# ENERGY SECURITY & SUSTAINABILITY (ES$^2$) STRATEGY

U.S.ARMY


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DEPARTMENT OF THE ARMY
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# Leadership Letter

For over two centuries, the United States Army has continued to proudly serve the Nation by winning its wars and securing the peace. The Army stands ready to defend the Nation and its interests at home and abroad, against current and emerging threats, both today and in the future. As the Army continues to serve, we must be able to accomplish our missions in a world defined by uncertain, adverse, and dynamic conditions. Maintaining our tactical and strategic edge heavily depends upon the wise use of our resources — energy, water, and land — to preserve future choices through superior knowledge, technologies, and execution.

This **Energy Security and Sustainability (ES$^2$) Strategy** positions the Army to enhance its current and future capabilities, readiness, and performance by building upon its ability to employ resources effectively to support all aspects of operations through effective system design and integration of resource considerations into behaviors and decision processes. Building on the Office of the Assistant Secretary of the Army for Installations, Energy and Environment Strategy 2025, this strategy represents a turning point. The Army is evolving from a historic framework that viewed resource considerations as constraints on operational effectiveness to a perspective that considers the critical role of energy, water, and land resources as mission enablers. Such an integrated perspective requires balanced decisions to achieve the greatest military benefit while keeping faith with civilian communities. This distinction is key. This strategy will guide the Army to maintain our global superiority by reducing future resource risk and increasing mission assurance.

Measuring performance is vital to evaluating Army achievement. Headquarters, Department of the Army organizations and Army Commands will develop metrics to monitor progress in their areas of responsibility.

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1 May 2015
Date

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1 May 2015
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# I. Introduction

The Army faces a wide array of fast-moving domestic and global challenges and must continue to adapt in order to remain effective in this constantly changing environment. The Army has engaged in more than a decade of continuous combat operations followed by rising tension in the Mid- and Far-East, serious conflict in Europe, and expanding aggression from terrorist organizations and their supporters. At the same time, increasingly hostile global adversaries that exploit disruptive technologies, especially in the cyber realm, require the Army to meet complex and dangerous threats in the face of shrinking defense budgets. The Army must position itself to respond with sufficient land forces, capable of seizing the initiative, defeating enemy organizations, establishing security, consolidating gains, and achieving sustainable outcomes consistent with vital national interests.[1]

Trends of global significance, such as increased urbanization, rising populations, young adult unemployment, and a growing middle class that drive resource competition will also shape the Army's future operating environment. Additionally, the effects of climate change, rapid technology proliferation, and shifts in centers of economic activity represent major forces of change. Global resource constraints will also undermine the integrity of the Army's supply chain. Army leaders will face these challenges with a shrinking force and a constrained budget. Such diverse conditions compel the Army to foster a more resource-informed culture that supports decisions and behaviors across all levels, locations, and domains.

In response to this evolving environment, the Army's installations are becoming increasingly integral to operational effectiveness. We can no longer assume unimpeded access to the energy, water, land, and other resources required to train, sustain, and deploy a globally responsive Army. Adopting an Energy Security and Sustainability Strategy built upon the principle of resiliency will enhance the Army's adaptability to rapidly deploy, fight, and win whenever and wherever our national interests are threatened.

## Resilience

The ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions.
(*Executive Order 13653*)

[1] TRADOC Pamphlet 525-3-1, *The U.S. Army Operating Concept: Win in a Complex World, 2020-2040,* 31 October 2014.

# II. Purpose

The Energy Security and Sustainability ($ES^2$) Strategy presents the Army's strategic roadmap to foster a more adaptable and **resilient** force that is prepared for a future defined by complexity, uncertainty, and rapid change.[2] The $ES^2$ Strategy is designed to explain the Army's energy and sustainability posture and establish the underlying basis for an Army that adopts "security," "resiliency," and "future choice" as organizing approaches.

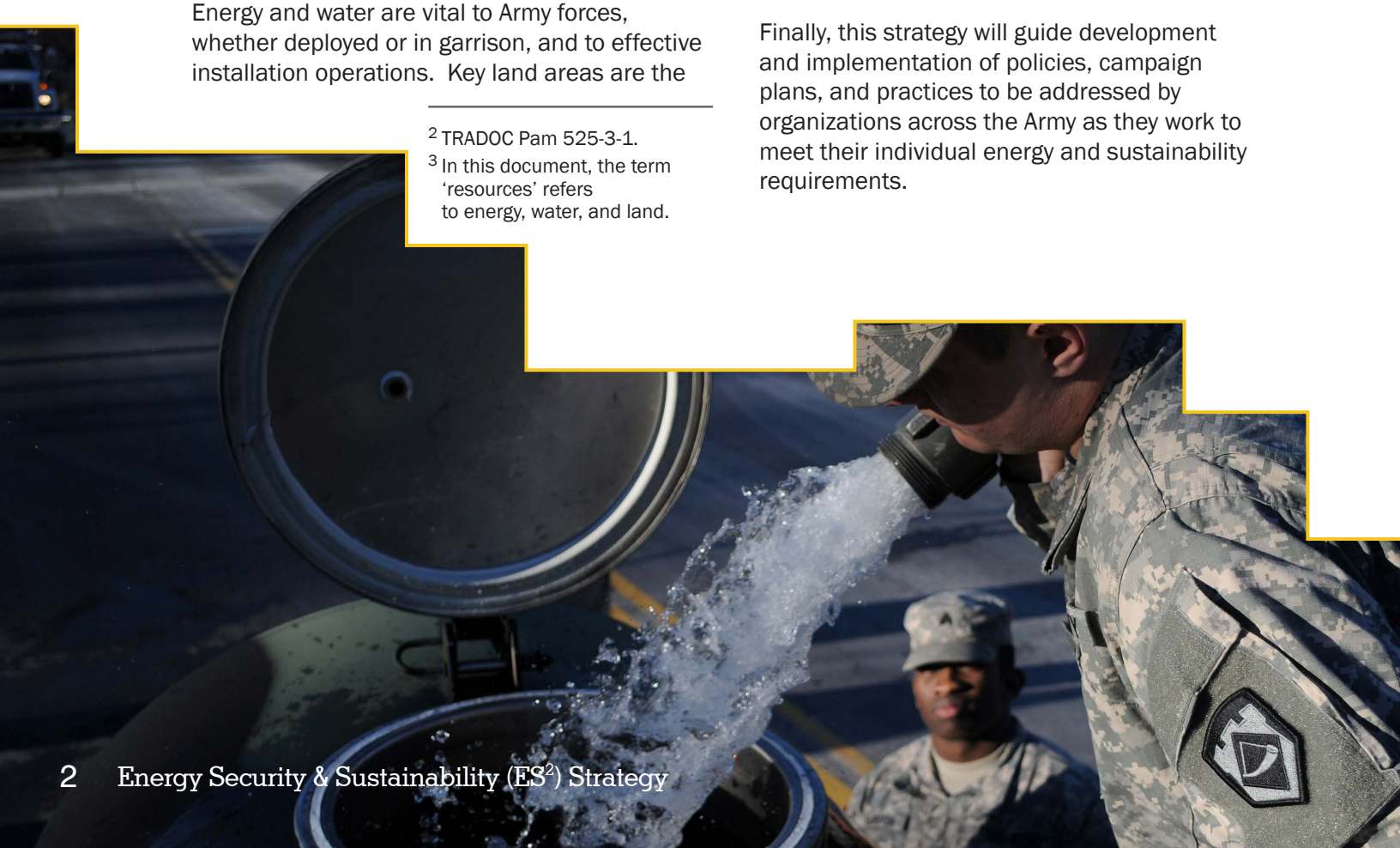
The $ES^2$ Strategy expands on and replaces the 2009 Army Energy Security Implementation Strategy (AESIS) by including operational energy and sustainability while strengthening the focus on resource management for our installations. This document complements the Office of the Assistant Secretary of the Army Installations, Energy and Environment Strategy 2025 and the Army Strategy for the Environment by emphasizing energy and including recognition of water and land as equally essential resources.[3] Energy and water are vital to Army forces, whether deployed or in garrison, and to effective installation operations. Key land areas are the essential venue for our testing and training ranges, as well as installation support. This strategy reflects the continuous evolution of Army energy and sustainability programs and also sets the stage for future efforts to exceed Federal energy, environmental, and sustainability requirements codified in legislation, regulations, presidential mandates, Department of Defense (DOD) directives, and Army policies.

This document introduces the concept of **resilience** as a key component of the Army's energy and sustainability strategy. We operate in an increasingly complex world that requires us to anticipate, prepare for, withstand and adapt to a range of inevitable natural or man-made disruptions and to recover rapidly across the entire Army spectrum. Resilience is essential for a responsive Army force posture and an effective network of installations and capabilities at home and abroad to protect U.S. interests and those of our allies.

Finally, this strategy will guide development and implementation of policies, campaign plans, and practices to be addressed by organizations across the Army as they work to meet their individual energy and sustainability requirements.

[2] TRADOC Pam 525-3-1.

[3] In this document, the term 'resources' refers to energy, water, and land.



# III. Vision


A ready and resilient Army strengthened by secure access to the energy, water, and land resources in order to preserve future choice in a rapidly changing world.

"The Army's mission is to fight and win our Nation's wars by providing prompt, sustained land dominance across the full range of military operations and spectrum of conflict in support of combatant commanders."[4] This means the Army must remain ready and able to execute military operations around the globe — from combat operations to partner nation capacity-building and humanitarian responses — often under uncertain, adverse, and dynamic conditions. At home, the Army must also provide defense assistance to civil authorities. Maintaining our mission effectiveness and associated levels of training requires adaptive management of energy, water, and land resources. In a world that will be increasingly defined by conditions of resource competition, we cannot continue to rely on unlimited access to any of these items to help defeat complex state and non-state threats in austere environments and rugged terrain.

The ES² Vision describes a strong, mobile, and flexible force that is housed, trained, and maintained on resilient installations that are able to project power, unimpeded by disruptions to domestic utilities or land use constraints. When deployed, these forces will accomplish their missions by making optimal use of available resources with the lowest possible logistics footprint and by creating beneficial relationships with local communities.

**This vision has three components: a ready force, secure resources and resilient capabilities.** Each component is critical to support effective performance and provide our leaders with a range of viable resource decision options.

First, a ready force is trained, equipped, sustained, and motivated — able to rapidly move anywhere as needed and operate in a decisive manner.

Second, secure access to resources depends on system redundancies, diverse supply sources, and efficient use of energy, water, and land resources to implement the Army's wide-ranging responsibilities today and for years to come.

Third, resilient capabilities build upon self-reliance, teamwork, and flexibility to support a broad ability to anticipate and withstand shifting conditions, to recover rapidly, and to adapt to unforeseen disruptions as well as long-term change.

The ES² Vision represents an enduring image of our future. The Army will continue to approach this vision through increasing competence and confidence in our ability to use energy, water, and land resources wisely to operate and sustain the full range of assigned missions.

[4] The Army Mission: http://www.army.mil/info/organization/

# IV. Goals Summary

## Army Energy Security & Sustainability Strategic Goals

1. Inform Decisions
2. Optimize Use
3. Assure Access
4. Build Resiliency
5. Drive Innovation

This strategy is organized to achieve five strategic ES$^2$ Goals that support the ES$^2$ Vision by developing, aligning, and synchronizing energy-related capabilities and by honing energy, water, and land resource use to enable Army missions to succeed. This strategy's goals provide broad direction for integration of improved energy and water use into the Army capabilities through research, acquisition, training and leadership, and expanded application of informed decision processes and behaviors.

The strategy is designed to involve all Army organizations in realizing the ES$^2$ Vision. The ES$^2$ Strategic Goals will unify and assist Army organizations with considering resource use in their respective plans, programs, and policies to foster readiness, build resilience, and expand options for future action. Progress in support of these goals will represent important improvements in the Army's energy security and sustainability posture and will help ensure that the Army remains the most dominant land force in the world now and in the future.

We will achieve the ES$^2$ Strategic Goals through steady progress across the enterprise — materiel, readiness, human capital, services and infrastructure — with targeted measures and metrics as guides. Especially in the face of tight budgets, advancing toward these goals will strengthen our fundamental capabilities and resource use to perform across a range of military operations to Prevent, Shape, and Win.[5] Our forces and installations must be flexible and adaptable, postured for change as conditions inevitably shift in unforeseen ways. We must build a more resilient culture if we are to better address our complex, dynamic, and uncertain future.

[5] The Army's Strategic Vision. *Army Strategic Planning Guidance,* 2014

# V. Goals

The five ES$^2$ Strategic Goals are designed to unify the Army's energy and sustainability functions across both the generating and operating force. These goals address broad Army global missions but also guide the Army's interaction with nearby civilian communities and national authorities.

## GOAL 1: Inform Decisions

Leverage Army culture to use resources wisely, improve mission effectiveness, and preserve future choice.

Army culture is the foundation that supports all we do. We will leverage those aspects of Army culture that emphasize reducing risk and developing the future force through improved resource use. We will ensure that Army planning and decision-making processes fully consider the current and long-term resource implications. Commanders, program executives, and garrison leadership teams must have knowledge of and access to the information necessary to assess how the direct and indirect consequences of their decisions affect capabilities, resource utilization, and associated vulnerabilities.

To achieve this goal, the Army will:

- **Incorporate Resource Sustainability in Plans and Processes** – Ensure that resource considerations, including sustainability, security, integrated design, and total life-cycle cost, are incorporated into plans, business processes, materiel management, and acquisition strategies at all levels.

  Informed decisions include consideration of total life-cycle costs, applicable externalities and intangible benefits such as increased force effectiveness, security, and continuity of operations; decreased operational risk; decreased health and safety risks; and enhanced resource stewardship today and into the future. To do this, the Army will integrate resource considerations and cost management into its range of plans, business processes, materiel management, and acquisition strategies, along with associated investment and risk management processes at all relevant levels from headquarters to units and installations. Plans and processes across the enterprise include:

  - Operations. Campaign plans, operations plans, contingency plans; force planning analyses and processes (including planning scenarios and war games); stationing analyses; analyses for Defense Support for Civil Authorities; and requirements generation;
  - Testing and Training. Test and training plans; range complex master plans; compatible use planning; integrated cultural resources management plans; and integrated natural resource management plans;
  - Acquisition and Supply. Requirements analysis and acquisition strategies (including strategic reserves and stockpiles for critical components); weapons fielding and maintenance plans; and materiel management and supply activities (including procurement, storage, and distribution and transportation); and
  - Services and Infrastructure. Integrated design, construction, and major renovation standards and programs; facility operation, maintenance, and repair processes and decisions; installation real property master plans; installation water resource management plans; and energy and water security plans.

# Goals (continued)

- **Educate and Train Personnel Across the Enterprise** – Integrate resiliency and sustainability principles in training and Leader development to support an adaptive and innovative force.

  Our people are our strength, and the Army will continue to invest in our Soldiers, Civilians, and Family members. Our education and training will incorporate evolving knowledge, doctrine, and policy to guide Soldiers, Civilians, and Leaders to incorporate sustainability into planning and decision making.

  Organizational resilience and sustainability concepts will be integrated into Soldier and Civilian education programs at every level, from basic training to senior service colleges, as well as programs that focus on the holistic health and well-being of our people. To benefit the total Army, civilian training and advancement are also essential elements to inculcate sustainability into the daily decisions of our workforce.

- **Lead by Example** – Leverage Army culture to shape resource-informed behavior by our Soldiers, Civilians, and Family members.

  Army Leaders at all levels must make sustainability an integral part of our Army culture and values, so that we can continue to meet our operational requirements today and into the future. The Army ethos and values are a foundation for executing the Army's mission, and leadership is the catalyst that makes the decisive difference. Our Army Leaders will ensure that the principles of sustainability inform what they say and do. Leaders will also recognize their subordinates' activities and efforts that increase the Army's sustainability and resilience.

## GOAL 2: Optimize Use

Minimize demand and increase both efficiency and recovery to maximize resource and mission effectiveness for systems, installations, and operations.

The Army will improve productivity by reducing resource demand, investing in increased efficiency or enhanced recovery, and switching to renewable resources. Improved resource use can increase security and reduce expenses. We will minimize our environmental impacts from systems, installations, and operations by using natural resources more productively.

To achieve this goal, the Army will:

- **Decrease Resource Demand** – Minimize demand for energy, water, and land resources in the design, manufacture, and operation of systems, aircraft, vehicles, and equipment, along with the installations and operating locations that support them.

  Opportunities to decrease resource needs for direct mission related activities include increasing awareness so Soldiers are attentive to the amount of resources key activities require and the potential mission impacts. The goal is behavioral and operational change so more Army assets are focused on mission-related activities and fewer are focused on planning, execution, and protecting resource resupply missions.

  The resource demand of Army facilities, systems, aircraft, vehicles, and equipment will be reduced through design, development, and procurement requirements that reward and mandate resource efficiency without compromising mission effectiveness. For example, the Army can incorporate innovative building technologies into new and renovated facilities, require more fuel efficient engines for aircraft, include lightweight materials in vehicles, and install as standard low-flow

showerheads and networked generators at base camps. Additionally, the Army will embrace the principles of sustainable design and development when siting and designing future facilities and conducting major renovations.

- **Increase Resource Efficiency** – Increase the productivity of Army energy, water, and land use.

  We will improve resource utilization by considering energy, water, and waste systems holistically so that optimal solutions are developed to involve all three. The Army will prioritize solutions that reduce multiple resources.

  The Army can use energy more efficiently by purchasing energy efficient products, modernizing buildings and utility systems, purchasing energy efficient vehicles, and using more renewable/alternative energy sources. We can use water more efficiently by purchasing water efficient products, matching water quality to use, maximizing opportunities for water reuse, and increasing water recharge. The Army will build on its Sustainable Range Program, integrated natural resource management plans, and real property master plans to optimize land use requirements, while protecting the natural and cultural resources entrusted to our care. Additionally, the Army can support resource sustainability by using building materials or products that are derived or manufactured within a region. Utilizing regional resources where feasible can improve supply chain efficiency, thereby ensuring greater project or mission success, increasing both materiel and operational sustainability of facilities, and reducing the logistical burden on operations.

  Behavioral and organizational changes will be linked to and integrated with any technological or land use changes to maximize efficiencies. These changes will be informed by quantitative measurement of resource use over time. These regular and timely measurements will determine if the resource efficiency efforts are effective.

- **Support Resource Recovery** – Implement systems and processes that improve energy, water, and land utilization, including life-cycle materiel management.

  The Army will continue to consider a variety of approaches and technologies to implement energy recovery. Energy recycling can be implemented using energy cogeneration, also known as combined heat and power (CHP), or waste heat recovery for uses, such as preheating process fluids and space

conditioning. Army applications like CHP reduce energy expenses and increase energy reliability or reduce greenhouse gas (GHG) emissions when linked to renewable sources to generate electricity.

Similarly, the Army will seek opportunities to reuse or recycle water to increase the beneficial use of each gallon of water, regardless of the initial source. Using alternative sources of water, such as treated wastewater or rainwater, also decreases the volume of potable water that has to be treated and distributed. Using green infrastructure as an integral part of stormwater management provides multiple options to beneficially address these flows, including using them to replenish ground water sources and maintain both surface and subsurface ecosystem services.

All Army land management plans will include best management practices that balance land use needs with ecosystem recovery requirements. Land maintenance and rehabilitation are critical components of effective land management and will enable continued use of the Army's test, training, and cantonment areas.

## GOAL 3: Assure Access

Provide reliable access to energy, water, and land resources and protect delivery mechanisms to mission-essential functions and applications, both domestically and to contingency bases during operational deployments.

The Army will continue to ensure that mission-essential and supporting assets are available and secure by pursuing options to diversify and expand resource supplies, to increase redundancy and multiple distribution pathways, and to manage vulnerability and risk.

To achieve this goal, the Army will:

- **Diversify and Expand Resource Supply** – Secure access to multiple energy and water sources, including renewable and alternative options, to improve resource availability.

  Secure access to resources in the quantities and quality required will ensure that unimpeded use can occur for the time duration needed. The Army will seek to establish multiple locations and sources, disconnected from one another in time

and/or space to increase the variety and breadth of supply options at fixed installations and forward locations. Physical access may be divided between surface and subsurface source locations. The Army will ensure that resource needs of critical suppliers are integrated into our resource diversification and expansion options since disruption of supplier resources will also directly affect our ability to operate.

- **Maximize Flexibility in System Design and Use** – Employ systems that are designed to provide multiple sources/pathways or are capable of being applied in alternative ways.

  Flexible systems, such as micro-grids for power distribution, increase the Army's ability to rapidly adapt to disruption and maintain operations. The Army will seek to design new systems and incrementally upgrade existing platforms to expand capability for dynamic adjustments to alternative applications, particularly when each response requires some tailoring to be effective. We will seek to use multi-fuel platforms and infrastructure that can provide flexible operations during energy and water shortages at fixed installations and forward locations. If a subsystem fails or is temporarily unavailable, other parts of the system will continue to operate at an acceptable level until full functionality is restored. System flexibility also increases the Army's ability to rapidly adapt to each situation's unique, complex, and unexpected challenges.

- **Reduce Vulnerability and Risks** – Upgrade physical and cyber protection to reduce risk and increase security for resource supply, storage, and distribution pathways; industrial control systems; supply chain; key testing facilities; and training lands.

  The Army will continually assess vulnerabilities and risks and work to enhance protections to directly increase availability of the key resources, facilities, and systems and platforms on which we depend. Required upgrades may be needed immediately, depending on the importance of an asset and its use, or may be conducted over time if the asset retains an acceptable level of secure functionality. We will continue to manage resources at fixed installations and contingency bases to reduce the frequency of threat exposure during resupply and delivery operations.

## GOAL 4: Build Resiliency

Advance the capability for systems, installations, personnel, and units to respond to unforeseen disruptions and quickly recover while continuing critical activities.

Resilience expands our focus from protecting key systems against specific threats to an outcome orientation that emphasizes flexibility, diversity, and a proactive posture. Resilience requires coordinated action to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions. Adopting flexibility and adaptable approaches at all levels, from individual to enterprise, ensures that we can accomplish the mission in the face of both near- and long-term change.

To achieve this goal, the Army will:

- **Maintain Continuity of Operation** – Implement integrated and distributed technologies and procedures to ensure critical systems remain operational in the face of disruptive events.

  The Army will analyze, plan, and stage capabilities to maintain continuity of operation while responding to and recovering from anticipated or unanticipated change. The traditional focus on protection of existing systems from anticipated events will be reinforced by pursuing strategies to assure

continuity of essential functions and rapid recovery in the face of diverse, unexpected situations. We will build this resilient posture through balanced investment in and integration of technologies, information, and individual and organizational elements with a focus on outcomes — what we need to achieve — considering both near-term events and long-term developments.

- **Foster Adaptability** – Ensure Army operations can quickly adjust in response to disruptions in land availability, energy and water supplies, and supply chain functions.

  The Army will cultivate flexibility and diversity among Army capabilities and processes with respect to energy, water, and land resources. Appropriate design margins, alternative methods, and diverse sources will be incorporated into operational processes to reduce dependence of outcomes on maintaining specific conditions. The Army will also provide ready access to information and instill entrepreneurial problem-solving within training and leadership development. Diversity will be built into energy, water, and land resources to maximize the value of functional flexibility.

- **Adapt to Uncertain, Changing Conditions** – Develop comprehensive energy, water, and land management practices, to include materiel and acquisition decisions that can adjust to evolving conditions such as climate change and increased need for Defense Support for Civil Authorities.

  The Army will continuously monitor the operating environment at all levels and time scales to provide early warning and characterization of relevant events and trends. Ongoing performance and projected future resource-related requirements will be assessed to determine impacts to operating capabilities and evolving missions. New insights will be factored into force modernization and organizational learning to accommodate trends such as climate change and the growing focus on coordination with local community officials.

## GOAL 5: Drive Innovation

Identify new concepts; develop, test, and field new processes and technologies; and institutionalize and communicate best practices to maximize resource effectiveness.

While we continually seek out technological and doctrinal innovations, we need to link these innovations to more effective use of energy, water, and land to maximize our capabilities. As we invest in new technologies and the capabilities that they create or enhance, we need to ensure that we include the life-cycle energy and water requirements so that we maximize each technology's effectiveness.

To achieve this goal, the Army will:

- **Leverage Expertise** – Deploy the Army's science, technology, engineering, operations, and environmental expertise to increase resource-effective solutions.

  Every day, Army scientists, engineers, planners, medical professionals, and other personnel use their extensive expertise to improve the Army's operations and effectiveness. We will continue to leverage this expertise to develop innovative and resource-effective technologies, systems, equipment, and operations. At the same time, the Army will invest in its personnel through professional education and development programs designed to support Army priorities, foster individual growth, retain experienced personnel, develop high performing teams, and attract new expertise.

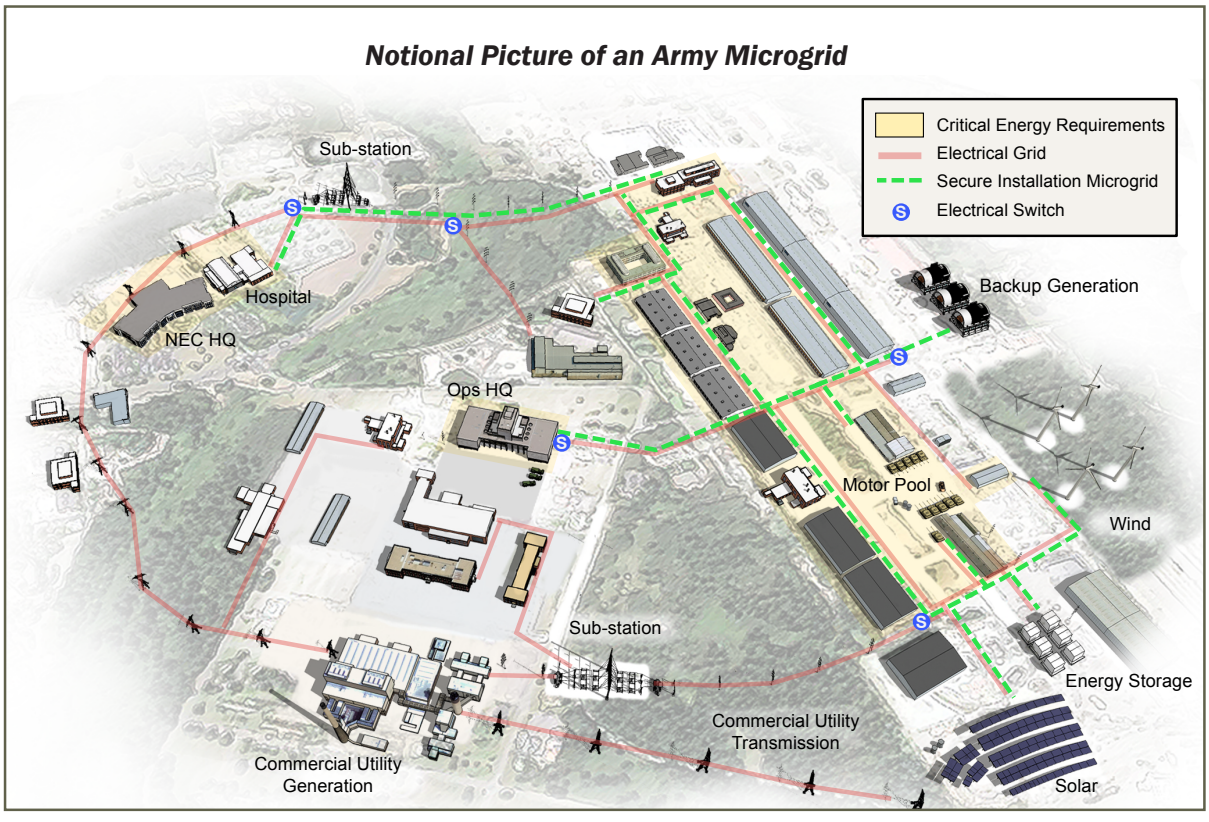
- **Expand Collaboration** – Expand opportunities to work with industry, academia, other Federal agencies, state/local governments, non-governmental organizations (NGOs), and local communities to develop sustainable and resilient solutions.

  Collaboration with other agencies and governments, industry, NGOs, academia, and our surrounding communities is a long-standing Army practice that continues to benefit all parties. Through collaboration, the Army can leverage expertise and benefit from successes and lessons learned. Collaboration with our surrounding communities is especially important because we live in these communities and often share critical resources and services (e.g., utilities and emergency services). The Army will seek to expand its collaboration to solve shared challenges, develop resource-effective technologies, foster sustainable and resilient communities, and enhance the well-being of our Soldiers, Civilians, and Families.

- **Continuously Improve** – Implement continuous process improvement (CPI) approaches in management and use of energy, water, and land resources.

  While the Army has already made tremendous progress, we must strive to continuously improve as new challenges emerge. New threats, missions, operating environments, and resource constraints require innovative approaches and solutions. To ensure the Army recognizes and appropriately responds to these challenges, we will implement CPI approaches throughout energy, water, and land management programs. CPI approaches will identify inefficiencies and opportunities for improvement, and enable us to leverage internal and external expertise to implement effective and innovative solutions.

***Notional Picture of an Army Microgrid***



# VI. Governance and Performance

The Under Secretary of the Army serves as the Army's Senior Sustainability Official (SSO) while the Assistant Secretary of the Army for Installations, Energy and Environment is the designated official with primary responsibility to support the Under Secretary in the role as SSO. The Deputy Assistant Secretary of the Army for Energy and Sustainability is the Army's designated Senior Energy Executive and Senior Sustainability Executive.

The Army's Senior Energy and Sustainability Council (SESC) provides strategic direction to integrate sustainability and energy considerations into Army plans, policies, and activities. The SESC is co-chaired by the Under Secretary of the Army and the Vice Chief of Staff of the Army and reports to the Secretary of the Army. The SESC is supported by a General Officer Steering Committee (GOSC) and a Council of Colonels (COC). Progress on implementation of this strategy will be monitored through the SESC and supporting sub-committees and issues will be raised through the COC to the GOSC and SESC as needed.

ES$^2$ sets the Army's vision for a ready and resilient Army, strengthened by secure access to our energy, water, and land resources. It focuses first and foremost on enhancing mission effectiveness while considering all existing Federal energy and sustainability drivers (i.e., statutes, regulations, and executive orders). We believe that mandates follow mission. The five strategic goals are interrelated with existing Army programs and initiatives (e.g., Net Zero, large-scale renewable energy, contingency basing, energy security, climate adaptation, and water security), and the Army will incorporate them further into other programs and new approaches. Therefore, the Army will integrate the strategy's goals, focus areas, and associated metrics into campaign plans and supporting documents.


Headquarters, Department of the Army organizations and Army Commands will monitor progress, in their areas of responsibility, against these energy and sustainability goals, and take necessary actions to improve performance. Measuring performance is vital to evaluating Army achievement and is accomplished through metrics reporting. The Army will reevaluate metrics as requirements evolve. The data supporting the metrics is compiled from a variety of sources and used to establish the baseline and track progress.

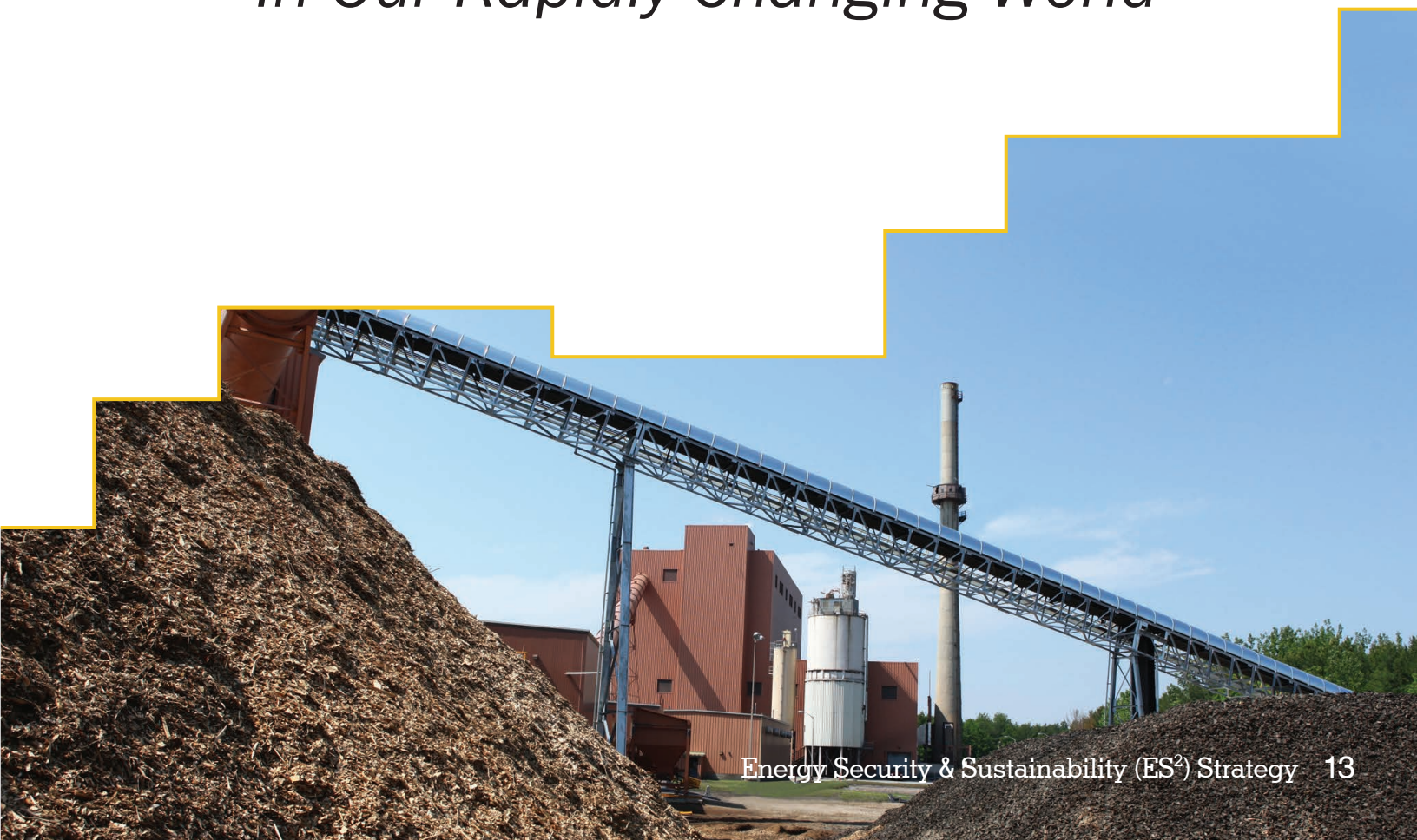
Appendix D identifies Federal, DOD, and Army mandated energy and sustainability performance targets.

# VII. Conclusion

The Army ES$^2$ Strategy is designed to guide the Army's use of energy, water, and land resources well into the 21st Century. Resource management is a dynamic process that will require the Army to continuously incorporate new information and make improvements to maintain freedom of action. The goals and supporting actions presented in this strategy are mutually reinforcing and facilitate a holistic, cross-organizational approach towards goal achievement now and in the future. To implement the aggressive goals of this strategy, the Army will identify initiatives and continually assess and refine efforts to assure progress towards these goals. Where tools and management initiatives already exist, they will be applied; where they do not, we will develop them. Implementation of this strategy is vital to the Army's continued relevance, especially in support of the Army Campaign Plan. This ES$^2$ Strategy will make the Army ready and resilient while preserving future choice in our rapidly changing world.

## *READY AND RESILIENT:*

## *Preserving Future Choice In Our Rapidly Changing World*



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# Appendix B: Definitions

**Adaptation:** Adjustment in natural or human systems in anticipation of or response to a changing environment in a way that effectively uses beneficial opportunities or reduces negative effects (*Executive Order (EO) 13653, Preparing the United States for the Impacts of Climate Change, 1 November 2013*).

**Emergency Relocation Facilities (ERF):** A facility located, when possible, outside a prime target area to which all or part of a civilian or military headquarters may be moved in specified crises or emergencies. An ERF has the minimum essential communications and information systems to enable the organization to continue performing essential missions and functions, and is usually hardened against the effects of weapons of mass destruction (*AR 500-3, U.S. Army Continuity of Operations Program Policy and Planning, Section II: Terms, 18 April 2008*).

**Energy Security:** Having assured access to reliable supplies of energy and the ability to protect and deliver sufficient energy to meet mission essential requirements (*Public Law 112-81, 31 December 2011*).

**Mission Assurance:** A process to protect or ensure the continued function and resilience of capabilities and assets – including personnel, equipment, facilities, networks, information and information systems, infrastructure, and supply chains – critical to the execution of DOD mission-essential functions in any operating environment or condition (*DOD Directive 3020.40, DoD Policy and Responsibilities for Critical Infrastructure, 14 January 2010, Change 2, 21 September 2012*).

**Mission Essential Function (MEF):** Any function that is vital to the continuation of operations of the organization or agency. These functions include those required by statute or Executive Order, and other functions deemed essential by the head of each organization. MEFs are those continuing activities that must be performed without interruption to execute critical Army missions. MEFs may be prioritized, which allows for a graduated response and relocation to the emergency relocation facilities (ERF) with minimum interruptions to operations during a national/local emergency or during normal operations (*AR 500-3, U.S. Army Continuity of Operations Program Policy and Planning, Section II: Terms, 18 April 2008*).

**Mission Critical System:** A system whose operational effectiveness and operational suitability are essential to successful completion or to aggregate residual combat capability. If this system fails, the mission likely will not be completed. Such a system can be an auxiliary or supporting system as well as a primary mission system (*Defense Acquisition University. Glossary, updated 7 January 2015,* https://dap.dau.mil/glossary/Pages/Default.aspx).

**Preparedness:** Actions taken to plan, organize, equip, train, and exercise to build, apply, and sustain the capabilities necessary to prevent, protect against, ameliorate the effects of, respond to, and recover from climate change related damages to life, health, property, livelihoods, ecosystems, and national security (*EO 13653, Preparing the United States for the Impacts of Climate Change, 1 November 2013*).

**Readiness:** The ability of U.S. military forces to fight and meet the demands of the National Military Strategy. Readiness is the synthesis of two distinct, but interrelated levels: unit readiness and Joint readiness. Unit readiness is the ability to provide capabilities required by the combatant commanders to execute their assigned missions. This is derived from the

# Appendix B: Definitions (continued)

ability of each unit to deliver the outputs for which it was designed. Joint readiness is the combatant commander's ability to integrate and synchronize ready combat and support forces to execute their assigned missions (JP 1–02) (*AR 220-1, Army Unit Status Reporting and Force Registration – Consolidated Policies – Glossary*, 15 April 2010).

**Resilience:** The ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions (*EO 13653, Preparing the United States for the Impacts of Climate Change, 1 November 2013*).

**Resource:** Energy, water, and land for military use (i.e., a source or supply from which military benefits can be produced (*this report*).

**Resource Security:** Assured access to reliable supplies of energy, water, or land in the quantity, quality and for the duration needed at the point of use to meet mission essential requirements (*this report*).

**Risk:** Probability and severity of loss linked to hazards (*Department of Defense Dictionary of Military and Associated Terms, 8 November 2010, as amended through 15 January 2015, http://www.dtic.mil/doctrine/dod_dictionary/*).

**Security (military security):** A condition that results from the establishment and maintenance of protective measures that ensure a state of inviolability from hostile acts or influences (*DOD Dictionary of Military and Associated Terms, 8 November 2010, as amended through 15 January 2015*, http://www.dtic.mil/doctrine/dod_dictionary/).

**Sustainability:** "Sustainability" and "sustainable" mean to create and maintain conditions, under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic, and other requirements of present and future generations (*this report*). The DOD vision of sustainability is to maintain the ability to operate into the future without decline—either in the mission or in the natural and man-made systems that support it (*DOD 2014 Strategic Sustainability Performance Plan, June 2014*).

**Vulnerability:** A weakness or susceptibility of an installation, system, asset, application, or its dependencies that could cause it to suffer a degradation or loss (incapacity to perform its designated function) as a result of having been subjected to a certain level of threat or hazard (*DOD Directive 3020.40, DOD Policy and Responsibilities for Critical Infrastructure, 14 January 2010, Change 2, 21 September 2012*).

# Appendix C: Acronyms

| | |
|---|---|
| **ACP** | Army Campaign Plan |
| **AESIS** | Army Energy Security Implementation Strategy |
| **AR** | Army Regulation |
| **COC** | Council of Colonels |
| **CHP** | Combined Heat and Power |
| **CPI** | Continuous Process Improvement |
| **CY** | Calendar Year |
| **DOD** | Department of Defense |
| **EO** | Executive Order |
| **ERF** | Emergency Relocation Facilities |
| **ES²** | Energy Security and Sustainability |
| **FY** | Fiscal Year |
| **GHG** | Greenhouse Gas |
| **GOSC** | General Officer Steering Committee |
| **NGO** | Non-Governmental Organization |
| **MEF** | Mission Essential Function |
| **SESC** | Senior Energy and Sustainability Council |
| **SSO** | Senior Sustainability Official |
| **SSPP** | Strategic Sustainability Performance Plan |
| **TRADOC** | Training and Doctrine Command |
| **UFC** | Unified Facilities Criteria |

# Appendix D: Federal Energy, Water, and Land Requirements

| Federal Mandate | Focus Area | Performance Target | DOD/Army Driver |
|---|---|---|---|
| Energy Policy Act of 2005 | Electricity use for Federal government from renewable sources | > At least 3% of total electricity consumption (FY07-09), 5% (FY10-12), 7.5% (FY13 +) | DOD SSPP Goal 1.2 |
| | Meters | > Meter electric use. Requires all agencies to install meters that provide use data at least daily on every building by October 1, 2012. | DOD metering policy |
| Energy Independence and Security Act of 2007 | Total consumption from renewable sources | > 25% by FY2025 -"Sense of Congress" | DOD SSPP Goal 1.2 |
| | Hot water in new/renovated Federal from solar power | > 30% by FY2015 if life-cycle cost-effective | UFC 1-200-02 |
| | Fossil fuel use in new/renovated Federal buildings | > Reduce 55% by FY2010; 100% by FY2030 | DOD SSPP Goal 7.3 |
| | Metering | > Meter natural gas and steam. | DOD metering policy |
| | Low Impact Development | > Incorporate low impact development best management practices as a means to maintain or restore pre-development hydrology. | UFC 3-210-10 |
| Executive Order 13653 | Managing Lands and Waters for Climate Preparedness and Resilience | > Inventory and assess proposed and completed changes to land- and water-related policies, programs, and regulations necessary to make the Nation's watersheds, natural resources, and ecosystems, and the communities and economies that depend on them, more resilient in the face of a changing climate. | 2014 DOD Climate Change Adaptation Plan |
| Executive Order 13693 | Energy use in Federal buildings | > Reduce 2.5% annually through FY2025 (FY2015 baseline) | DOD SSPP Goal 1.1 |
| | Total amount of electric and thermal energy from renewable sources | > Not less that 25% by FY2025 and each year thereafter.<br>> At least 50% of required annual renewable energy consumed from "new" renewable sources | DOD SSPP Goal 1.2 |
| | GHG emission reduction | > DOD Goal: reduce Scope 1 & 2 GHGs by 34% by FY2020<br>> DOD Goal: reduce Scope 3 GHGs by 13.5% by FY2020 | DOD SSPP Goals 3.1 and 3.2 |
| | Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings | > At least 15 percent of the agency's existing buildings (above 5,000 gross square feet) and building leases (above 10,000 gross square feet) meet the Guiding Principles by FY2025<br>> The agency makes annual progress toward 100-percent conformance with the Guiding Principles for its building inventory. The Guiding Principles address energy and water in and around facilities. | DOD SSPP Goal 7.3 |
| | Net zero buildings | > All new buildings (over 5,000 gross square feet) that enter design in FY2020 and after achieve net zero energy, and where possible net zero water and waste by FY2025 | |
| | Potable water intensity reduction | > Reduce water consumption intensity by 2% annually through FY2025 (FY2007 baseline) | DOD SSPP Goal 2.1 |
| | Industrial, landscaping, and agricultural water consumption | > Reduce consumption by 2% annually for a 20% total by 2020 (FY2010 baseline) | DOD SSPP Goal 2.2 |
| | Waste minimization | > Divert at least 50% of non-hazardous solid waste & 50% of construction and demolition waste by FY2015 | DOD SSPP Goals 5.2 and 5.2 |
| | Fleet and vehicle efficiency | > Reduce fleet-wide GHG emissions by 30% by FY2025<br>> 50% of all new fleet passenger vehicles are zero emission or plug-in hybrids by CY2025. | DOD SSPP Goal 1.3 |
| National Defense Authorization Act, 2010 | Renewable fuels use | > Directs the Secretary of Defense to provide a report to Congress on renewable fuels in aviation, maritime, and ground transportation fleets. | |
| | Facility renewable energy use | > Produce or procure 25% of the total quantity of facility energy needs, including thermal energy, from renewable sources by FY2025 | |

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***Front Cover*** Army Magazine, First Place 2014 Contest Winner, "Bush Rush." *Credit: Christina Graber*

***Page 1*** 170th Infantry Brigade Combat Team along with other 3rd Platoon Soldiers survey an area near Gerdab, Afghanistan. *Credit: U.S. Army*

***Page 2*** Members of the West Virginia National Guard's 1257th Transportation Company draw from the water supply in support of Operation Elk River. *Credit: U.S. Army Sergeant 1st Class Timothy Fischer*

***Page 4*** U.S. Army Staff Sergeant (unknown) secures a landing zone as his transportation, a UH-60 Blackhawk helicopter, flies away near the Koh Band district of Kapisa Province, Afghanistan. *Credit: U.S. Air Force Capt. Darrick B. Lee*

***Page 7*** Summer river at sunset. *Credit: Thinkstock.com. Permitted for use with permission from the license holder.*

***Page 8*** Section of the largest Army solar energy project of 18MW at Fort Huachuca, Arizona. *Credit: U.S. Army Executive Director of the Office of Energy Initiatives Ms. Amanda Simpson*

***Page 11*** Notional picture of an Army microgrid. *Credit: © Copyright Concurrent Technologies Corporation 2015. Used with permission from copyright holder.*

***Page 13*** 60 MW biomass plant at Fort Drum, New York. *Credit: ReEnergy Ms. Lori Whitney*

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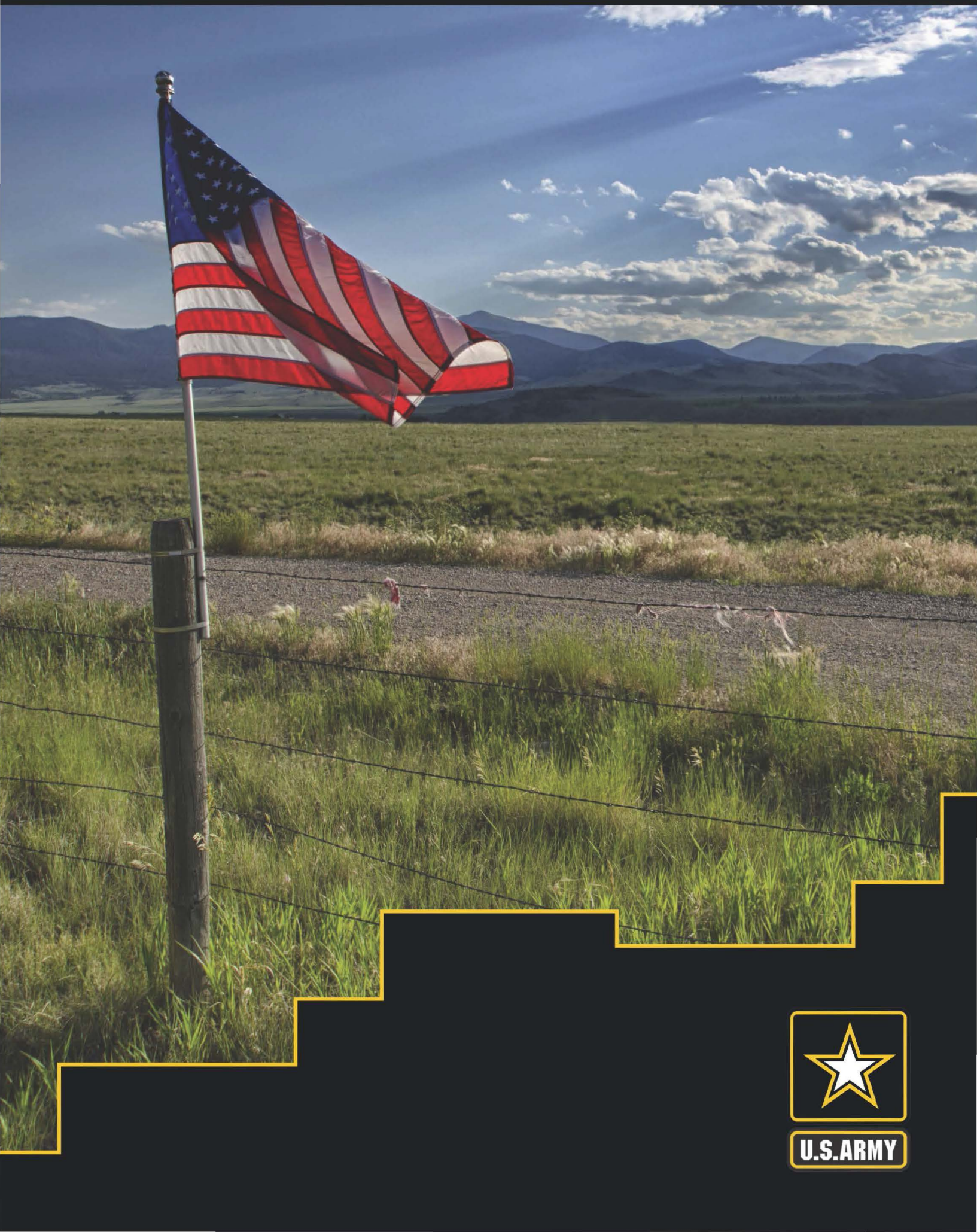
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