ARMY ENERGY SECURITY IMPLEMENTATION STRATEGY

January 13, 2009

The Army Senior Energy Council

and the

Office of the Deputy Assistant Secretary of the Army for Energy and Partnerships
Washington, D.C. 20301-3140

The Army Energy Security Implementation Strategy has been built on a foundation of prior work from several Army organizations and the Air Force as documented in the sources below:

Army Energy Security Strategy Industry Day Forum - After Action Report, December 2008

United States Air Force Infrastructure Energy Strategic Plan, 2008

Army Sustainability Report, 2007

Army Energy & Water Campaign Plan for Installations, 2007

Army Energy Strategy for Installations, 2005

This document was approved by the Army Senior Energy Council and the Secretary of the Army on 13 January 2009. For questions, comments or additional copies of this report please contact the Office of the Deputy Assistant Secretary of the Army for Energy and Partnerships, DASA(E&P), at 703-692-9890.

Foreword

The United States military is one of the nation's largest consumers of energy. In 2008 alone the Army spent over $4.1 billion for fuel and energy. We face increasing challenges to reduce consumption, increase efficiency, and make greater use of alternative and renewable energy sources.

The Army Energy Security Implementation Strategy (AESIS), approved on 13 January, 2009 by the Senior Energy Council, establishes five strategic energy security goals and outlines a broad approach for accomplishing them. The strategy also focuses on creating a culture of energy awareness throughout the Army.

The AESIS does not provide all the energy security answers, it is a starting point. The AESIS is a living document that will help us focus our policies and programs to enhance our energy posture across the Army enterprise. Specific plans, decisions and actions will be developed by the Army Commands and Offices that test, produce, deliver and use energy. Progress will be measured on a regular basis and reported to senior leadership. The Strategy will be re-evaluated and updated as required to address evolving needs, make course corrections, and challenge Army leaders at all levels with developing innovative and affordable energy security solutions.

For the Army Energy Security Implementation Strategy to be successful the support and participation of everyone in the Army is required. By achieving our energy security goals, we will better position the Army to accomplish its mission regardless of the energy challenges in the future. Army Green! Army Strong!

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EXECUTIVE SUMMARY

Historically, the Army operated with the assumption that low cost energy would be readily available when and where it is needed. Now, however, reliable access to affordable, stable energy supplies is a significant challenge for the Army and the nation. Given the Army's reliance on energy, disruption of critical power and fuel supplies would harm the Army's ability to accomplish its missions. Such a risk exposes an Army vulnerability that must be addressed by a more secure energy position and outlook. The Army's assumptions concerning future plans for power and fuel at home, overseas and on the battlefield must account for such challenges.

On the positive side, increasing efficiencies and lowering corporate demand for energy would save money for the Army and free up both fiscal and personnel resources. Industry partnerships that supply excess power to the commercial grid from Army installations provide additional opportunities to financially benefit the Army. Funds from both savings and income could then be spent on vital programs and other operational needs. In a similar vein, lower tactical fuel demands would place fewer Soldiers in harm's way during their support of the long logistical fuel tail in theatre.

Drawing on the work of the Army Energy Security Task Force (AESTF) established by the Secretary of the Army in April 2008, this document presents the Army Energy Security Implementation Strategy (AESIS). The AESIS addresses the energy security challenge through newly established central leadership and integrated, goal-driven energy activities. This leadership was established with formation of the Army's Senior Energy Council (SEC) and the Deputy Assistant Secretary of the Army for Energy & Partnerships [DASA(E&P)] to integrate and focus the energy activities across the Army.

This document presents the Army's energy security vision, mission, and goals, with direction on the development of objectives and metrics to gauge progress toward such goals. Through the leadership of the SEC, initiatives and activities will be coordinated across the Army to chart the best vector forward to attain the energy security goals. Army leadership will expect each organization, Soldier, and Civilian to incorporate energy security into the fabric of all Army activities.

Army Energy Security Vision

An effective and innovative Army energy posture, which enhances and ensures mission success and quality of life for our Soldiers, Civilians and their Families through Leadership, Partnership, and Ownership, and also serves as a model for the nation.

Army Energy Security Mission

Make energy a consideration for all Army activities to reduce demand, increase efficiency, seek alternative sources, and create a culture of energy accountability while sustaining or enhancing operational capabilities.

Strategic Energy Security Goals (ESGs)

- ESG 1. Reduced energy consumption
- ESG 2. Increased energy efficiency across platforms and facilities
- ESG 3. Increased use of renewable/alternative energy
- ESG 4. Assured access to sufficient energy supplies
- ESG 5. Reduced adverse impacts on the environment.

These goals implicitly incorporate the fundamental principle that the improvements achieved shall not lead to reductions in operational capability or the ability of the Army to carry out its primary missions.

Measuring Progress

The Army will measure progress toward ESGs through engaging in specific implementation activities that support energy security objectives and their associated metrics. Progress from across the Army will be reported to the SEC. Principle metrics will be based on both quantitative and qualitative requirements for energy performance that have been established by legislation, Presidential Executive Orders (EO), Office of the Secretary of Defense (OSD) mandates and Army policies. Additional metrics (e.g. those related to surety and reliability of energy supplies) will be established by the summer 2009 SEC meeting as performance tracking tools.

The Way Ahead

Enhancing energy security is a basic responsibility of every Army Soldier and Civilian. Success lies in individual accountability for improved energy security through development and implementation of solutions to each organization's energy security challenges. The AESIS communicates the Army-wide energy security vision, mission, and goals to facilitate the integration of all Army organization's energy activities to an enterprise level with a focus on Leadership, Partnership, and Ownership.

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ARMY ENERGY SECURITY IMPLEMENTATION STRATEGY

I. INTRODUCTION

Surety, Survivability, Supply, Sufficiency, Sustainability – these are the core characteristics defining the energy security necessary for the full range of Army missions. Energy security for the Army means preventing loss of access to power and fuel sources (surety), ensuring resilience in energy systems (survivability), accessing alternative and renewable energy sources available on installations (supply), providing adequate power for critical missions (sufficiency), and promoting support for the Army's mission, its community, and the environment (sustainability).

As a critical resource, energy must be readily available to support Army missions operating tactical and non-tactical vehicles and equipment, powering Soldier-carried equipment, and providing electricity and other utilities to fixed installations and Forward Operating Bases (FOBs). The central role of energy security for operational missions was highlighted in 2006 when the commanding general of the multi-national force in western Iraq submitted a priority request to reduce the number of fuel logistics convoys. Although necessary, these convoys and the associated logistical fuel tail were increasingly vulnerable to attack and had "the potential to jeopardize mission success." This vulnerability points to a potential asymmetric advantage for an adversary. Reducing such energy security risks will continue to be a priority for future contingency operations.

In addition to reports from the field concerning mission risks, recent government-sponsored reports address energy security issues across the Department of Defense. One of these reports, the Defense Science Board Report, "More Fight – Less Fuel", sheds additional light on the need for the military to strengthen its energy security posture.

To facilitate development of a cohesive Army-wide approach to energy security, the Secretary of the Army commissioned the Army Energy Security Task Force (AESTF) in April 2008. The AESTF assessed the Army energy security posture and developed recommendations for reducing Army energy consumption, increasing energy efficiency across platforms and facilities, promoting the use of new sources of alternative energy, establishing benchmarks for reducing the Army's energy footprint and providing guidance for the creation of a culture of energy awareness across the Army based on the principles of Leadership, Partnership and Ownership.

As a result of the AESTF recommendations, the Office of the Deputy Assistant Secretary of the Army for Energy & Partnerships [ODASA(E&P)] and the Army Senior Energy Council (SEC) were established. In accordance with the SEC charter and the associated Army Directive 2008-04, "Army Energy Enterprise", the SEC is comprised of the senior leadership of the Army's key energy stakeholder organizations and will oversee the Army's Energy Enterprise. The DASA(E&P) serves as the Army's Senior Energy Executive (SEE) and will monitor and report the Army's progress toward energy goals. This document, the Army Energy Security Implementation Strategy (AESIS) is a key for successful implementation of the AESTF guidance and is required by the charter of the SEC. The AESIS communicates the Army's energy security vision, mission, and goals and describes the framework of the SEC to address energy security.

This document also supports the Army in addressing energy security from an enterprise perspective. This means that all Army organizational missions and functional areas (Headquarters, Department of the Army [HQDA], Army Commands [ACOMs], Army Service Component Commands [ASCCs], Direct Reporting Units [DRUs], and Field Operating Agencies [FOAs]) have a role and responsibility to support the Army's energy security goals and that those roles will be coordinated and integrated. An enterprise perspective is essential since energy investments and activities in one organization have potential impacts on the ability of other organizations to perform their respective missions. The enterprise represents vertical and horizontal alignment of people, processes and technology across organizational and functional boundaries to efficiently support delivery of integrated Army capabilities. The strategy in this document is encompassed by linking the Army's enterprise vision, mission and goals to the development of objectives and metrics to facilitate activities across Army organizations.

Many Army organizations have existing energy activities and plans while other organizations' plans are still in development. The AESIS reflects existing plans and initiatives under an enterprise framework, but it is also designed to be an evolutionary document addressing future Army energy security requirements and initiatives. Organizations with existing energy plans will now be able to map them to the Army enterprise level energy security goals.

Army Energy Security Vision

> *An effective and innovative Army energy posture, which enhances and ensures mission success and quality of life for our Soldiers, their Families, and Civilians through Leadership, Partnership, and Ownership, and also serves as a model for the nation.*

Figure 1 illustrates the core concepts of the vision: Leadership, Partnership and Ownership. As main components of the Army Energy Security Vision, these elements support the logistics of expeditionary force troop mobility; the research, development, testing and acquisition of new alternative energy sources and technologies; the training of Soldiers and Civilians; and the improvement of installation and facility infrastructure for an energy secure future.

Leadership

A successful Army energy program requires both centralized and decentralized leadership with the appropriate authority and support to lead the entire Army energy program. Changing the culture of the Army to one that prioritizes efficient energy utilization will require the leadership to integrate current projects and efforts with new and improved energy security proposals. This will be accomplished by holding Army commands, offices, and personnel accountable for their energy programs and by providing incentives for innovative energy solutions. The SEC and SEE will galvanize the multitude of energy programs as supported by the AESIS.

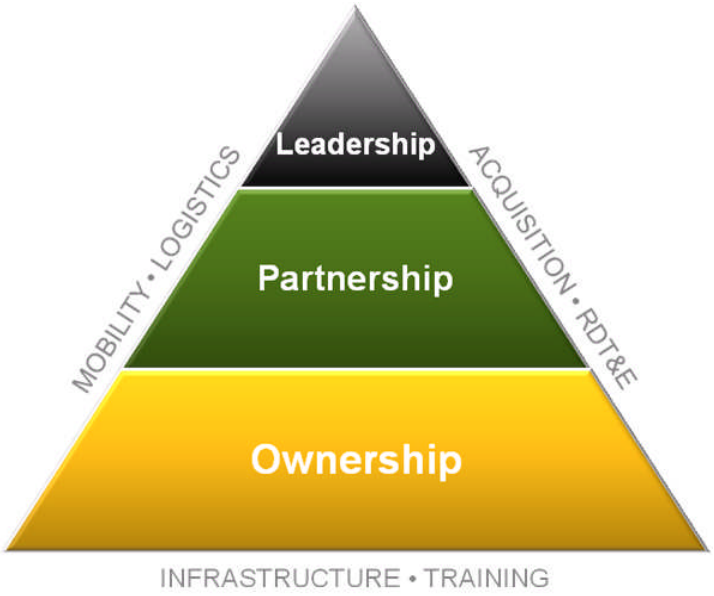


Figure 1. The Army Energy Vision

Partnership

This Army energy initiative will be an enterprise-wide partnership that leverages internal Army organizations, other Services, the Department of Defense (DoD), federal agencies, and the private sector to benefit Army mission accomplishment. Partnerships with the private sector have great potential to enhance energy security and to generate net revenues for the Army if certain types of alternative financing mechanisms (e.g. enhanced use leases) are fully utilized in a coordinated approach. Great advances can be made with industry to enhance energy efficiency as well as build alternative and renewable energy facilities on installations. A number of Army installations (as presented in Section IV of this document) have significant potential for development of alternative and renewable energy programs. Providing access for industry to such opportunities "inside the fence" is a factor that the Army can take advantage of to build these partnerships.

Ownership

The foundation of the Army Energy Vision is Ownership. Taking ownership leads to accountability and a culture change for Army personnel. Ownership comes from knowledge, training, and operational awareness of the importance of energy to all aspects of the Army mission. Ownership and culture awareness begins immediately upon a Soldier's induction into the Army and a Civilian's first day of employment. Successfully addressing the Army's energy security needs will be highly dependent on the Army's culture of ownership.

Army Energy Security Mission

Make energy a consideration in all Army activities in an effort to reduce demand, increase efficiency, seek alternative sources, and create a culture of energy accountability, while sustaining or enhancing operational capabilities.

A fundamental Army responsibility is to provide the Soldier with superior capabilities, weapons, and facilities to live, work, and fight. The energy required to power these assets is integral to the success of the mission and the quality of life for our personnel and their Families. This mission statement indicates the breadth of impact and responsibility required to enable achievement of the Army Energy Security Vision. To accomplish this mission, five enterprise goals have been established.

Strategic Energy Security Goals

The Army's five Strategic Energy Security Goals (ESGs) are designed to be achieved over the long term through steady annual progress that will be monitored through review of appropriate metrics. Success will represent a significant improvement of the Army's energy security enterprise and will place Army assets in a strong position for future energy-effective operations. These goals implicitly incorporate the fundamental principle that the improvements achieved shall not lead to reductions in operational capability or the ability of the Army to carry out its primary missions. The solutions being considered to achieve these energy goals will effectively maintain and enhance operational capabilities, achieve long term cost savings, and strengthen the ability of the Army to fulfill its missions.

ESG 1. Reduced Energy Consumption

Reduce the amounts of power and fuel consumed by the Army at home and in theatre. This goal will assist in minimizing the logistical fuel tail in tactical situations by improving fuel inventory management and focusing installation consumption on critical functions.

ESG 2. Increased Energy Efficiency Across Platforms and Facilities

Raise the energy efficiency for generation, distribution, storage and end-use of electricity and fuel for system platforms, facilities, units and individual Soldiers and Civilians. This goal also relates to the productivity of a system based on energy requirements and supports the ability to make informed trade-offs in development, engineering and deployment of weapon systems.

ESG 3. Increased Use of Renewable/Alternative Energy

Raise the share of renewable/alternative resources for power and fuel use, which can provide a decreased dependence upon conventional fuel sources. This goal also supports national goals related to renewable/alternative energy.

ESG 4. Assured Access to Sufficient Energy Supply

Improve and maintain the Army's access to sufficient power and fuel supplies when and where needed. Energy is a critical resource in conducting Army missions. Vulnerabilities to external disruption of power and fuel sources should be minimized and the potential for industry partnerships to enhance energy security and generate net revenues for the Army should be considered.

ESG 5. Reduced Adverse Impacts on the Environment

Reduce harmful emissions and discharges from energy and fuel use. Conduct energy security activities in a manner consistent with Army environmental and sustainability policies.

II. ARMY ENERGY LEADERSHIP

The Army's energy leadership framework centers on the Army Senior Energy Council (SEC). As outlined in its charter, the SEC is an intra-Army, departmental committee established to develop an Army enterprise energy strategic plan encompassing all aspects of Army production, delivery, storage and end-use of energy. Figure 2 depicts the SEC structure and charter offices. SEC membership may be augmented at the discretion of Army senior leadership. This new centralized energy leadership structure complements current command and control structures and chains of command. The AESIS supports linking decentralized approaches to an enterprise approach consistent with initiatives of the Army's enterprise transformation. Guidance for implementation is discussed in Section III.

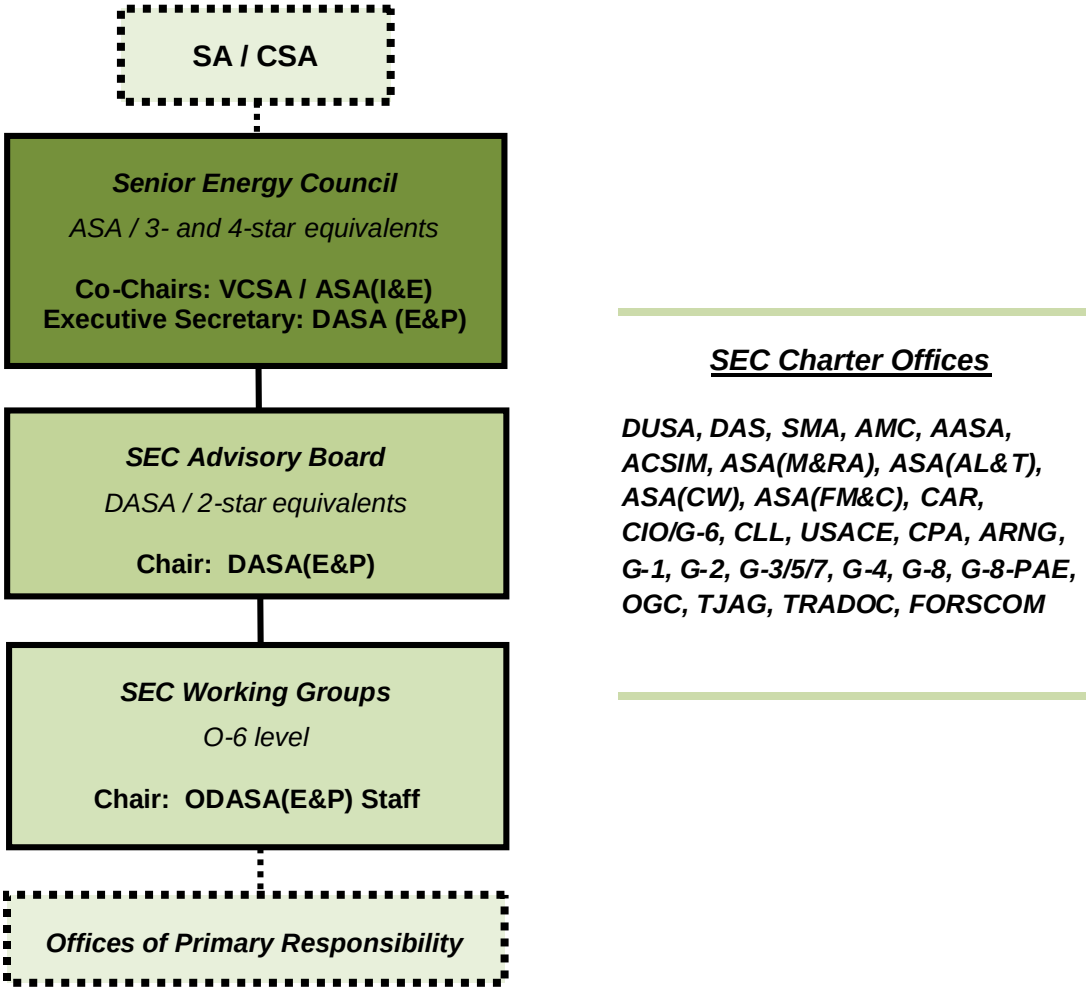


Figure 2. SEC Structure and Membership

Summary of SEC Functions

The SEC sets the overall energy security strategy and goals for the Army through the development and revision of the AESIS. In the end, it is the role of the Offices of Primary Responsibility (OPRs), from HQDA, ACOMs, ASSCs, DRUs and FOAs, to develop and execute "implementation plans" that include activities to achieve those goals. The WGs will work with the OPRs to align implementation plans with enterprise goals in a manner consistent with guidance in the AESIS and will also provide assessments of progress to the SEC Advisory Board. The Advisory Board serves a senior validation role for those assessments and identifies issues that require resolution by the SEC.

SEC Working Groups (WGs)

The SEC WGs are the foundation of the SEC and consist of designated O-6-level representatives from the SEC and Advisory Board member organizations. This representation ensures a direct linkage between WG activities and the SEC principals and their organizations. Additional participants may be added to form cross-functional teams of mission owners and subject-matter experts in areas such as installations and infrastructure; mobility fuel logistics; acquisition, procurement and technology; and contracting. The WGs are led by representatives from ODASA(E&P) and will meet on an as needed basis.

An initial task of the WGs will be to identify by spring of 2009 appropriate initial sets of objectives and metrics to guide the development of implementation plans by OPRs toward achieving the goals outlined in this document. The WGs will assess the alignment of initial OPR implementation plans with the strategic goals and present a summary of this assessment to the SEC Advisory Board prior to the summer 2009 SEC meeting. Feedback from the Advisory Board and SEC will guide future modifications to objectives and metrics and adjustments to implementation plans.

SEC Advisory Board

The SEC Advisory Board consists of the DASA(E&P) and SEC member organization Two Star-level representatives. The Advisory Board is chaired by the DASA(E&P) and will convene no less than two times per year prior to the SEC meetings. Other selected two-star level representatives, such as the Deputy Commanding General of Installation Management Command, [IMCOM]), DASA(Environment, Safety and Occupational Health), DASA(Strategic Infrastructure) and DASA(Installations & Housing), and the Deputy Administrative Assistant to the Secretary of the Army may also participate in the Advisory Board. The primary role of the Advisory Board is to review the assessments of the OPR implementation plans and provide feedback on meeting the goals set forth in the AESIS prior to updating the SEC on overall progress. The Advisory Board will work to resolve energy related issues that impact multiple Army organizations (or the enterprise as a whole). The Advisory Board will also review the AESIS (at a minimum bi-annually) and provide recommendations to the SEC concerning changes in this document.

Army Senior Energy Council (SEC)

The primary role of the SEC is to review, align and confirm the Army energy security posture. The SEC reports to the Secretary and the Chief of Staff of the Army and is co-chaired by the Assistant Secretary of the Army for Installations and Environment [ASA(I&E)] and the Vice Chief of Staff of the Army (VCSA). The SEC will convene not less than two times per year. The SEC may make recommendations for enterprise level energy initiatives or identify issues to be resolved by other enterprise bodies or senior leadership.

Senior Energy Executive (SEE)

The DASA(E&P) was named the Army's Senior Energy Executive (SEE) by the SEC charter to serve as the Executive Secretary of the SEC, to chair the SEC Advisory Board and to facilitate the SEC meetings. In this role, the DASA(E&P) is to monitor the Army's progress in meeting the goals established by the AESIS, and report the status to the SEC. In addition, the SEE will serve as the Army's main point of contact to report Army energy matters to the Office of the Secretary of Defense (OSD).

III. STRATEGIC IMPLEMENTATION GUIDANCE

Overview

In accordance with the SEC charter, a focus of this AESIS is implementation — identifying, integrating and executing specific actions to achieve the Energy Security Objectives (ESOs). This means that AESIS supports integrating current and future power and energy plans, programs and activities from the OPRs to strengthen the Army's enterprise-wide energy posture and operations while facilitating management of energy costs. The AESIS should also be referred to for guidance in the development of new power and energy plans by the OPRs in accordance with the Army's energy priorities.

The elements of the AESIS implementation framework are presented in this section, along with operational guidance for use of performance metrics, financial management and energy conservation incentives.

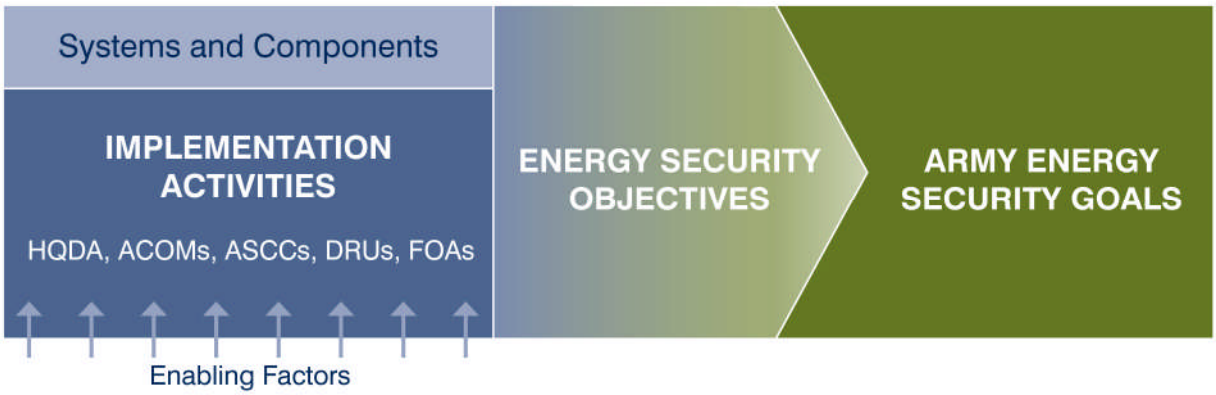


Figure 3. Strategic Implementation Overview

Figure 3 illustrates the strategic approach required to achieve the Army Energy Security Goals (ESGs). The ESGs represent the Army's desired future energy security posture. On the left side of the figure, the approach is grounded on a set of Enabling Factors that support the Implementation Activities and promote their success across the evolving Army enterprise. The activities are conducted by the OPRs throughout the Army as part of efforts to accomplish their respective missions. Execution of these activities impact the Systems and Components that produce, transmit, store or use various types and amounts of energy. To guide development and execution of implementation activities, Energy Security Objectives (ESOs) that support the ESGs will be established by the SEC WGs.

Enabling Factors

The Enabling Factors consist of a broad suite of "levers" vital for bringing about successful energy security improvements. By themselves, Implementation Activities may not always be fully executable unless they occur in an appropriate institutional context – and the right context is established by recognizing the valuable role of enablers in the AESIS. Utilizing these factors will encourage energy awareness, innovative work practices and accountability for performance, while acknowledging new technology, capital improvements and the systems acquisition / procurement process as essential ingredients for improving the Army's energy system.

Key enabling factors include:

- Organizational Leadership
- Institutional Culture
- Recognition and Awards
- Measurement and Accountability
- Acquisition and Procurement
- Research, Development, Testing & Evaluation
- Innovation & Promulgation of Best Practices
- Integration/Implementation of Technology Upgrades
- Construction and Capital Improvements
- Knowledge Management
- Financial Partnerships.

These factors will be considered by the SEC WGs to form objectives and metrics and incorporated by the OPRs to design, fund and execute implementation plans.

Energy Security Objectives

To achieve the ESGs, action-oriented Energy Security Objectives (ESOs) will be established by the SEC to guide development and coordination of implementation activities, programs and investments by the Army. ESOs will be developed by the SEC WGs to provide the strategic focus necessary for the Army to comply with key energy directives (laws, regulations, instructions, and policies) and to achieve the ESGs. An initial set of objectives and metrics will be developed before the summer 2009 SEC meeting. To illustrate the type of ESOs to be developed, two example objectives are shown below:

Tactical Mobility Example

Example ESO – Improve tactical fuel inventory management
This includes developing technologies, policies and procedures that leverage automation to provide enterprise level fuel asset visibility.

Potential Performance Target:
90% Reduction of out-of-tolerance tactical accounts by 2010

Potential Performance Metric:
Annual percent reduction of out-of-tolerance tactical fuel accounts

Energy Security Goals Addressed:
ESG 1 and ESG 4

Installation Example

Example ESO – Improve the energy performance of current infrastructure
This includes facilities, equipment and energy use practices at the Army's installations.

Potential Performance Target:
Completed electricity metering program by 2012

Potential Performance Metric:
Percent completion of electricity metering program

Energy Security Goals Addressed:
ESG 1 and ESG 2

Implementation Activities

As shown in Figure 3, the Implementation Activities represent actions taken by the Army OPRs to achieve the ESGs. These activities will be developed as part of the implementation plans to support established ESOs and will include energy programs and efforts already prescribed, and in some cases underway, by the various Army OPRs. Candidate implementation activities would include infrastructure initiatives such as building metering, weapon system improvements such as developing hybrid engines for tactical vehicles, or Soldier power advancements such as high-performance portable power sources. This document is not intended to prescribe the specific Implementation Activities, but to provide the overall guidance and expectations for how the Army will meet the ESGs and metrics.

Once the implementation plans developed by the OPRs have been aligned with the ESGs and confirmed by the SEC to adequately address the goals, implementation progress will be measured bi-annually against the established performance metrics and monitored by the SEC WGs. The assessed performance will then be reported to the Advisory Board and SEC for feedback.

Systems and Components

In general, improvements in energy security are accomplished through changing three factors: institutional actions, human behavior, and capital stock (upgrading equipment, components facilities and technology). For the Army, institutional actions are represented by Federal laws, executive orders, DoD directives, and Army mandates regarding energy. Human behavior covers Army Soldiers, their Families, the Civilian work force, contractor support, and suppliers and includes efforts for human systems integration (e.g. MANPRINT). Drawing from guidance in the SEC charter, capital stock encompasses infrastructure, weapon systems & mobility and individual Soldier power technology and is further described below:

- ***Infrastructure*** refers to permanent installations and facilities (CONUS and OCONUS) and the energy equipment to operate them, including non-tactical vehicles (NTVs). One avenue to impact installations and facilities is through military construction (MILCON).
- ***Weapon systems & mobility*** include the Army inventory of tactical and combat manned and unmanned ground and air platforms, weapons/logistics/C4ISR systems, and forward operating bases (FOBs) and other contingency operations base camps as well as other components and related devices that consume power or fuel.
- ***Soldier power*** includes the electricity or other power sources required to operate personal equipment such as weapons, communications and life support, as well as the individual Soldier know-how and commitment to use energy wisely.

Performance Targets and Metrics

The Army is committed to measuring the impact of energy security Implementation Activities undertaken to meet its ESGs. Measuring and tracking progress will occur systematically across all major energy activities to ensure that the ESGs are being addressed and that compliance with energy directives (i.e., laws, statutes, Executive Orders and DoD and Army policies) is occurring. Progress toward directive targets and ESGs will be gauged using quantitative and qualitative metrics to permit periodic data collection, analysis and reporting and to build an historical record of performance. Specific metrics will be derived from current mandated targets as well as for the ESGs (e.g., related to surety of energy supplies, improved asset visibility for tactical fuel use) from coordination within the SEC WGs. This analysis will include consideration of an "energy security premium", which reflects an incremental cost over and above the commodity consumption cost to provide assurance that critical activities and functions will continue to have access to the energy they need for operations.

The mandated target and metric examples in Table 1 represent only a portion of the directives for installations and operational systems to be addressed.

Table 1. Example Energy Directives and Metrics

Directive Topic	Energy Performance Target [Source]	Potential AESIS Metric	AESIS Goals
Directives and Metrics for Fixed Installations			
Installations energy use	Reduce by 30% by 2015 from 2003 baseline [EO 13423 / EISA 2007]	% Installation energy savings relative to 2003 baseline	ESG 1, ESG 2
Non-tactical vehicle (NTV) fuel consumption	Reduce 2% annually through 2015, 20% total by 2015 - 2005 baseline [EO 13423]	% NTV fuel savings relative to 2005 baseline	ESG 1, ESG 2
Electricity from renewable sources	A voluntary "sense of Congress" goal - 25% by 2025 [EISA 2007 / NDAA 2007]	% of Army energy use provided by renewable / alternative sources	ESG 3, ESG 4, ESG 5
Fossil fuel use in new/renovated buildings	Reduce 55% by 2010; 100% by 2030 relative to 2003 level [EISA 2007]	% Fossil fuel use reduction in new / renovated buildings relative to 2003 level	ESG 1, ESG 2, ESG 5
Hot water in new/ renovated buildings from solar power	30% by 2015 if life cycle cost-effective [EISA 2007]	% of new / renovated buildings with hot water from solar	ESG 3, ESG 4, ESG 5
Non-petroleum fueled vehicles use (ethanol, natural gas)	Increase by 10% annually [EO 13423]	% annual increase in non-petroleum fueled vehicle use	ESG 3, ESG 4, ESG 5
Energy metering for improved energy management	Meter electricity by Oct 2012 [EPAct 2005] Meter natural gas and steam by Oct 2016 [EISA 2007]	% completion of metering planned for electricity, natural gas and steam	ESG 1, ESG 2
Directives and Metrics for Operational Systems			
Implementation of fully burdened cost of energy (FBCE)	Use FBCE in life-cycle cost analysis for new military capabilities during analysis of alternatives and evaluation of alternatives [NDAA 2009]	Number or % of life cycle cost analyses for new systems using FBCE	ESG 1 - 5
Implementation of energy efficiency as a key performance parameter (KPP)	Include fuel efficiency as a KPP for modifying or developing new machinery that consumes fuel, such as tanks or jets [NDAA 2009]	Number or % of equipment modifications or developments for new systems including energy efficiency as a KPP	ESG 1, ESG 2

Financial Resource Management

The existing Planning, Programming, Budgeting & Execution System (PPBES) will be the primary method for addressing Army energy requirements. It is vital that commanders, program and resource managers of organizations serving as energy OPRs be engaged at every level to make the ESGs a priority within their Program Objective Memorandum (POM) and requirements building process. As energy initiatives surface for consideration, a business case analysis should be accomplished and include the following elements:

- The anticipated financial benefit.
- Baseline and post implementation cost estimates, including any long-term commitments by the Army for increased or decreased fixed or variable costs.
- Appropriate performance metrics so that actual cost/energy savings can be quantified and reported.
- Available funding streams to offset or cover the anticipated expenses in both current and future years.

Upon request, ODASA(C&E) can provide costing methodology guidance and review to support development of the business case analysis for proposed energy initiatives.

In addition to using the budget process to fund energy security and conservation activities, potential funding sources other than appropriated funds may be available at the installation or command level. These alternative sources are described in the Assistant Secretary of the Army, Financial Management and Comptroller [ASA(FM&C)] document, "Sources of Funds for Army Use" (http://www.asafm.army.mil/rabp/suf/sof.pdf). It contains a number of programs directly related to the objectives of the AESIS, such as:

- Venture Capital Investment Corporation
- Energy Conservation Investment Program
- Sale of Air Pollution Emission Reduction Incentives
- Energy Savings Performance Contracts and Utility Partnerships for Energy Savings and Water Conservation Projects
- Financial Incentives for Energy Savings and Water Conservation
- Efficient Facilities Initiative
- Enhanced Use Lease (EUL)

Incentives for Energy Conservation

To encourage conservation of the Army's critical energy resources and to improve the Army's overall energy security posture, Congress has enacted several measures that provide for receipt and use of cost savings from reduced energy consumption. The statutory guidance for energy conservation incentives are found under Title 10, United States Code (U.S.C.), Chapter 169, in the following sections.

- 2866 Provides for receipt and use of incentives and water cost savings from utilities for water conservation
- 2912 Concerns availability and use of energy cost savings
- 2913 Concerns energy savings contracts and activities

- 2914 Concerns energy conservation construction projects
- 2915 Concerns new construction and use of renewable forms of energy efficient products
- 2916 Concerns sale of electricity from alternate energy and cogeneration production facilities

The Office of the Under Secretary of Defense (Comptroller) provides similar financial management policy and procedures in DOD 7000.14-R, Financial Management Regulation (FMR), Volume 12, Chapter 12, "Identification, Retention, and Use of Energy and Water Conservation Savings."

One of the more important requirements in the FMR is the establishment of an extended availability energy savings account to hold savings in the form of unobligated funding balances until they may be expended on certain designated projects. The funding deposited in these accounts shall remain available for expenditure for five years following the year the funds would have expired as originally appropriated. As an incentive, 50% of these savings shall be used for implementation of additional energy conservation measures, and the other 50% shall be used at the installation that realized the savings for Morale Welfare and Recreation, Family Housing or quality of life activities of interest to the recipient installation commander (in accordance with the FMR, V12, Ch12).

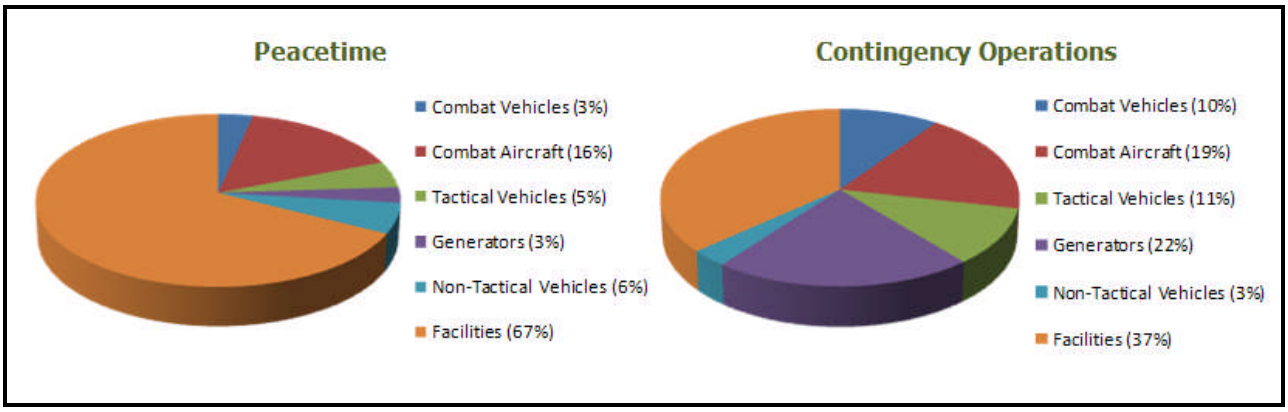
IV. Army Energy Security Considerations

Many considerations will enter into decisions to meet the Army's ESGs from an enterprise-wide perspective, including evaluation of the current Army energy posture and planning for future energy security needs and opportunities. This section presents background information on recent energy consumption patterns, major programmed drivers of future energy use and an illustration of on-going Army energy activities and programs.

Army Energy Consumption

The Army operates in a complex energy environment. In Fiscal Year (FY) 2008, the Army's total energy consumption is estimated to be over 180 trillion British thermal units (BTU) at a cost of more than $ 4 billion, including purchase of approximately 880 million gallons of fuel for mobility operations and 9.1 million megawatt hours (MWh) of electricity for installations. Actual costs for FY 2009 are difficult to predict since the prices of oil, gas and electricity have fluctuated significantly during the past year.

The way the Army uses energy is dramatically different in peacetime than in wartime. Figure 4 shows estimated Army consumption patterns during scenarios for peace (total of 112 trillion BTU) and wartime contingency operation (total of 208 trillion BTU) based on realistic system energy consumption performance in the FY 2006-7 time period. The major Army energy consumer is Facilities for both scenarios, but during time of war the Facilities (and non-tactical vehicle) share of the total drops substantially relative to increases in other components.



Sources: Defense Science Board. More Fight – Less Fuel (February 2008); Department of the Army FY07 Annual Energy Management Report (December 2007)

Figure 4. Army Energy Consumption Scenarios

Internal Army Energy Drivers

Energy is a critical resource and must be readily available to support Army missions. Army energy planners must address several near term developments within the evolving Army's internal operations that will significantly affect future energy and fuel use. The energy impacts of some of these key developments are described in more detail below.

- Future Combat Systems (FCS) – FCS will provide superior mobility, decision making and lethality on the battlefield. The FCS "system of systems" will require new technologies and an integrated energy approach to support an array of electric/hybrid manned and unmanned vehicles; deployed sensors; electric weapons and active protection systems.
- Army Base Realignment and Closure (BRAC) – The Army's implementation of BRAC 2005 will involve many Army installations, closing some and increasing the presence of Army staff and equipment on others. Changes impact not only these facilities and personnel, but also influence the Army's energy use patterns and requirements.
- Grow the Army – In 2007, Congress authorized a 74,200 Soldier increase in end strength for the Regular Army by the end of 2012 and by 2013 for the Army National Guard (ARNG) and United States Army Reserve (USAR). The end dates for achieving the growth were later accelerated to the end of 2010 for the Regular Army and ARNG. Housing these forces and providing for their readiness, the Army is building additional infrastructure such as homes, barracks, and training ranges.
- Redeployment and Rebasing – About 380,000 Soldiers, Families and Civilians will be moved during the next three years in what is expected to be the largest Army re-basing since World War II. This is in concert with the Army's detailed planning for significant redeployment of its overseas forces in Kuwait, Iraq, Afghanistan and elsewhere.
- Expeditionary Force – The Army force structure is transforming from a forward-deployed model with units permanently stationed overseas to an expeditionary model with units stationed within the United States and deployed overseas on a rotational basis. Significant shifts in energy supply and use are only one of the consequences of this transformation. More agile energy operations will be necessary.

Current Army Energy Activities

The Army already has a number of on-going plans and activities that exemplify the types of implementation actions that will make the AESIS successful. This document does not represent the beginning of the Army's interest in energy programs, but signals the establishment of energy security as an enterprise priority with appropriate leadership and management guidance. These efforts illustrate the Army's commitment to minimizing the impact of possible grid failure, strengthening Expeditionary Force energy resources and developing better fuel management systems for increased accountability of future fuel purchases and distribution.

They also demonstrate support for a commitment to a sustainable environment through expanded use of renewable and alternative energy sources that can reduce harmful greenhouse gas emissions. Future energy activities will build on these efforts to address the Army's evolving energy security needs.

A few of the many new or ongoing energy activities the AESIS will integrate to strengthen energy security throughout the Army are:

Development of Energy and Environmental Plans

- Army Energy & Water Campaign Plan for Installations, 2007
- Army Energy Strategy for Installations, 2005
- The Army Strategy for the Environment, 2004
- The AR 5-5 Future Tactical Fuel and Energy Strategy Study, in process

Energy programs or organizations for reduction of energy use, efficiency gains and accountability

- Army Metering Program
- Chartering of the Army Mobility Fuels & Energy Council (AMFEC)
- Energy Engineering and Analysis Program (EEAP)
- The Natural Gas Risk Management Program
- Army construction that incorporates Leadership in Energy and Environmental Design® (LEED) green building rating system

Ongoing technology development

- Smart power grids; micro-grids
- Electric/hybrid vehicles
- AMC-led Fuels Management Defense (FMD) Initiative

Energy Conservation Investment Program (ECIP)

- High efficiency lighting project at Fort Lee, VA
- Phase two barracks geothermal conversion at Fort Knox, KY
- Industrial energy optimization at Rock Island Arsenal, IL

Army Energy Initiative Projects

- Solar energy generation at Ft. Irwin, CA
- Private industry installation energy management, Ft. Leavenworth, KS
- Neighborhood electric vehicles (NEVs) at multiple Army installations
- Geothermal power, Hawthorne Army Depot, NV
- Biomass-to-liquid fuel technology demonstration at six Army installations

Renewable/Alternative Energy Opportunities

The Army is an emerging leader in the DoD for use of renewable/alternative energy and fuels, and intends to pursue a variety of these energy opportunities in partnership with industry. The AESIS recognizes what the Army brings to the table for energy technology and service vendors and utilities — secure, useful land and stable energy demand. Figures 5-8 show notional maps (not to scale or inclusive of all Army installations) that illustrate potential Army-owned land that could be used to harvest solar, wind, geothermal and biomass renewable energy resources. In addition, Figure 9 identifies the possible nuclear energy opportunities, by location, based on the current nuclear certificates held by the US Army.

Renewable Energy = energy produced from renewable fuel resources such as biomaterial (biomass, landfill gas (LGS) and municipal solid waste (MSW)), hydropower, geothermal, wind, ocean (tidal, wave, current, and thermal), biofuels, thermal and solar.

Alternative Energy = any source of energy (e.g., nuclear, clean coal technologies, hydrogen) that can supplement or replace fossil fuels (oil, coal and natural gas) and other conventional energy sources.

Implementation of future renewable/alternative energy projects is likely to involve contractual agreements with industry that offer land and stable energy demand as Army assets in return for power supply, improved energy security and additional revenues to the Army for supplying excess power to the commercial grid. Example agreements for such energy projects are Enhanced Use Leases (EULs) for leasing DoD lands for private development; Energy Savings Performance Contracts (ESPCs) to improve energy efficiency and reduce energy use and costs through private investments; and Power Purchase Agreements (PPAs) that provide for long-term agreements to purchase power at a set rate.

It is important to note that for each future energy project, including MILCON and other construction, the Army will assess potential environmental impacts in compliance with requirements of relevant legal requirements such as those from the National Environmental Policy Act (NEPA). Compliance with these requirements will be considered when establishing the process and timelines for these energy projects.

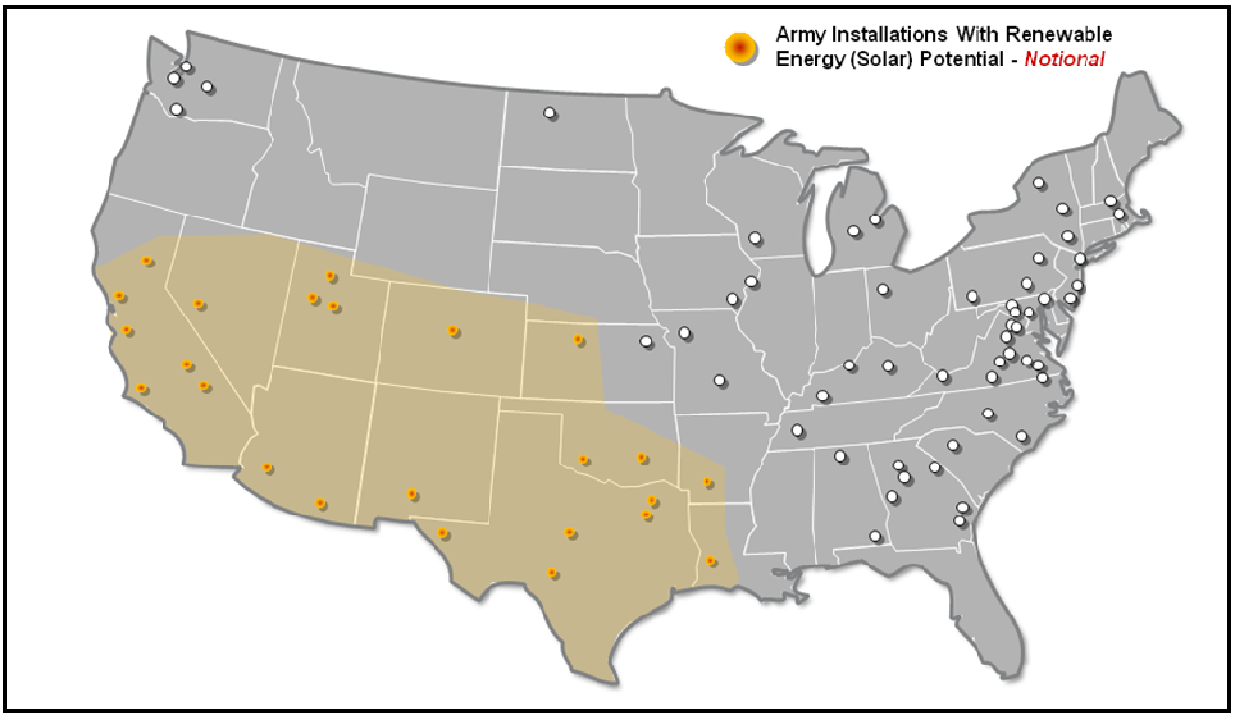


Figure 5. Notional Solar Potential

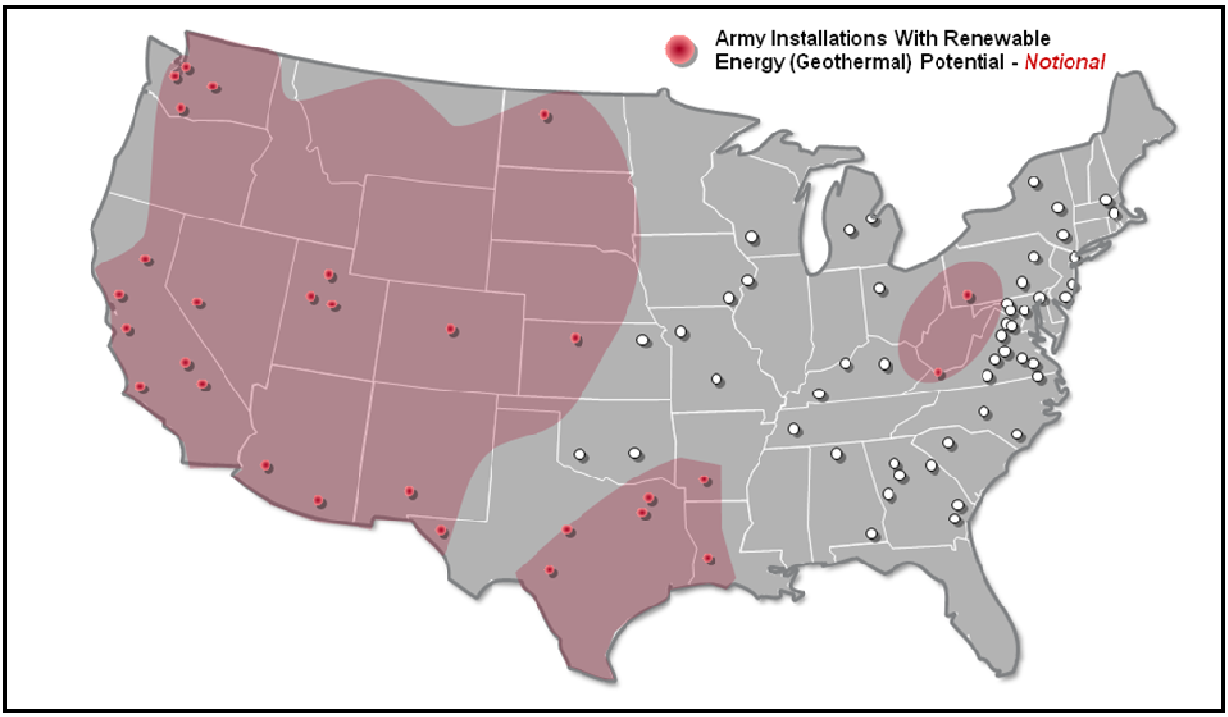


Figure 6. Notional Geothermal Potential

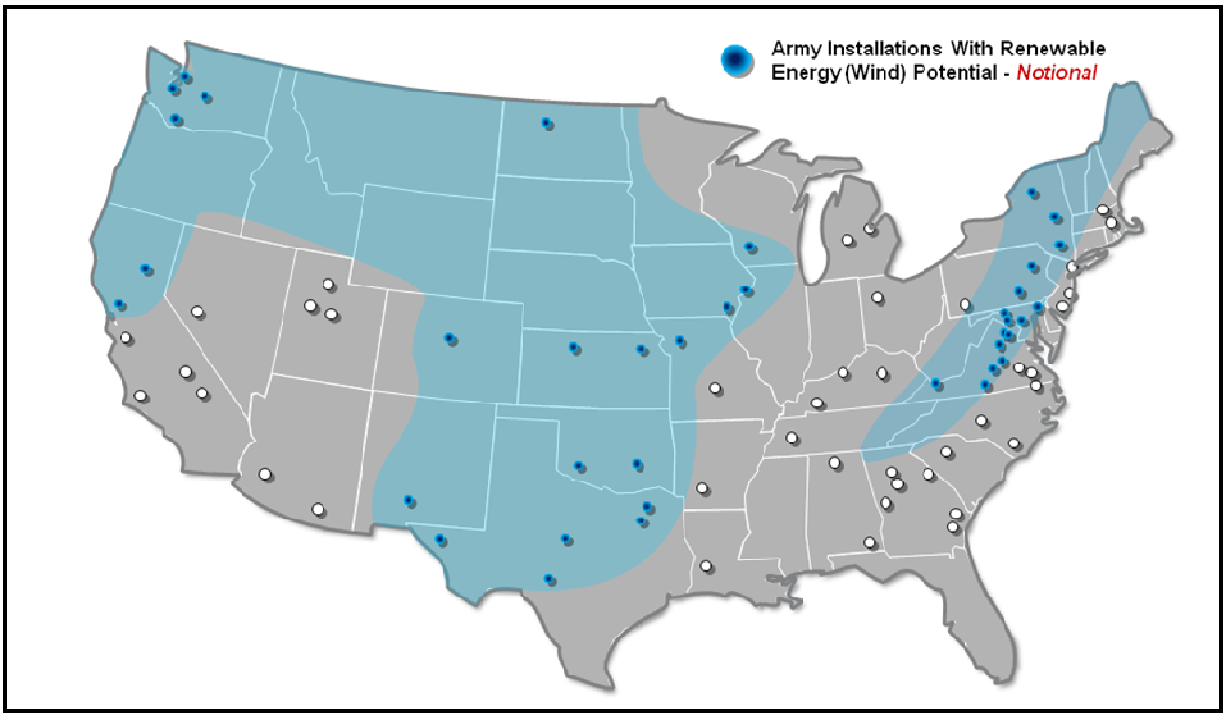


Figure 7. Notional Wind Potential

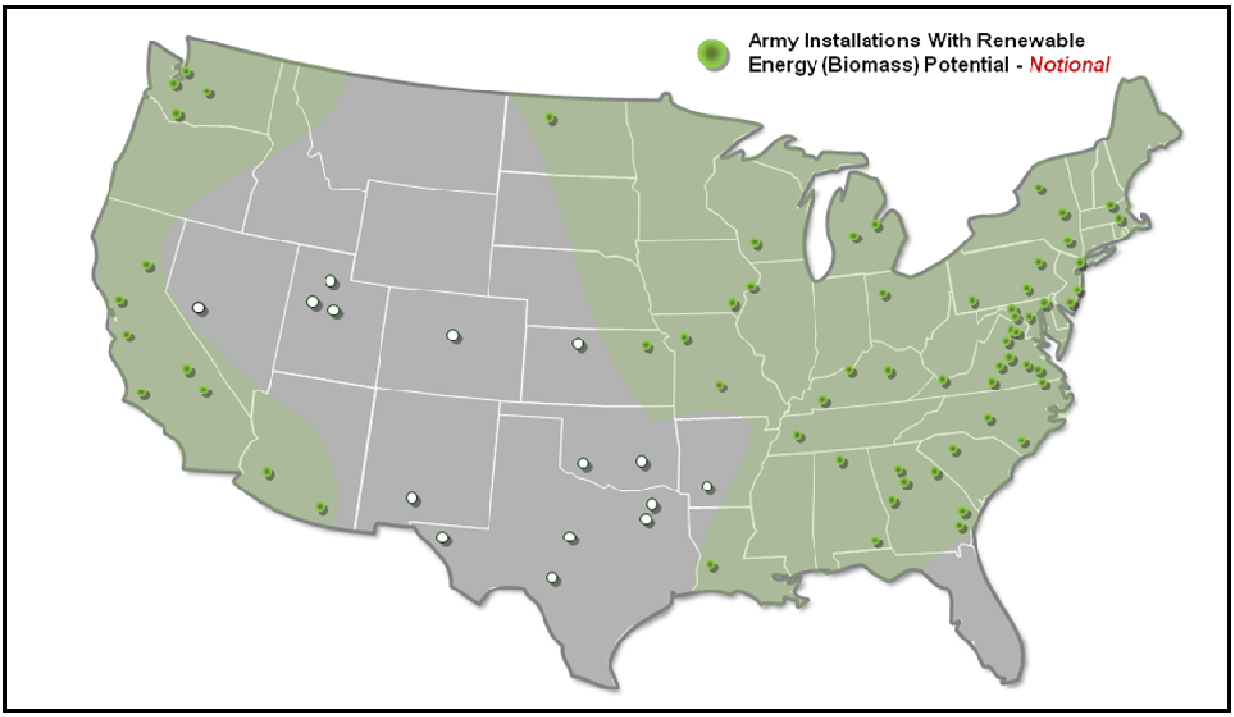


Figure 8. Notional Biomass Potential

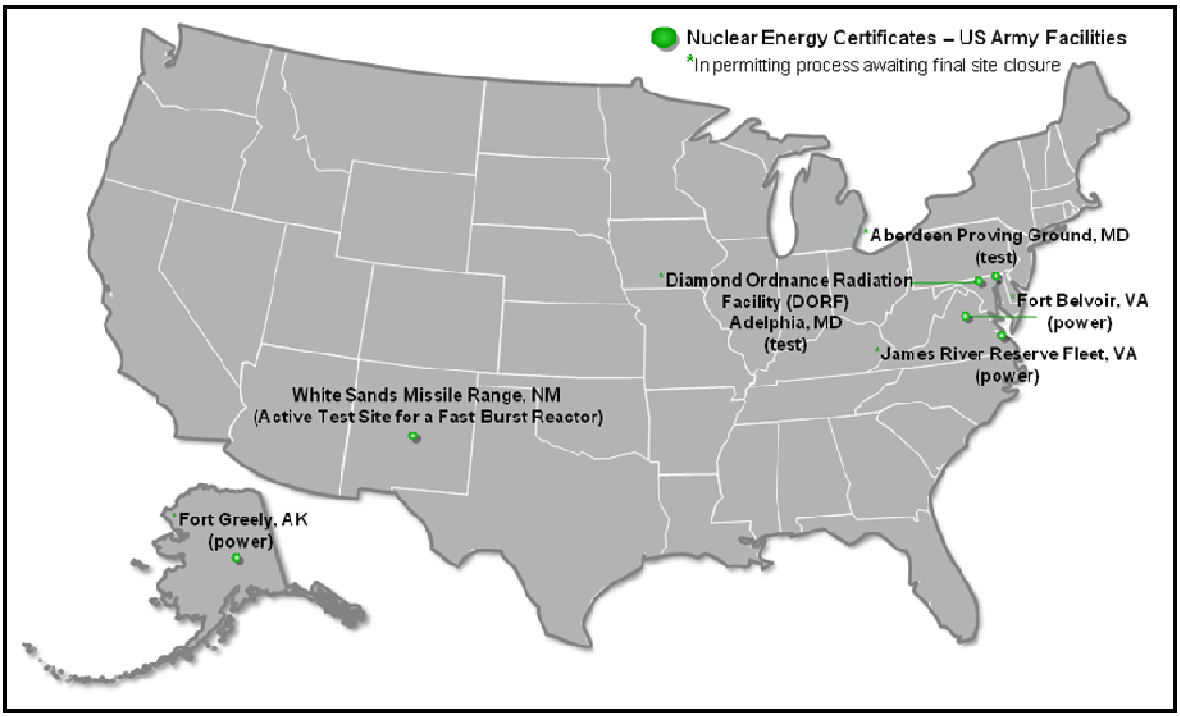


Figure 9. Current Army Nuclear Energy Potential

V. CONCLUSION

The vital importance of energy security to the Army and its missions led the Army leadership to raise the priority of energy security to the highest levels by chartering the SEC and setting a new course for the future. The SEC directed the development of a strategy as the next step to strengthen energy security and build a culture of energy awareness throughout the Army. The AESIS represents an enterprise framework to establish the best practices for coordinating and solving energy security challenges for years to come. The goal of this document is to communicate Army leadership's energy security vision, mission, and goals to each organization and support the integration of each organization's energy activities into the enterprise level strategy.

An enterprise-wide approach is necessary because cost-effective management of energy requires coordinated efforts across the Army. The Army must respond to federal laws, DoD energy directives and strategies and must coordinate energy goals with environmental and sustainability goals. Many Army organizations are already implementing energy initiatives to meet federal energy mandates — these efforts will be coordinated under an enterprise structure to optimize the limited resources and provide top level leadership support to ensure success.

The job has just begun. The AESIS lays the ground work to begin addressing the energy security challenges. In order to achieve the ESGs outlined here, implementation plans need to be developed; metrics to mark progress must be established and coordinated; and the significant job of executing this strategy must begin at all organizational levels with a focus on incorporating leadership, partnership and ownership into the execution phase.

Increasing energy security is every Soldier's and Civilian's mission. Success exists in each individual's support and execution of solutions to their organization's energy security needs. The Army will address the challenge of energy security while helping the nation to capitalize on leading-edge research, technology and business practices. Successfully meeting these challenges will take dedication, sustained leadership, and accountability at all levels.

APPENDIX A – ACRONYMS AND ABBREVIATIONS

AASA	Administrative Assistant to the Secretary of the Army
ACOM	Army Commands
ACSIM	Assistant Chief of Staff for Installation Management
AESIS	Army Energy Security Implementation Strategy
AESTF	Army Energy Security Task Force
AMC	Army Material Command
AMFEC	Army Mobility Fuels and Energy Council
ARNG	Army National Guard
ASA	Assistant Secretaries of the Army
ASA(AL&T)	Assistant Secretary of the Army, Acquisition, Logistics and Technology
ASA(CW)	Assistant Secretary of the Army, Civil Works
ASA(FM&C)	Assistant Secretary of the Army, Financial Management and Comptroller
ASA(I&E)	Assistant Secretary of the Army, Installations and Environment
ASA(M&RA)	Assistant Secretary of the Army, Manpower and Reserve Affairs
ASCC	Army Service Component Commands
BRAC	Base Realignment and Closure
BTU	British Thermal Unit
CAR	Chief of the Army Reserves
CASCOM	Combined Arms Support Command
CECOM	Communications and Electronics Command
CIO	Chief Information Officer
CLL	Chief, Legislative Liaison
COE	Corps of Engineers
CONUS	Continental United States
CPA	Office of the Chief of Army Public Affairs
CSA	Chief of Staff of the Army
DARNG	Director, Army National Guard
DAS	Director of the Army Staff
DASA(E&P)	Deputy Assistant Secretary of the Army, Energy & Partnerships
DASA(ESOH)	Deputy Assistant Secretary of the Army, Environment, Safety and Occupational Health
DASA(I&E)	Deputy Assistant Secretary of the Army, Installations and Environment
DASA(SI)	Deputy Assistant Secretary of the Army, Strategic Infrastructure
DoD	Department of Defense
DRU	Direct Reporting Units
DUSA	Deputy Under Secretary of the Army
ECIP	Execute the Energy Conservation Investment Program
EEAP	Energy Engineering and Analysis Program

EISA	Energy Independence and Security Act
EO	Executive Order
EPAct	Energy Policy Act
ESG	Energy Security Goal
ESO	Energy Security Objectives
ESPC	Energy Savings Performance Contracts
EUL	Enhanced Use Leases
FBCE	Fully Burdened Cost of Energy
FCS	Future Combat Systems
FMD	Fuels Management Defense
FMR	Financial Management Regulation
FOA	Field Operating Agency
FOB	Forward Operating Bases
FORSCOM	Forces Command
FY	Fiscal Year
HQDA	Headquarters Department of the Army
IMCOM	Installation Management Command
KPP	Key Performance Parameter
LEED	Leadership in Energy and Environmental Design ®
LGS	Landfill Gas
MILCON	Military Construction
MSW	Municipal Solid Waste
MWh	Megawatt Hours
NDAA	National Defense Authorization Act
NEPA	National Environmental Policy Act
NEV	Neighborhood Electric Vehicle
NTV	Non-tactical Vehicles
OCONUS	Outside Continental United States
ODASA(E&P)	Office of the Deputy Assistant Secretary of the Army for Energy and Partnerships
OGC	Office of General Council
OPR	Office of Primary Responsibility
OSD	Office of the Secretary of Defense
PAE	Program, Analysis and Evaluation
POM	Program Objective Memorandum
PPA	Power Purchase Agreements
PPBES	Planning, Programming, Budgeting and Execution System
RDECOM	Research, Development and Engineering Command
RDT&E	Research, development, testing & evaluation
SA	Secretary of the Army

SEC	Senior Energy Council
SEE	Senior Energy Executive
SMA	Sergeant Major of the Army
TARDEC	Tank-Automotive Research, Development and Engineering Center
TJAG	The Judge Advocate General
TRADOC	Training and Doctrine Command
U.S.C.	United States Code
USAR	United States Army Reserve
USACE	United States Army Corps of Engineers
USD(AT&L)	Under Secretary of Defense for Acquisition, Technology and Logistics
VCSA	Vice Chief of Staff of the Army
WG	Working Group