

# What Is the Army Doing With Operational Energy?

Operational energy management has become an important facet of Army sustainment and should be incorporated in doctrine and reinforced during training.

■ By Maj. Ryan T. Hulse

About four years ago, Maj. Gen. James L. Hodge, then the commanding general of the Combined Arms Support Command (CASCOM), wrote an article for *Army Sustainment* entitled, “Every Soldier is an Energy Manager.” In the article, he briefly discussed operational energy and the creation of a new operational energy office at CASCOM.

The goal of the CASCOM Operational Energy Branch is to reduce consumption and demand to provide operational commanders with increased capabilities in the form of extended range and endurance, increased freedom of action, and therefore, less risk. The office wants the Army’s combat systems and platforms to be more energy efficient, and at the same time, it wants to change the behavior of Soldiers so that they use energy wisely.

## Operational Energy Background

The Duncan Hunter National Defense Authorization Act for fiscal year 2009 defines operational energy as “the energy required for training, moving, and sustaining military forces and weapons platforms for military operations.” It includes, but is not limited to, energy used by tactical power systems, generators, and weapons platforms.

The U.S. military’s energy demand has steadily increased since World War II. We have added more protection to our vehicles and weapon platforms, increased our aviation assets, modernized our systems with

added equipment and technology, and added quality of life services in our larger bases overseas.

Compare the fuel consumption of our forces between World War II and today. During World War II, one Soldier used on average one gallon of fuel per day. In 2007 during Operations Enduring Freedom and Iraqi Freedom, the average usage was 22 gallons per Soldier per day. Today, fuel comprises about 50 percent of ground resupply in theaters of operations, while water comprises about 20 percent.

In 2009, while he was the undersecretary of defense for acquisition, logistics, and technology, Secretary of Defense Ashton B. Carter testified to Congress that “protecting large fuel convoys imposes a huge burden on the combat forces.” This means that the Army regularly has had to use infantry, military police, and field artillery Soldiers to protect fuel and water convoys instead of using them for their traditional tactical missions.

Former Secretary of the Army John McHugh stated that “for every 44 convoys we put on the road, we lose one Soldier.” In the future, sustaining operational forces will be even more challenging. Army forces will require sufficient access to power and energy to enable maneuver and freedom of action over wide areas.

That power and energy will provide operational reach, endurance, resilience, and flexibility to respond to operational demands. In order

for the Army to be more energy efficient, we must incorporate energy awareness, training, and education at all levels.

## Training and Education

CASCOM’s Army Operational Energy Training Strategy sets forth the plan for incorporating operational energy concepts, practices, and techniques into the institutional, operational, and self-development training domains.

The goals of the strategy are to give Soldiers and leaders the knowledge and skills needed to manage and use operational energy effectively and to make energy a consideration in all they do. The approach should add minimal time (one to two hours) to current training requirements.

To create an energy-informed culture, we need to give every Soldier basic energy conservation responsibilities and techniques to conserve energy. Soldiers should receive tiered technical training and leader education in power production, distribution, storage, planning, and management.

The Army should integrate energy management concepts and best practices into certain doctrinal publications and task all leaders with the responsibility of communicating to their Soldiers the importance of using energy effectively.

Operational energy training is divided into three main categories: awareness, technical training, and education. Energy training and education will be integrated into all

skill levels and ranks to “establish an energy informed culture through education, training and awareness programs that value energy as a resource that enables enhanced capabilities and lowers operational risk,” in accordance with the 2013 Department of Defense Operational Energy Policy.

Every Soldier will understand operational energy concepts through awareness training. Content will be developed for the institutional, operational, and self-development domains.

**Institutional domain.** Training for the institutional domain will begin with awareness training in initial military training. The training will establish the principles of conservation as habits at the start of service and continue throughout professional and leadership development.

Technical components of operational energy are currently taught in military occupational specialty-specific courses and may need to be added, as directed by the proponent school, to other institutional courses.

**Operational domain.** Operational energy training will be included in the operational domain through home-station training and technical training for operators, power managers, and advisers. Operational energy issues will be integrated into scenarios during contingency training at combat training centers when practicable.

**Self-development domain.** Operational energy training in the self-development domain will support the training received in the other training domains and will include graphic training aids, job aids, training handouts, and online learning.

Soldiers will have access to these self-development resources:

- Operational energy training videos.
- Graphic Training Aid 09-16-001, Tactical Electric Power Planning and Operations Operational Reference Guide.
- AutoDISE, which is a computer

model developed to simulate the use of the Distribution Illumination System, Electrical (available at <https://www.autodise.net>).

- An operational energy interactive application for smartphones and tablets (will be available in the Central Army Registry at <https://rdl.train.army.mil/catalog>).

- Allied Logistic Publication 4.2, Land Forces Logistic Doctrine.

### An Energy Efficient Army

The Training and Doctrine Command’s capability developers must add energy key performance parameters to their capability development documents and capability

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### Doctrine and Concepts

The Operational Energy Branch has developed a plan to incorporate operational energy concepts into specific logistics publications. However, no overarching Army operational energy doctrine addresses operational power and energy for expeditionary operations, nor is the use and management of this critical commodity addressed in operational publications.

To ensure that it delivers critical knowledge to the point of need, the CASCOM Operational Energy Branch will work with proponents to add operational energy planning and management considerations into selected operational publications, to include the following:

- Army Doctrine Reference Publication (ADRP) 1, The Army Profession.
- ADRP 4-0, Sustainment.
- ADRP 5-0, The Operations Process.
- ADRP 6-0, Mission Command.
- ADRP 7-0, Training Units and Developing Leaders.
- Field Manual 4-95, Logistics Operations.
- Field Manual 6-0, Commander and Staff Organization and Operations.

production documents. Capability developers must follow the updated 2015 Joint Capabilities Integration and Development System manual, which provides instructions for developing capabilities, including energy key performance parameters.

Force 2025 and Beyond is being designed as a flexible and agile force with more options to resolve crises in multiple locations. As the Army becomes more expeditionary, the Operational Energy Branch will continue to evaluate energy-related technologies at network integration evaluations and Army warfighting assessments at Fort Bliss, Texas.

The Operational Energy Branch is working with lead planners of a network integration evaluation on an expeditionary base camp with several operational energy-related technologies and is assisting in the development of a tactical power management concept.

The team is also working with Project Manager Expeditionary Energy and Sustainment Systems and the Army Materiel Command on automatic start-stop tactical power generation microgrids, which will tie multiple generators and alternative power sources together and provide electricity more efficiently at contingency basing sites.

In addition to working on the advanced medium mobile power source, a generator that uses 21 percent less fuel than older systems, the branch is addressing five of CASCOM's top priorities related to operational energy technologies for the future.

**Autonomous convoy operations.** The team is supporting the development of autonomous convoy operations, which involve driverless supply vehicles that follow a manned vehicle in the combat zone. The benefits include minimizing the logistics footprint, reducing risk to Soldiers, and preserving freedom of maneuver and action.

**Alternative water sources.** Using alternative water sources would save operational energy. For example, the water from air system extracts water from air then cools it and purifies it to be drinking water. The benefits include minimizing the logistics footprint, reducing risk to Soldiers, and increasing the availability of water in the combat zone without using resupply.

**Additive manufacturing.** With additive manufacturing, also called 3D printing, replacement parts can be quickly manufactured on site. The benefits include manufacturing closer to the point of need, reducing the stockpiling of parts in the combat zone, minimizing the logistics footprint, and reducing risk to Soldiers by reducing the number of supply convoys.

**Intelligent power management distribution system.** The intelligent power management distribution system is a portable, rugged power distribution system with automatic load balancing and electrical hazard warnings. Its benefits include a reduced burden on the warfighter during power grid set up, greater power grid reliability, and fewer potential injuries caused by electrical hazards.

**Autonomous aerial delivery.** An unmanned vertical take-off and lift flight module could be used for resupply operations. The capability would allow a quicker turnaround time for emergency resupply and

more scalable and responsive resupply of tactical deployed units.

The Army's ability to effectively manage operational energy directly affects operational reach and endurance. Energy management concepts must be reflected in doctrine and reinforced in training, education, accountability systems, and communications programs. The goal is to make every Soldier and civilian an energy manager who makes energy a consideration in every action.

CASCOM will update doctrine to reflect the methods that will meet the operational energy objectives already found in policy and guidance. It will do this using a multifaceted approach that leverages the capabilities of existing training platforms, such as institutional training sites and web-based familiarization courses. Leaders need to supplement this training by highlighting why energy effectiveness is important.

Awareness goes a long way, but to maintain momentum we need to improve operational energy training and education. Education is the platform that bridges the gap between awareness and action. Once we begin to change the behavior of Soldiers to use energy more efficiently, then every Soldier will be an energy manager.



*The Army's principal power distribution system, the power distribution illumination system electrical, is a rugged version of a home circuit breaker panel. It safely distributes power and is easy to connect and disconnect.*

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