full-scale fracturing process was begun in July 2011 as an interim measure. The interim measure entailed injecting more than 134,000 pounds of amendment into six boreholes. Amendment was injected at three to seven discrete depth intervals for a total of 11,000 to 29,000 pounds of amendment per borehole. Water-filled, inflatable packers were used to pack-off the borehole above and below the injection interval to force the fractures to occur at the desired depths.

The contractor's field crew positions a super-sack containing micro-scale zero-valent iron and organic carbon above a mixing tank. Photo by Delma Stoner

The fractures were initiated by injecting a guar gel formulation, and then the pump intake was quickly switched so that the amendment slurry could be injected without pausing. After the required volume of amendment was injected, more of the guar gel was injected as a "chaser."

The borehole locations provide coverage across most of the 100 parts per billion TCE contour of the plume. It was assumed that amendment would be propagated a radial distance of about 60 to 80 feet from each borehole. According to the subcontractor, the amendment was observed to be daylighting from open boreholes that were as much as 120 feet away from the injection borehole in some instances. However, uniform distribution of amendments cannot be assured during hydraulic fracturing. Amendment propagation distances can differ substantially in each direction.

About 2,900 gallons of the slurried amendment was injected at each discrete depth interval in which a fracture was initiated within each boring. The slurry was injected continuously at pressures near 62,660 pounds per square inch until the prescribed volume had been injected.

Injecting the full volume of amendment took about 30-45 minutes at each depth interval. The crew had to wait about one to three hours until the pressure had dissipated to move to the next depth interval or to the next borehole location. This waiting time appears to be one of the bottlenecks that drives the time required by the field crew. The time needed for pressure dissipation depended on the formation's permeability and the slurry's viscosity. After the amendment was injected, each borehole was sealed with bentonite grout.

Post-treatment groundwater monitoring data indicates that TCE levels are continuing to decline or are remaining stable. The TCE levels in most of the monitoring wells remain above the cleanup goal of 5 micrograms per liter. However, a three- to five-year monitoring period is not uncommon before proper assessment of *in-situ* chemical reduction for groundwater can be done.

At some monitoring wells, substantial TCE reductions were accompanied by increases in dichloroethylene. DCE is an intermediate breakdown product of TCE. Generation of DCE indicates that biotic reductive dechlorination is occurring. Continued monitoring will be needed to confirm that complete dechlorination ➤

Water balances, project road maps being developed for net-zero water pilot installations

by Marc Kodack and Kate McMordie Stoughton

As requested by the eight net-zero water pilot installations, water balances and project road maps are being created for the Army by the U.S. Department of Energy's Pacific Northwest National Laboratory. The laboratory has expertise in assessing water efficiency and conservation, and in recommending cost-effective solutions to reduce water use.

The Net-Zero Water Program, part of the Army's Net-Zero Initiative, contains installations in many commands, including Installation Management Command, Army Materiel Command, the National Guard and the Reserves. The pilots are located across the United States in different environmental settings. They include: Aberdeen Proving Ground, Md.; Camp Rilea, Ore; Fort Buchanan, Puerto Rico; Fort Riley, Kan.; Joint Base Lewis-McChord, Wash.; Tobyhanna Army Depot, Pa.; Fort Carson, Colo.; and Fort Bliss, Texas and New Mexico.

A net-zero water installation limits the consumption of freshwater resources and returns water to the same watershed so as not to deplete the groundwater and surface water resources of that region in quantity and quality over the course of a year.

PNNL is conducting a water balance for each net-zero water installation. A water balance collects information from multiple sources to examine how water is used at a locality such as an installation. An audit is performed among a sample of different classes of facilities or uses, including barracks, central plants, motor pools, dining halls, office buildings and landscape irrigation.

The water balance audits for all eight pilot installations are now complete, and most of the data collected are now being analyzed. All of the final summary water balance reports will be available by the end of 2012.

The results of the water balance will act as a launching point for the project road map phase, providing a prioritized approach to implementing water efficiency and conservation measures. A project road map is a process through which an installation implements a mix of projects through 2020 to achieve potable water use intensity efficiency improvements and reductions in industrial, landscaping and agriculture water use to achieve net-zero water.

The project road maps will assist the pilot installations in achieving a 50 percent reduction in water use intensity by square foot from a 2007 baseline and a 40 percent reduction in industrial, landscaping and agriculture water use from a 2010 baseline, by 2020. The 2020 date is derived from Executive Order 13514, *Federal Leadership in Environmental, Energy, and Economic Performance.*

With no new funding for the Net-Zero Initiative, achieving the goals will require new approaches and innovative, cost-effective technologies. These goals are not end points but "way points" that require continual investigation and implementation of both technological and cultural changes to reduce overall water use and increase water efficiency.

Achieving net-zero water assists the Army in increasing its water and energy security and in securing the Army mission.

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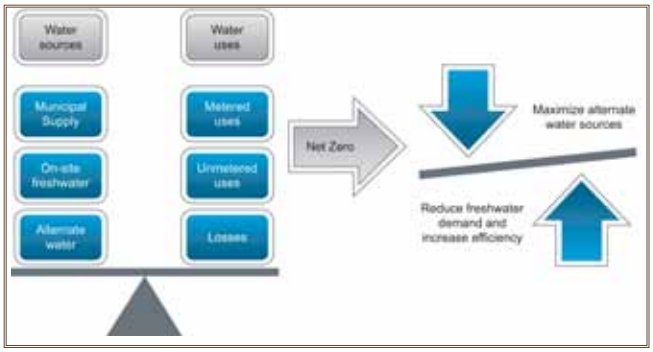
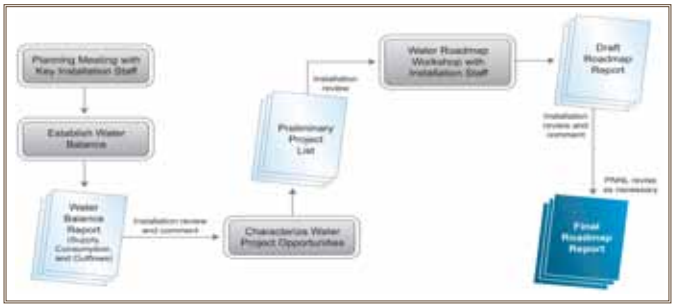


Water balance
Graphics by Kate McMordie Stoughton and Brian Boyd, PNNL



Project road map process

Acronyms and Abbreviations	
PNNL	Pacific Northwest National Laboratory

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of DCE is proceeding.

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Charles Coyle is an environmental engineer, Environmental and Munitions Center of Expertise, U.S. Army Engineering and Support Center Huntsville, Omaha. Neb.; Jeff Skog is the project manager, Jean Chytil is the project geologist, and Delma Stoner is the environmental engineer, former F.E. Warren Atlas Missile Site 12 project, Omaha District, U.S. Army Corps of Engineers.

Career Program 18 workshop focuses on how change will affect you

by Mary Beth Thompson

No news was definitely not the news at the Career Program 18 Annual Workshop in Kansas City, Mo., April 16-17. Civilian Workforce Transformation is driving big changes in the Army human resources world, and they affect how you will recruit, train and develop your workforce.

"It is absolutely critical that, as we may be losing our most experienced workforce more rapidly, it's important that that workforce that we have brought on over the last two or three years, and those we will be bringing on, are going to have to get up to speed a lot faster than maybe we did when we were coming into this workforce," said Bob Slockbower, CP-18 functional chief representative, in his opening remarks. "So it's incumbent on all of us to help to set the stage for competency based development of our workforce, to be sure we sustain them."

About 80 CP-18 representatives from Installation Management Command, U.S. Army Corps of Engineers, Army Medical Command, Army Network Enterprise Command and Army Cyber Command attended the workshop at the National Weather Service Training Center.

Bob Slockbower, CP-18 functional chief representative, responds to an issue raised by a workshop attendee. Photos by Mary Beth Thompson

Kalli Clarke, acting chief, Engineering and Construction, Tulsa District, poses a question.

"Return on value" was the theme, and Nathan Ainspan, an industrial psychologist in the Office of the Deputy Chief of Staff for Civilian Personnel, explained that it is different from return on investment.

Return on investment is a business model that captures what you paid versus what you got out of what was paid for, Ainspan said. Return on value is more holistic and less focused on one calculation.

He gave the examples of a security guard doing his job right and no attack occurs, and engineers designing a bridge that does not collapse. As with most government work, no quantifiable number results from training those individuals, but there is value, he said.

"We all know budgets are tight," Ainspan said. "Training is the first thing under the knife; therefore, it is both expedient and necessary to know what people get out of training."

Vicki Brown, chief of Army Civilian Training and Leader Development, spoke about **Army Career Tracker**. ACT, available at *https://actnow.army.mil/wps/myportal/act/Civilian/CivilianHome/*, is a leader-development and career-management tool that integrates training, assignment history, education and experience into a personalized, online interface.

"ACT houses the career maps not only for Army Civilians with recommendations from the career program managers, but also, on the military side, it shows what their development is," Brown said. "It enables supervisors to accurately coach and provide meaningful recommendations to their [Civilian] employees and their Soldiers. It's a powerful, powerful tool." *(Editor's note: For more on ACT, see page 42.)*

Pamela Whitman, chief, Environmental Division, Army Materiel Command, gives an update on her agency's CP-18 efforts.

Pathways, a program that will allow the hiring of students and recent graduates, was the topic of Phil DeMarais, chief, Employee Compensation, Headquarters USACE. The new term for "intern" is "recent graduate," he said, and college students will be "interns."

"The final regulation on Pathways should be published sometime this summer," DeMarais said.

The regulation is unlikely to be published in time to be used for fiscal 2012 intern allocations, and until it and a transition plan are published, everyone should be using existing authorities, Slockbower said.

Planning for change — for filling the voids when employees depart — was the subject of Sue Engelhardt's presentation on **succession planning**. Engelhardt is the director of Human Resources, Headquarters USACE.

She presented a five-step method of ➤

Acronyms and Abbreviations	
ACT	Army Career Tracker
CP-18	Career Program 18, Engineers and Scientists – Resources and Construction
IMCOM	Installation Management Command
USACE	U.S. Army Corps of Engineers

GovEnergy 2012: Gateway to smart energy solutions

by John D. Anderson

GovEnergy, the nation's premier energy training workshop and trade show for federal energy professionals, will take place Aug. 19-22 at the America's Center Convention Complex in St. Louis. Supporting the theme "The Gateway to Smart Energy Solutions," the event will feature more than 150 training sessions within 19 educational categories, including sustainability, water and net-zero environmental impact.

Now in its 15th year, GovEnergy expects to draw around 4,000 attendees and an estimated 250 exhibitors for its trade show. Participants will receive training, gather information and build networks. This event is the single largest gathering of the federal energy management community, an audience consisting of federal energy management staff members and the contractors who support this market.

Attendees are educated through interactive learning experiences. In addition to classroom sessions, GovEnergy provides poster sessions, technology demonstrations and optional technical tours. These methods illustrate how behavior impacts energy consumption as they teach best practices for promoting energy efficiency and awareness.

Attendees and exhibitors work the floor at the GovEnergy 2011 trade show. Photo by Mark Bealer, GovEnergy 2011

Education credits will be awarded based on session attendance. Attendee badges will be scanned prior to each GovEnergy training session, providing documentation of attendance.

GovEnergy is sponsored by the Department of Energy Federal Energy Management Program; the General Services Administration; the Departments of Veterans Affairs, Defense, Homeland Security and Agriculture; and the Environmental Protection Agency. By bringing together the nation's leading experts in policy, technology and facility operations, GovEnergy provides federal employees with energy management training that meets the requirements of the Federal Buildings Personnel Training Act of 2010, the Energy Policy Act of 1992, Executive Order 13514 and the Energy Independence and Security Act of 2007. ➤

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determining your succession needs and planning for them that includes:

- building a business case;
- identifying mission;
- identifying competencies;
- developing, acquiring and maintaining needed competencies; and
- creating a pipeline of candidates.

Engelhardt distributed a *Succession Planning Guide*, which is available at *https://ekopowered.usace.army.mil/cp18/*.

David Williams, USACE's Energy Program manager, talked about energy as an Army career. Energy has become an important focus, and Army energy professionals are growing in number. The human resources, environmental and sustainability communities are collaborating to build an **energy career path.**

"Energy competencies cross occupational series," Williams said. They are needed by engineers, installation managers, master planners, designers, in Directorates of Public Works and for USACE Civil Works. In addition, having trained energy managers on installations is a statutory requirement.

The goal of the current effort is to identify their training and development needs.

Information about the **School of Public Works** at the IMCOM Academy in San Antonio was presented by Gus DeJesus, chief, Facilities Management Branch, Headquarters IMCOM. Classes at the school teach the specific skills needed by the Army Public Works professional.

The school uses a mix of workshops, distance learning, electronic venues, specific courses and leadership overview sessions, De Jesus said. The school is free for IMCOM employees. Course seats are open to others on a space-available basis.

Slockbower also talked about training and **holding onto valued employees**.

"It is absolutely essential that we really focus on ensuring that our workforce has the competencies that they need to be able to be of value to the Army and the nation," he said.

"Lastly, it's really important that we want to retain our best. We do need to retain critical members of this workforce, and the way we retain them is to provide them challenging opportunities that keep them engaged and that each one really feels value in what they are doing."

These notes skim the surface of just a few of the CP-18 workshop topics. Check with your activity career program manager for more information on what came out of the workshop. The workshop presentations are posted on *https://ekopowered.usace.army.mil/cp18/*. Exploring that website will help you stay in tune with career development information.

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Mary Beth Thompson is the managing editor, Public Works Digest.

Army Career Tracker: New tool to make career planning easier

by Dana M. Gunter

The Army Career Tracker is a web-based professional leader development and career management tool that integrates employee training and education paths into one personalized interface for Department of the Army Civilians. ACT provides employees, supervisors and career program managers with an easy-to-use dashboard and an effective way for employees to monitor career development.

ACT provides Army employees with the capability to take charge of and manage their own career goals. Leaders and supervisors have the ability to view, track and advise their employees on their career progress and to mentor, counsel and help plan for the development of their employees.

The goal of ACT is to ensure all Army Civilians are aware of the career tools that are available and provide them with the opportunity to participate in professional development to help achieve their career goals and support their organizational mission.

ACT allows users to view their career-related data in one online portal, view professional development career maps, complete an Individual Development Plan and plan new activities designed to reach their professional and personal goals.

ACT leverages existing systems to capture and present career management data. The portal pulls information from training, education and experiential learning sources to present a complete training picture as well as a single common access card sign-on to see a consolidated course catalog. ACT does not replace or eliminate current systems, for example the Civilian Human Resources Training System known as CHRTAS.

Spiral 1	Spiral 2	Spiral 3	Spiral 4	Spiral 5
29 Aug 11	30 Dec 11	16 Apr 12	6 Jul 12	28 Sep 12
CP 18 Engineers & Scientist (R&C) *CP 22 Public Affairs* *CP 27 Housing* *CP 31 Education Services* *CP 32 Training* *CP 34 Information Technology*	CP 10 Human Resources CP 11 Comptroller CP 12 Safety /Occupation Health CP 13 Supply Management CP 17 Material Maintenance CP 24 Transportation CP 29 Installation Management*	CP 14 Contracting & Acquisition CP 16 Engineers /Scientists CP 20 Quality Assurance CP 26 Manpower/ Force Mgt CP 28 Equal Employment CP 33 Ammunition Management	CP 15 Quality Assurance CP 35 General Intelligence CP 36 Modeling /Simulation CP 50 Military Personnel CP 53 Medical* CP 56 Law*	CP 19 Physical Law CP 51 General Administrative/ Management* CP 55 Inspector General* CP 60 Foreign Affairs/Strategic Planning* CP 61 Historians and Museum Curators* CP 64 Aviation*
**New CPs*				

The ultimate purpose of ACT is to provide a complete view from various source systems into a single user interface. Users can employ ACT to search multiple education and training resources as well as see and understand their relevant career information. When employees want to take action, they are guided to the source systems to execute transactions to register for training.

The portal facilitates communication from CP proponency officials to their careerists. CP proponency offices manage dedicated pages that provide training and development information and CP news. They can recommend new training by sending messages directly to careerists and identify training priority.

Another ACT feature is the ability to search for qualified subject matter experts and individual mentors. Subject matter experts are rated by other careerists, which results in a score that facilitates topic searches. And an individual can provide access to several mentors within the portal, so the mentors can identify training and developmental assignments they would recommend for the mentoree's development.

Employees are encouraged to access ACT at least monthly to communicate with their leaders, supervisors and mentors about career development goals and to obtain the latest news and information tailored to their CP and individual needs. ACT will assist employees in locating and requesting a mentor and in sharing information for collaboration on professional development plans.

ACT is Part of the 2011 Army Campaign Plan, and aligns to Civilian training and career development in support of Civilian Workforce Transformation initiatives. ACT is managed by the U.S. Army Training and Doctrine Command.

ACT is deploying in five spirals. CPs 10, 11, 12, 13, 17, 18, 22, 24, 27, 31, 32 and 34 were spiraled into ACT between August 2011 and February. The next CPs scheduled to spiral in are CPs 14, 16, 20, 26, 29 and 33. The remaining CPs are scheduled to be in ACT by the end of the fiscal year.

Visit the ACT website, *https://actnow.army.mil*, for additional information.

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Acronyms and Abbreviations	
ACT	Army Career Tracker
CP	career program

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More GovEnergy information is available at *www.govenergy.gov.*

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Ward heads Public Works environmental team

by Mary Beth Thompson

When Jeff Ward served on the Army's Sustainable Design and Development team, he helped evaluate Military Construction projects to see how they measured up to Leadership in Energy and Environmental Design standards.

"That experience put me into this arena," said Ward, the chief of the Environmental Branch in the Public Works Division, Headquarters Installation Management Command. "Sustainability goes hand-in-hand with environmental."

Ward's diverse background started with earning a bachelor's degree in architectural engineering with concentrations in structural engineering and environmental systems within buildings from the University of Texas at Austin and a master's degree in civil engineering with concentrations in structural engineering and engineering mechanics from Southern Methodist University.

He began his federal career with the Corps of Engineers' Galveston and Jacksonville districts. He moved to the Corps' Europe District as a contract administrator and project engineer.

Ward transferred to IMCOM Europe Region as a Family Housing program manager where he initated the Urlas Townhouse *PassivHaus* pilot project. He next moved to the Office of the Assistant Chief of Staff for Installation Management, where he was in charge of utilities privatization and edited the *U.S. Army Energy and Water Campaign Plan for Installations.* He came to Headquarters IMCOM in October 2008 as the deputy Public Works chief and oversaw the transformation and move to San Antonio.

Ward's 13 years with the Corps taught him how the Corps interrelates with IMCOM restoration and construction projects. Working with IMCOM Europe helped him understand how IMCOM regions interact with garrisons and the Corps. His work at OACSIM and Headquarters IMCOM rounded out his experience, and his SDD team role sparked his developing interest in the environmental and sustainability arena.

Acronyms and Abbreviations	
IMCOM	Installation Management Command
MILCON	Military Construction
OACSIM	Office of the Assistant Chief of Staff for Installation Management
SDD	Sustainable Design and Development

Headquarters IMCOM Public Works environmental team members are (left to right) Jill Reilly, Jeff Ward, Rich Morris, Mark Ditmore, Craig Slebrch and Dave Giffin. Photo by Steve Tallman

"It was a turning point for me to really understand that one of our big missions is to ensure that training can go on on our garrisons," Ward said.

Ward's branch comprises five members: **Dave Giffin**, team lead; **Jill Reilly**; **Mark Ditmore**; **Craig Slebrch**; and **Rich Morris**. All came from Army Environmental Command when the Public Works Environmental Branch was set up in 2011.

"They're all extremely talented, hard-working individuals," Ward said.

The branch is working on several initiatives, projects and responsibilities:

- environmental quality management – identifying, validating and prioritizing critical IMCOM environmental requirements;
- environmental quality – coordinating draft installation agreements to ensure focus on mission, environment and community, and cost management;
- support to other IMCOM directorates – making sure National Environmental Policy Act requirements are planned for;
- MILCON planning – ensuring environmental considerations and net-zero initiatives are integrated;
- outreach – incorporating environmental education into Installation Management Academy classes, the other IMCOM G-staffs' signature courses and the Garrison Leader Course
- manpower modeling – ensuring that IMCOM has a valid, U.S. Army Manpower Analysis Agency-approved model for environmental manpower requirements.
- oversight – overseeing 13 direct report garrisons;
- management practices – identifying and sharing best practices;
- reporting requirements – actively supporting environmental requirements reporting;
- service agreements – reviewing contracts;
- project execution – coordinating at Headquarters IMCOM.

"Environmental touches everyone — Soldiers, Families, Civilians," Ward said. "It's really an across-the-board subject."

Garrisons contact the Environmental Branch on funding, manpower and regulatory issues, Ward explained.

"We represent them within the command, and if they have issues, this is where they can come whether they are a direct reporting garrison or they report to a region," he said. "We provide an environmental presence within the G-staff and can work issues that are integral to many parts of the headquarters within the headquarters and help to resolve them."

The Environmental Branch can also help garrisons get answers to technical questions or point them to the right people to answer those questions, he said.

"Keep focused on the Army training mission," Ward advised garrisons. That goal is of key importance.

Mary Beth Thompson is the managing editor, Public Works Digest.

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