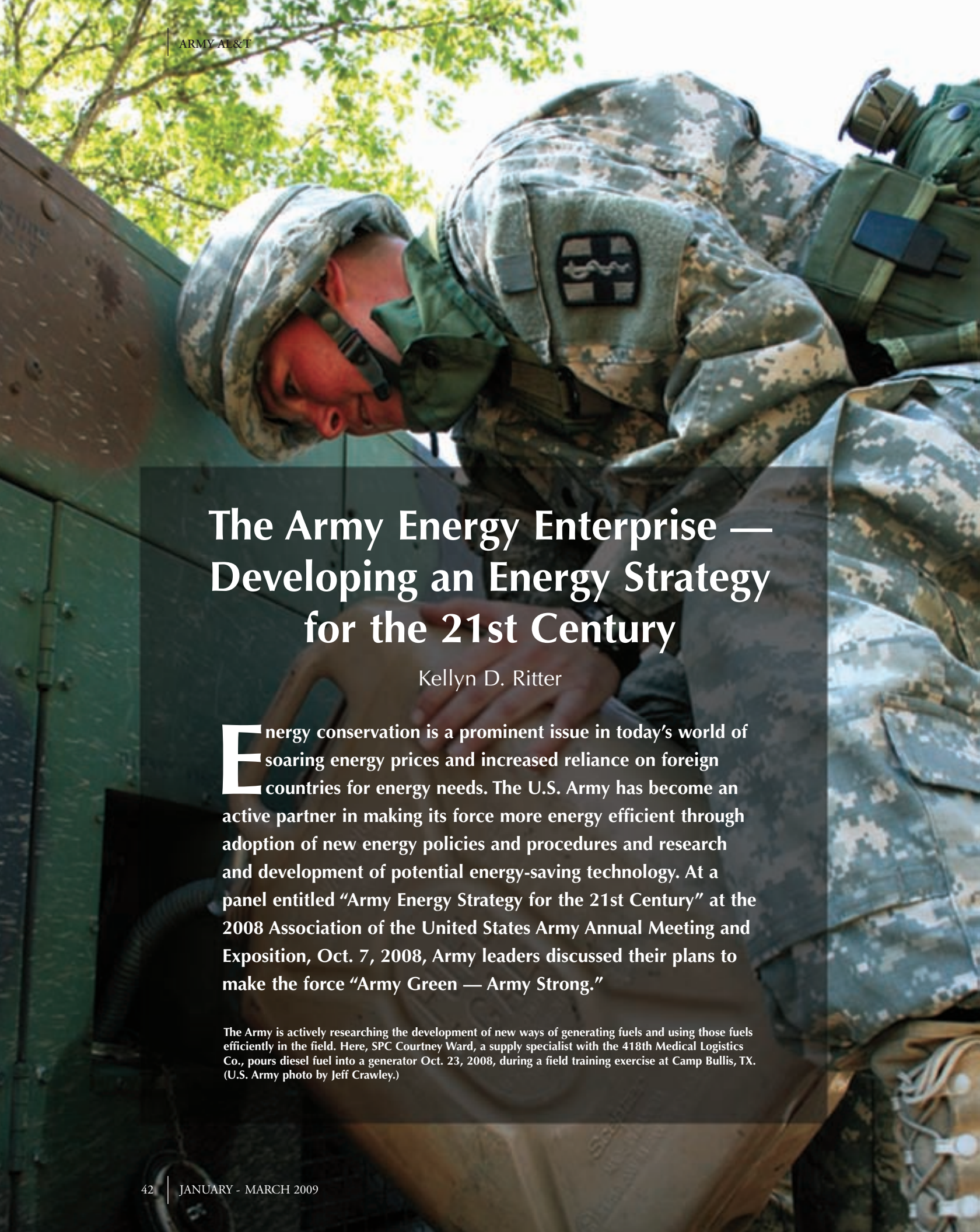

The Army Energy Enterprise — Developing an Energy Strategy for the 21st Century

Kellyn D. Ritter

Energy conservation is a prominent issue in today's world of soaring energy prices and increased reliance on foreign countries for energy needs. The U.S. Army has become an active partner in making its force more energy efficient through adoption of new energy policies and procedures and research and development of potential energy-saving technology. At a panel entitled "Army Energy Strategy for the 21st Century" at the 2008 Association of the United States Army Annual Meeting and Exposition, Oct. 7, 2008, Army leaders discussed their plans to make the force "Army Green — Army Strong."

The Army is actively researching the development of new ways of generating fuels and using those fuels efficiently in the field. Here, SPC Courtney Ward, a supply specialist with the 418th Medical Logistics Co., pours diesel fuel into a generator Oct. 23, 2008, during a field training exercise at Camp Bullis, TX. (U.S. Army photo by Jeff Crawley.)

The MGV's need for a large amount of energy to support its electronics is fulfilled through a hybrid-electric capability. Here, the FCS program's MGV Non-Line-Of-Sight Cannon prototype successfully fires its first artillery projectile. (U.S. Army photo.)

Energy Conservation Importance

Paul Bollinger, Deputy Assistant Secretary of the Army for Energy and Partnerships (DASA(E&P)), Assistant Secretary of the Army for Installations and Environment (ASAIE), moderated the Army Energy Strategy panel. He explained the vital role that energy plays in the Army's missions, especially in today's Army where Soldiers are deployed in *Operations Enduring* and *Iraqi Freedom*. During wartime, the Army's energy consumption almost doubles. Bollinger declared that "war is expensive, but it does not have to be wasteful." He explained that a 1-percent energy reduction in theater results in a reduction of almost 6,500 Soldier trips. This not only saves energy, but it enables the availability of Soldiers, equipment, and logistics for other missions.

ASAIE Keith Eastin advised that the Army consumes 22 percent of DOD's energy (approximately $1.6 billion a year) on installations alone, excluding contingency operations. Eastin advised that implementing a successful energy strategy is critical to the Army's success. "We undertake this mission because it sustains our Army's ability to fight and win our Nation's wars," he said.

Rising energy costs are another concern for the Army. Since 2002, energy consumption, while not consistently, has gone down significantly. However, the cost of energy has gone up. The Army is cutting energy use, but the increased costs negate this reduction. Since 2002, energy consumption was cut by 8.4 percent, but energy cost has gone up by 60 percent. Dr. Thomas H. Killion, DASA for Research and Technology and Chief Scientist, advised that the Army has a real challenge in terms of transportation costs, which include fuel acquisition and protection and providing supply lines to our troops. All are critical parts of the Army's infrastructure, but present a large and growing cost. To drive down that cost, in terms of technology, the Army must design more efficient vehicles and develop new ways of generating fuels and using those fuels efficiently in the field.

> Implementing a successful energy strategy is critical to the Army's success. We undertake this mission because it sustains our Army's ability to fight and win our Nation's wars.

A challenge in reducing energy consumption is that the Army itself is growing in numbers. As the size of the Army increases, so will the amount of energy used. In addition, the Future Combat Systems (FCS) being developed for the Future Force require more energy. The *National Defense Authorization Act for 2009* also contains many energy responsibilities and requirements for DOD and the Army. These challenges are evidence that the Army must act now to enact its energy strategy and prepare the Army for its energy future.

Secretary of the Army (SecArmy) Energy Strategy

SecArmy Pete Geren made energy conservation and reduction a priority for the Army. After the Defense

Science Board and Energy Accountability Office issued energy reports in early 2008, Geren wanted to determine the significance of these reports for the Army. He created the Army Energy Task Force, which consisted of Bollinger as chair and 20-30 participating commands, to generate a report on how the Army plans to handle its energy strategy.

Geren gave specific instructions on the Energy Task Force's role: "I expect the Task Force Report to be the guiding document to reduce Army energy consumption, increase efficiency across platforms and facilities, promote the use of new sources of alternative energy, establish benchmarks for our environmental footprint, and provide guidance for the creation of a culture of energy awareness across the Army."

The Energy Task Force Report recommended establishing the DASA(E&P) as the person responsible for Army energy. It also created the Senior Energy Council, co-chaired by Eastin and Army Vice Chief of Staff GEN Peter Chiarelli, which is responsible for the Army's energy policy, programs, and initiatives. This council briefs the SecArmy twice a year on all Army energy issues. The council also works to accelerate the use of renewable energy resources, expedite metering in Army installations, implement practices and technologies that control Forward Operating Bases (FOBs), and uphold energy accountability to reduce consumption.

Geren's energy security strategy rolled out in early October 2008. This strategy was developed to implement enterprise-wide solutions for energy and will lead the Army to energy independence. The market today will demand more aggressive methods and holistic approaches for saving energy, and the Army plans to meet those challenges.

Solution — The Energy Strategic Plan

The Army's Energy Strategic Plan developed by the Senior Energy Council and approved by Geren directs the Army to move installations from net-energy consumers to net-energy producers over the next 15 years. The Army needs to produce more energy on its installations and export this energy for a monetary profit that can be given back to the installations. To make the Army a net-energy producer, options such as solar/wind power, biomass conversion, hydropower, geothermal, solar energy, wave power, and possibly nuclear energy, are considered. The Army is researching these methods to determine how and the extent to which they can be implemented.

The market today will demand more aggressive methods and holistic approaches for saving energy, and the Army plans to meet those challenges.

Currently, the Army does not have the resources or expertise to be a net-producer. The panel agreed that to accomplish a reduction in energy consumption, the Army must work with science and industry. As Bollinger pointed out, industry is ahead of the wheel, so the Army needs to partner with them for the use of technology: "We are not trying to reinvent the wheel, but use the technology we know already works."

U.S. Army Corps of Engineers' (USACE) Energy Efforts

LTG Robert L. Van Antwerp Jr., Chief of Engineers and USACE Commanding General (CG), explained how his command is implementing the energy strategic plan. USACE is charged with reducing energy by 2 percent a year and is committed to going above and beyond that if possible. USACE is also tasked with metering every energy source and method and aims to have

An example of Army energy efficiency is the solar panels at the Pohakuloa Training Area, HI, (shown here) that charge the batteries beneath them, which provide enough energy to operate the range tower building beside it and the range pop-up targets. (U.S. Army photo by Chicpaul Becerra, U.S. Army Garrison-Pohakuloa Training Area Public Affairs.)

this completed by 2012. Retroactive work is being completed on existing buildings to implement metering and all new structures are being built with a metering capability. USACE is required to identify new buildings that need or exceed standards, so it is reporting out on every facility built. It is also incorporating energy-efficient specifications and holding standards. USACE's target is a 30-percent betterment/reduction in energy use.

One of USACE's chief tasks is to make new Army facilities as energy efficient as possible. An example of a building that was constructed to reduce energy consumption is the Golden Knight Parachute Team's Headquarters, Fort Bragg, NC. All water that hits the building is reused, geothermal heating is implemented, and there is a special treatment on the building's glass that cools it in the summer and heats it in the winter. Another example is the Niagara Falls Air Reserve Station Lodging Facility, NY, that has a ground heat exchanger designed for air supply to extract air out, making it extremely efficient. The building came in under 50 percent of what a building of its size usually uses for energy consumption.

Energy-efficient and energy-saving options that USACE is implementing on installations include geothermal heat pumps, wind generation, solar hot water, hydropower, biomass woodchips, and exploring Tactical Garbage to Energy Refinery (TGER) use (see related *Army AL&T Online* article at **http://www.usaasc.info/alt_online/article.cfm?iID=0811&aid=03**).

The Army's Energy Strategic Plan developed by the Senior Energy Council and approved by Geren directs the Army to move installations from net-energy consumers to net-energy producers over the next 15 years.

Fort Irwin's Energy Efforts

BG Dana J. H. Pittard, National Training Center (NTC) and Fort Irwin, CA, CG, explained Fort Irwin's energy campaign plan, one of the most advanced in the Army. NTC's goal is to reduce its energy consumption and move toward renewable energy by 4 percent per year. A significant step in this goal is reducing costs on the training FOBs at NTC that are similar to those in Iraq and Afghanistan. Each brigade combat team training at NTC uses $3 million dollars each rotation (10 per year) to rent tents and generators for the NTC FOBs. NTC used foam technology over the tents, making them semipermanent structures and conserving energy. This reduced generator use by 8 percent and carbon emissions by 67 percent. An investment of $16 million to use foam technology on all the FOBs would save the Army approximately $105 million over 4-5 years. The investment would pay for itself within six rotations.

NTC also examined making each FOB a microgrid. With approximately 1,200 square miles for training, NTC has the potential to use wind, sun, and geothermal power. The center's ultimate goal and environmental campaign plan is to have 100 percent of its energy as renewable resources and make Fort Irwin its own microgrid. Furthermore, NTC plans to make these processes profitable by becoming its own energy net-producer.

Vehicle and FCS Energy Plan

Killion discussed how the Army is applying energy savings to its vehicles. Today's vehicles require a greater consumption of mechanical and electric energy. Tactical vehicles have an increased complexity and consume more power, fuel, heating, and cooling.

The Army is exploring the capability of converting garbage to energy with the TGER, a system already being tested in theater. Here, contractors install a TGER at Camp Victory, Iraq. (U.S. Army photo by Jerry Warner, Defense Life Sciences.)

Tactical vehicles have an increased complexity and consume more power, fuel, heating, and cooling, so the Army must be diligent about conserving their energy use. Here, SPC Carlos Mantano pumps gas into his light medium tactical vehicle during Joint Task Force Guantanamo, Cuba, drivers training. (U.S. Army photo by SPC Erica Isaacson, Joint Task Force Guantanamo Public Affairs.)

Manned ground vehicles (MGVs) have immense electronics in them — sensor, communication, and electronic warfare systems — and are, fortunately, hybrid-electric. The real demand for the hybrid-electric capability came from the need for the energy expended by the vehicle's electronics. The Soldier-as-a-system also demands power. Advanced computers, sensors, and battle command capabilities on the Soldier and his/her weapons require energy. All present a challenge to use battery, fuel cell, or alternative power.

There are several solutions being pursued by Killion's team. These include reducing platform energy consumption, discovering more efficient power sources, employing smart energy management, adopting proactive thermal management, and using alternative fuels. The science and technology (S&T) power and energy strategy involves basic and fundamental research on the design of power systems and new solutions. The strategy also includes advanced development for energy consumption associated with the vehicle platforms, manufacturing of lighter vehicles that demand less power while still providing the protection needed for our Soldiers' survival, use of lower-power electronics, and implementation of more efficient power sources.

> We are investing in solutions across the board that will pay off in terms of energy-efficient solutions that still provide the Soldier's needed capabilities.

Specific vehicle programs include using robotics for vehicle platforms to conduct transporting and missions, employing TGER, and using advanced and more efficient engine technology to create lighter weight vehicles with better protection.

Killion advised that the Army is making headway in its energy plan: "We are investing in solutions across the board that will pay off in terms of energy-efficient solutions that still provide the Soldier's needed capabilities. It is our ultimate responsibility to provide the capability that will work when they need it to work and provide the protection to do the things we ask them to do. Our challenge is to bring the best ideas to the table to help us be successful in powering those systems for the future in the most efficient and effective way possible."

The Army is committed to implementing its Energy Strategic Plan for the Current Force and investing in S&T for energy-efficient solutions for the Future Force. Through these efforts, the Army will remain the strongest fighting force in the world while also staying fiscally and environmentally sound.

KELLYN D. RITTER provides contract support to the U.S. Army Acquisition Support Center through BRTRC Technology Marketing Group. She has a B.A. in English from Dickinson College.