



**The U.S. Army**

# **Energy and Water Campaign Plan**

**for Installations**



**The Army's 25 Year Plan  
in Support of POM  
FY 2010-2015**



**ARMY STRONG**

Department of the Army

# Army Energy and Water Campaign Plan for Installations



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# Army Energy and Water Campaign Plan for Installations

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## Introduction

The *Army Energy and Water Campaign Plan for Installations* (Campaign Plan) will help the Army to provide safe, secure, reliable, environmentally compliant, and cost-effective energy and water services to soldiers, families, civilians, and contractors on Army installations. The Campaign Plan, originally developed in 2005, implements the *Army Energy Strategy for Installations* (Energy Strategy) and sets forth the Army’s 25-year energy goals through 2030. The Campaign Plan defines actions and the short, mid, and long-term methods, tools, technologies, and projects required to ensure the Army successfully achieves long-range energy and water goals and arrives at a more secure energy dependent future with increased efficiency use of utility resources.

The Energy Strategy sets the general direction for the Army with five major initiatives supported by specific objectives:

- **Eliminate energy waste in existing facilities** – Reduce and eliminate energy inefficiencies that waste natural and financial resources, and do so in a manner that does not adversely impact mission or the comfort and quality of the facilities in which soldiers, families, civilians, and contractors work and live.
- **Increase energy efficiency in new construction and renovations** – Increase the use of energy technologies that provide the greatest cost-effectiveness, energy efficiency, and environmental sustainability.
- **Reduce dependence on fossil fuels** – Increase the use of clean, renewable energy and improve efficiency of existing energy systems to reduce dependency on fossil fuels and to optimize environmental sustainability.
- **Conserve water resources** – Reduce water use to conserve water resources for drinking and domestic purposes.
- **Improve energy security** – Provide for the security and reliability of energy and water systems in order to provide dependable utility services.

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The Campaign Plan will undergo biennial updating to provide a dynamic, detailed road map for achieving the five initiatives of the Energy Strategy. The Campaign Plan is the implementation plan for achieving the strategic vision. The Campaign Plan:

- Lays out the specific actions, milestones and funding strategies needed to meet the energy and water conservation goals of the Energy Policy Act of 2005, Executive Order 13423, and other applicable policies and regulations.
- Identifies management and institutional requirements to achieve actions.
- Identifies funding strategies and resources (Non-public version).
- Describes the desired end state for the actions and identifies the metrics of success.
- Provides a year-by-year investment plan that coordinates all Army energy/water users and policy components (security, privatization, procurement, technology, construction, and environment) into cohesive and measurable objectives designed to meet the goals.

### **Background**

The Army operates in a domestic and world energy situation that is highly uncertain. To chart an effective and viable path for its energy and water future, the Army must consider the short and long-term issues involved in developing enduring energy policies and solutions for its installations. To sustain its mission and ensure self-capability to project and support the forces, the Army must anticipate, plan and mitigate impacts from anticipated economic and logistical energy and water-related problems. This requires a transition to modern, secure, and efficient energy and water systems, improved management practices and high efficiency facilities and technologies that are environmentally friendly. These supply and demand-side challenges require thoughtful planning and execution using integrated solutions.

### **Vision**

The Army Energy Strategy envisions secure, efficient, reliable, sustainable, and cost-effective energy and water services for installations while striving to establish and strengthen reciprocally beneficial partnerships with surrounding communities. The Campaign Plan looks out to the year 2030 to respond to dynamic influences affecting domestic and imported energy resources and the evolution of the energy marketplace.

Development of new technologies and increased efficiencies will not likely fully offset the increasing demands of global industrialization. Greater competition is predictable for dwindling energy resources, leading to energy price increases and shortages. Environmental considerations, technology gaps, construction backlogs, political unrest, and depleted supplies will play a larger role in determining the future availability and cost of energy resources.

Domestically, two seamless energy grids (natural gas and electricity) form the backbone of our national energy system. The challenges of maintaining and operating those grids, with appropriate control and adequate infrastructure, may result in supply problems at some locations. Continuing pressure to reduce operating costs and space constraints from increasing population may result in more compact installations and higher energy densities but with reduced expense for energy distribution between facilities. All of these considerations point to the need for greatly increased energy efficiency, load management, and alternative sources of energy.

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The Army as a whole will execute its energy and water management activities with more coordinated planning and organization to produce the required outcomes with existing resources. We will leverage off our collective talents with expanded collaboration. Our committed, enthusiastic leadership will continue to provide dedication and follow through. Our greater willingness to share ideas and risks, and change operations for increased agility and effectiveness will carry us far. We will carry on our tradition of being dedicated, disciplined, informed and active.

### **Energy and Water Resources**

The primary issues affecting energy supplies, and to a certain extent water supplies, are those of availability, affordability, sustainability, and security. Uneven distribution of global energy and water resources and the impacts of increasing global energy consumption continue to raise international focus in both environmental and political terms. The Army is not solely a key resource user, but is also under the high influence of tremendous geopolitical, economic, and strategic influences.

***Availability.*** Future availability of customary energy sources is uncertain. United States production of both oil and natural gas are past their peak, and world petroleum production is at or near its peak. Growing domestic consumption will continue to increase dependence on foreign, potentially unstable energy sources. Almost half of the existing domestic natural gas reserves are “stranded” (meaning too remote, located on restricted federal lands, or considered too environmentally detrimental to exploit). Construction of an Alaskan natural gas pipeline and the importation of Liquefied Natural Gas (LNG) are possible solutions to domestic natural gas problems.

Water scarcity may be the most underestimated resource issue. World water use has tripled in the past 50 years. Forty percent of our food supply now comes from irrigated lands, as part of an increased reliance on irrigation in the world food economy. While the demand continues to rise, the amount of fresh water supply provided by the hydrologic cycle remains relatively constant, but aquifers are increasingly stressed and challenged.

***Affordability.*** As demand for natural gas and petroleum exceeds supply on a national or worldwide basis, prices rise. As population increases and as standards of living improve for the developing world, competition for finite resources will increase.

Water remains a very affordable commodity to most citizens, especially for non-irrigation needs. Water availability and costs show considerable regional variability. In many areas of the country, water (and wastewater treatment) rates are rising faster than energy, especially in the arid West and in parts of the East coast. In regions that have abundant water supplies and low commodity costs, Army installations have less incentive to use the water wisely and most efficiently.

***Sustainability.*** The worldwide rate of consumption of fossil fuels continues to grow. Fuel combustion may affect the global climate with the production of green house gases and localized production of acid rain, low-lying ozone, and smog. Current energy policies and consumption practices are not sustainable and limit options for future generations.

The growing demands of increasing populations, increasingly burden water supplies that are limited by a relatively stable hydrologic cycles. This pattern of growing consumption is unsustainable, as evidenced by declining water tables levels in many parts of the world, particularly in the Western United States.

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More efficient use and re-use of water are the best options to address this dilemma and to mitigate potential regional crisis.

**Security.** In an age of terrorism, combustible and explosive fuels and weapons-grade nuclear materials create security risks. World market forces and regional geopolitical instabilities broadly threaten energy supplies. Infrastructure vulnerabilities pose further risks of disruption to Army installations.

Secure water supplies are critical to installation mission functions. Unlike energy, world market pressures do not affect water supplies, but they do similarly face threats to system infrastructure. Vulnerability assessments have revealed that water systems are additionally threatened by chemical or bio-terrorism attacks.

### **Energy Trends**

Energy consumption in Army facilities consists of approximately one-third electrical energy with the remainder being thermal energy supplied primarily by natural gas and increasingly less fuel oil. The expectation is that energy efficiency associated with the Army facilities and mobility will gradually improve, but overall consumption may potentially increase depending on future phases of the global war on terror and on geopolitical tensions resulting from the world energy situation.

Table 1 summarizes the current demand, supply, and proportionate distribution of energy on a global, national, and Army basis. Army totals include OCONUS energy use. Table 2 lists world reserves. Currently, the United States imports 26% of its total energy supply and 56% of its oil supply. The Army and the nation's heavy reliance on oil and natural gas are not in alignment with either the nation's or the earth's available and sustainable resources. Disparities between energy use and energy reserves underscore our need to develop alternative energy resources. The nation's demand for imported energy would be lessened by increasing coal, nuclear, and renewable energy contributions to our energy portfolio. Worldwide energy consumption should increase by 2.1% per year and domestic energy consumption by 1.4% per year, heightening global energy competition.

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**Table 1. Summary of Army, United States and World Energy Consumption.**

	Oil	Natural Gas	Coal	Nuclear	Renewable	Electricity	Purchased Steam	Total
Fuel Share of U.S. consumption	40%	23%	23%	8%	6%			100%
U.S. consumption (QBTU/yr) 2003, EIA	39	23	22	8	6			98
U.S. Imports (QBTU/yr)	22	4						26
Percent of U.S. consumption imported	56%	17%						27%
World consumption (QBTU/yr) 2003,	147	94	104	24	32			401
U.S. share of world consumption	27%	24%	22%	32%	18%			24%
U.S. Army on-site consumption (TBTU/yr) 2004, including mobility	20	27	7	*	1	30	7	92
On-site Fuel share of Army consumption	22%	30%	7%	0%	1%	33%	7%	100%
U.S. Army consumption primary fuels ** (TBTU/yr) 2004	22	40	55	6	4			127
Primary fuel share of Army consumption	18%	31%	43%	5%	3%			100%

- o **No** direct on-site consumption of nuclear fuel
- o \*\* Includes source energy used to produce electricity and purchased steam

**Table 2. Summary of United States and World Energy Reserves.**

	Oil	Natural Gas	Coal	Nuclear	Renewable	Total
U.S. reserves (Q) 2003	132	193	6,678			7,003
Domestic proportion fossil fuel	2%	3%	95%			
World reserves (Q) 2002	6,026	6,317	26,578			38,921
World proportion fossil fuel	16%	16%	68%			

### ***Natural Gas***

The trend for the near and mid-term natural gas market will be volatile. Prices will fluctuate significantly based on weather and supply. In the near term, natural gas prices will increase continually until the normalizing effects of the following are in place. The construction of a gas pipeline from Alaska and northern Canada, the expansion of exploration and production to areas of the United States now considered off limits, and a large increase in imports of liquefied natural gas.

### ***Petroleum***

Steadily rising oil prices reflect both geopolitical instability in the Middle East and increased demands from China, India, and other emerging economies. Continued price increases are possible as world production approaches its peak. The more than doubling of oil prices from 2003-2007 was not an anomaly, but a picture of the future. Oil production is approaching or has reached its peak and the trend is for very low growth in availability for the next 5 to 10 years.

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## *Coal*

In spite of the large production of air pollutants generated by coal consumption, it is necessary that the utility sector and possibly the large industrial sector continue to use the nation's large supplies of coal. With current technologies, coal combustion remains problematic, but current research shows promising technological solutions including coal-to-liquids and coal gasification. Deploying poly-generation techniques with carbon sequestration on a large scale may potentially allow the United States to use the nation's coal reserves in an environmentally friendly way to meet both liquid fuel and electricity requirements. Sequestration of the CO<sub>2</sub> gasses is required along with the new technologies.

## *Nuclear Power Trends*

Nuclear power appears headed for a renaissance. Some nuclear plant upgrades are in the planning stages for the short-term. In the mid-term, a modest construction program is getting under way, new-generation reactors are in design, and some shut down reactors may come back on-line.

## *Renewable Energy Trends*

Renewable energy technologies will certainly be a growing part of the energy mix and will penetrate faster and further as the technologies mature and become more cost-effective.

## *Electrical System Trends*

The electrical system will likely become increasingly problematic over the next 5 to 10 years. Power capacity should suffice and utilities have overbuilt to meet the peaking market. They are also planning additions to base capacity. However, there are weak points in the nation's electrical grid system and significant investments are required to maintain power flow demands and reduce bottlenecks and increase reliability.

## **Water Trends**

Facility consumption dominates Army water consumption. With careful planning and implementation of water conservation and reuse technologies, consumption of potable water in Army facilities will decrease.

There is considerable cost-effective and untapped potential for saving potable water through minimizing wasteful practices, water conservation and re-use at Army installations. To most effectively implement water conservation practices, water needs to be as highly valued as energy at Army installations.

## **Implications for Army Installations**

Our best options for meeting future energy requirements are energy efficiency and renewable sources. Energy efficiency is the least expensive, most readily available, and environmentally friendly way to stretch our current energy supplies. This ensures that we get the most benefit from every BTU used. It involves optimizing operations and controls to minimize waste and infusing state of the art technology and techniques where appropriate.

Renewable options make use of Earth's resources that are inexhaustible by our energy consumption practices: namely solar, wind, geothermal, geoexchange, hydropower, tidal movements, agricultural products, and municipal wastes. These options are available, sustainable, and secure. The affordability

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of renewable technologies is improving steadily, and with a strong market pull, cost reductions could be dramatic. For efficiency improvements and renewables, the intangible and hard to quantify benefits, such as reduced pollution and security, yield indisputable economic value.

We must act now to develop the technology and infrastructure necessary to transition to other energy sources and conserve water supplies. Policy changes, new and emerging technologies, cultural changes, increased use of recycled water, and significant investment in infrastructure and renewable energy sources is requisite for this new energy and water future, and is *specifically addressed* in the Campaign Plan.

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## Army Energy and Water Campaign Plan for Installations

### **Initiative #1: Eliminate energy waste in existing facilities**

*Eliminate energy inefficiencies that waste natural and financial resources, and do so in a manner that does not adversely impact mission or the comfort and quality of the facilities in which soldiers, families, civilians and contractors work and live.*

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# Army Energy and Water Campaign Plan for Installations

## **Initiative #1: Eliminate energy waste in existing facilities**

*Eliminate energy inefficiencies that waste natural and financial resources, and do so in a manner that does not adversely impact mission or the comfort and quality of the facilities in which soldiers, families, civilians and contractors work and live.*

### **1.1 Action #1: Develop effective national, regional and installation energy management plans**

#### **1.1.1 Approaches to Meet Actions and Priorities (S/M/L: short-term of up to two years; mid-term of two to five years; and long-term of more than five years)**

##### **Discussion**

The management of Army energy and water is a complex process. It requires synthesizing a diverse set of drivers and circumstances into a unified strategy. Changing mandates, technologies, fuel outlooks, and security issues form new challenges for consideration. These challenges range from global issues (such as climate change and energy resource availability) to local issues (such as providing energy system security and meeting new energy reduction targets). Careful systematic planning is imperative for success.

This Army level Campaign Plan organizes and focuses on energy and water management initiatives by responding to federal legislation, as well as reflecting Department of Defense (DoD) and Department of the Army (DA) requirements, vision and values. The Plan, written in light of the present and anticipated world situation, favorably postures us to maintain our utility needs in support of the Army's mission.

Presently, installations independently manage their own energy and water efficiency efforts. They are responsible for identifying, developing, and implementing projects; ensuring that new construction meets sustainable design criteria; and maintaining awareness. Installations lack incentives to provide a full-time energy and resource manager. This results in hasty and piecemeal projects, inconsistent calculation methods, and lack of awareness of regional activities and opportunities.

There is widespread belief at the installation level that the obvious, quick payback means of increasing efficiency are in place and any new efforts are yielding diminishing returns. Further, financial resources are limited, source fuels are increasingly uncertain, and energy reduction and operational requirements are progressively more challenging. Energy Managers both want and need more help to use limited dollars with as much impact as possible.

##### **Approaches**

Tiered planning efforts will augment the current mode of bottom up, decentralized energy and water management. These efforts will ensure installation level planning is in accord with regional and national perspectives and capabilities. Information and ideas will flow up, down, and across the management structure. This brings together multiple perspectives on a complex program and results in synergies in process and outcomes. This ensures that neither the big picture of national analysis nor the individual circumstances of the installation level are lost. (M)

Collectively managed goals and targets will allow the Army to meet requirements as an entire unit while not necessarily making the same progress at each installation. Efforts and resources

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will be concentrated where they make the most sense and yield the greatest returns. Systematic review, feedback, and adjustment of operations will keep efforts on target. (M)

Installation Management Command (IMCOM) and Army Commands will receive guidance from the Office of the Assistant Chief of Staff for Installations (OACSIM) on appropriate thermal comfort conditions, indoor air quality requirements, energy performance by building function and climate, water consumption standards and common yardstick calculations and procedures. Further, they will receive individualized performance targets, pertinent technology focus and strategic fuel diversity guidelines based on present performance and regional opportunities. These insights will generate from a centralized review of overall Army energy operations. (M)

The Army developed an energy management plan template (format provided on the Army energy program webpage at <http://army-energypolicy.hqda.pentagon.mil/>) for use to develop the IMCOM Headquarters/regional level plans. IMCOM is responsible for development of installation-level targets for use in development of installation-level plans. IMCOM will also track and report progress of programs. (S)

Progress at each level and for individual programs will undergo central review. This review will identify performance issues and corrective actions. Adjustments to refine targets over time are expected, indicating the need for continued effective analytical capabilities, e.g., ensure analysis linkage to knowledge management tools. Over time, develop targeting tools to improve Army ability to achieve the greatest progress. (M)

- a. Headquarters, Department of the Army (HQDA) will develop overall energy management plan. (S)
- b. HQDA will provide a template for Regions to follow in developing the Regional Plans. (S)
- c. Installations will develop installation specific energy management plans that tie into the Regional plans and template provided in Region plan. (S)
- d. Review and revise installation energy plans on a periodic basis. (M)

### 1.1.2 Technologies and Tools Required

Tiered planning efforts will require the development of a long-range energy-planning template, an energy performance targeting methodology, and rating and tracking tools. Centralized review of energy stewardship and suggestions for future progress will make use of verified data from the Army Energy and Water Reporting System (AEWRS), commercial building energy consumption survey (CBECS) data energy modeling capabilities, life-cycle costing capabilities, and the Technology Standards Group database and recommendations.

### 1.1.3 Policies, Management, and Institutional Issues Energy Policy Act of 2005

The Energy Policy Act of 2005 in Section 102: “Energy Management Requirements” requires:

- a. Annual energy reduction goal (BTU/ft<sup>2</sup>) is 2%/year per EPACT 2005 and 3%/yr per E.O. 13423 from FY 2006 through FY 2015. The overall goal is a 20% reduction (compared to the FY 2003 baseline) per EPACT 2005 (law) and 30% reduction per E.O. 13423 by FY 2015.
- b. Energy reduction reporting baseline changed from FY 1985 to FY 2003.
- c. Reduction goals apply to all buildings including industrial or laboratory facilities. Requests for lesser goals must be justified and authorized by ACSIM-ODF.

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- d. Retention of appropriated funds for energy, water and wastewater expenditures not made because of energy or water savings. Retained funds used for energy efficiency, water conservation or unconventional and renewable energy resources projects.

### Management and Institutional Issues

Installations will be required to prepare a long-range energy management plan to meet performance targets per the Energy Policy Act of 2005 requirements and track progress. Plans are subject to central review, collaborative updating and revision on at least a three-year cycle.

#### 1.1.4 Specific Projects to Meet Action

Several projects will be required to meet the intent of this action. These include:

- a. A centralized review of overall Army energy operations that will determine the status of utility consumption, source fuel portfolio, technology profiles and associated environmental impacts and costs. Assessments will be on an Army-wide, IMCOM (HQ/regional) and installation level. IMCOM (HQ/regional) and installation level targets will complement and enable associated Army-wide goals. Update trending and targets annually. (S)
- b. Develop the requirements for the long-range energy management plans. (S)
- c. Long-range energy management plan support to installations will include template development, calculation methods, procedures, trending and tracking tools. (S)
- d. The Army will determine installation level responsible party (by name); prepare and maintain a list at OACSIM as part of the Energy Manager's Data Base in the Army Energy and Water Reporting System (AEWRS). (S)

The establishment of a review process will ensure efforts are moving us in the desired direction while maximizing regional and collective opportunities. (M)

#### 1.1.5 Funding Strategies and Sources

Internal actions covered in existing operating budgets. Secure supplemental funding for developing installation energy management plans.

#### 1.1.6 Description of End State

- a. A centrally funded and managed energy program that addresses the multiple priorities of the Army's missions is the desired end state. Each level of the organization will have specific goals that support the overall energy management goals of the Army.
- b. One hundred percent of installations with completed energy management plans is the desired result.

#### 1.1.7 Metrics of Success

The measurable metrics of success for this action are 90 percent of installations will have current long-range plans (updated within the last two years), Army wide Energy Use Index (EUI) that shows reduction from the previous year and the established baseline per the Energy Policy Act of 2005 energy reduction requirements, meeting or exceeding the required percentage of renewable energy usage, and meeting or exceeding the required percentage of buildings meeting performance progress toward technology and fuel portfolio goals.

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### 1.1.8 Milestones (actions by FY)

Responsible party list	FY08
Develop/distribute policy for energy management plan requirements	FY08
Army-wide review with regional and installation level targets	FY08
Energy plan template, calculations and procedures	FY09
80% of IMCOM (HQ/regional) level plans in place	FY09
80% of installation level plans in place	FY09
Initial annual review of installation level plans	FY10
Meet energy reduction goals of the Energy Policy Act of 2005	FY08-30
Sites retain funds per the requirements of the Energy Policy Act of 2005	FY08-30
Continuous development of installation energy management plans	FY09-30

# Army Energy and Water Campaign Plan for Installations

## **Initiative #1: Eliminate energy waste in existing facilities**

### **1.2 Action #2: Provide a full-time, trained, and certified staff to lead the energy and water management program and its initiatives**

#### **1.2.1 Approaches to Meet Actions and Priorities (S, M, L)**

- a. Establish energy management program manpower staffing standards for garrisons, regions, and headquarters to include a baseline staffing level consistent with the size of the installation and annual utility budget. Mid-size installations have annual energy costs greater than \$5M while large-size installations have annual energy costs greater than \$10M. (S)
- b. Establish standardized job descriptions for energy/water managers. (S)
- c. Revise the Standard Garrison Organization (SGO) to establish an office within the DPW or directly under the Garrison Commander, to centralize all energy/water management program manpower resources. This would include the functions of an Energy/Water Program Manager, Utility Rates Clerk, and for Utilities Sales Officer and Engineering Technicians. (S)
- d. Obtain resources for full staffing at all organizational levels. (M)
- e. Increase the use of Resource Efficiency Managers (REMs) to supplement government staffing. (M)
- f. Develop Army-specific energy/water management training (Level 1 training). (S)
- g. Develop Army-specific utilities sales and acquisition training courses (Level 2 training). (S)
- h. Sponsor Certified Energy Manager (CEM) training and certification courses for energy managers (Level 3 training). (S)
- i. Survey the available training courses and materials. (S)
- j. Pursue development of higher-level technically oriented training courses through the U.S. Army Corps of Engineers Proponent Sponsored Engineer Corps Training (PROSPECT) program.
- k. Involve key partner organizations (i.e., Department of Energy (DOE), the American Society of Heating Refrigeration and Air conditioning Engineers (ASHRAE), national labs, Association of Energy Engineers (AEE), state agencies (EPA, etc.) in development of training levels. (S)
- l. Partner with the Department of Energy's Federal Energy Management Program (FEMP) office and other Defense Services to improve and expand application of energy training resources (example web-based energy savings performance contracting (ESPC) training, and industrial facilities training). (M)

#### **1.2.2 Technologies and Tools Required**

- a. Maximize use of web-based training as one way to keep training costs lower.
- b. Utilize classroom instruction where necessary (videoconferencing).
- c. Conduct standard energy auditing tests using appropriate measurement equipment.

#### **1.2.3 Policies, Management, and Institutional Issues**

- a. Development of staffing standards will require coordination and approval by Army proponent staff offices.
- b. Development of standardized job descriptions will require coordination and approval by civilian personnel office.
- c. Increase personnel staff funding in coordination with and approval by Army proponent staff offices.

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### 1.2.4 Specific Projects to Meet Action

- a. Publish energy office manpower staffing guidelines.
- b. Revise Standard Garrison Organization for Directorates of Public Works (DPW) and or Garrison Commander.
- c. Implement standardized job descriptions.
- d. Survey the available training courses and sources.
- e. Develop recommended training tracks/levels.
- f. Formulate process for obtaining self-sustaining REMs to support installation energy management programs where cost-effective.
- g. Implement Energy Manger concurrence approval authority by a qualified installation energy manager. If not available, obtain concurrence from a regional qualified energy manager for any new construction or renovation.

### 1.2.5 Funding Strategies and Sources

- a. Solicit increase in central funding to develop preliminary training course complementary to Certified Energy Manager training.
- b. Continue central funding of the annual energy manager training for turnover personnel.

### 1.2.6 Description of End State

Fully dedicated, trained and certified energy/water management staff at each organizational level.

### 1.2.7 Metrics of Success

- a. Staffing standards prepared, approved, and implemented.
- b. Job descriptions written and approved for all energy management positions, from engineer technicians to general engineers, GS-09 to GS-14 levels (NSPS pay bands 2 to 3) and Local National equivalent levels overseas.
- c. Additional manpower requirements/authorizations are recognized and provided.
- d. Centralized/regional contracts for procuring REMs are in place.
- e. Army-specific energy/water managers training courses developed for Levels 1 & 2.
- f. At least one full-time Level 3 certified energy manager, either government employee or REM, on staff at each IMCOM region and large-size installation. Large-size installation as defined above in section 1.2.1.

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### 1.2.8 Milestones (actions by FY)

Develop centralized/regional contracts for procuring REMs:	FY08
Develop and implement staffing standards	FY08
Revise Standard Garrison Organization for DPW to define location and staffing of the installation energy office.	FY08
Develop standardized job descriptions	FY08
Develop Army-specific energy/water management training courses	FY09
Develop Army-specific utilities sales and acquisition training courses	FY09
Energy managers at all mid- to large-size installations	FY10
Have all energy managers Level 1 certified:	FY10
Have all energy managers Level 2 certified	FY11
Have all energy managers Level 3 (CEM) certified	FY12
Have all new energy managers obtain Level 1, 2, & 3 certification	FY11-30
Obtain recognized and authorized energy manager positions and provide full staffing for energy program at all organizational levels	FY12

# Army Energy and Water Campaign Plan for Installations

## **Initiative #1: Eliminate energy waste in existing facilities**

### **1.3 Action #3: Create a Management Decision Package (MDEP) for Energy Management**

#### **1.3.1 Approaches to Meet Actions and Priorities (S, M, L)**

- a. Create synchronization matrix for overall Campaign funding requirements. (S)
- b. Develop tiered hierarchy for funding priority, based on what must come first (i.e. staff), logical follow on sequence of objectives, potential savings (worst condition-largest first, low hanging fruit). (S)
- c. Update MDEP funding matrix. (S)
- d. Structure the Army Energy Campaign Plan funding requirements in a format appropriate for submittal in the bi-annual program objective memorandum (POM). (S)

#### **1.3.2 Technologies and Tools Required**

- a. AEWRS data to rank energy use by installation, thousand British thermal units (KBTU) per square foot (sf) per year.
- b. Installation Status Report (ISR) output showing system condition.
- c. Cost estimate data.

#### **1.3.3 Policies, Management, and Institutional Issues**

- a. Promote comprehensive funding approach throughout Army.
- b. Improved planning and programming at installation level.

#### **1.3.4 Specific Projects to Meet Action**

- a. Work session to develop first funding matrix.
- b. Identify funding required to sustain program.
- c. Collect specific information as required from the installations (staffing costs, project costs, etc.).

#### **1.3.5 Funding Strategies and Sources**

Funding for this action is already in place through current manpower budget.

#### **1.3.6 Description of End State**

Dedicated Funding Stream for Army Energy and Water Campaign Plan action items and projects.

#### **1.3.7 Metrics of Success**

Establishment of dedicated MDEP for energy and water initiatives.

#### **1.3.8 Milestones (actions by FY)**

Prepare matrix	FY08
Obtain cost data	FY08
Develop FY10-15 POM input	FY08
First quarter distribution of program funding	1Qtr FY10

## Army Energy and Water Campaign Plan for Installations

### **Initiative #1: Eliminate energy waste in existing facilities**

#### **1.4 Action #4: Establish energy management accountability throughout the chain of command**

##### **1.4.1 Approaches to Meet Actions and Priorities (S, M, L)**

Installations will make the management of energy part of everyone's priority list by making it part of their annual performance objectives. Making energy stewardship a team effort, where we are accountable to each other for our use or abuse of these vital resources is a needed cultural shift on Army installations. Establish a process of reporting and review, augmented by ongoing awareness, awards, and recognition. (S)

##### **1.4.2 Technologies and Tools Required**

Job performance standards and a weighted scorecard will need to be developed.

##### **1.4.3 Policies, Management, and Institutional Issue**

Include an energy management element into performance standards and Officer Evaluation Reports.

##### **1.4.4 Specific Projects to Meet Action**

- a. An energy accountability program will consist of directives and guidance for installation level steering committees, annual reports at the DPW conference, and addition of an energy management element into job performance standards.
- b. Installations will establish energy steering committees, which include the Garrison Commander, the Installation Commander, the DPW, equipment purchasers, budgeters, building operators, building energy managers and select building occupants. They will meet on a quarterly basis to review activities affecting energy/water consumption, review local goal performance, discuss ideas, evaluate successes and develop strategies for improvement.
- c. Establishment of an energy accountability break-out session at the annual DPW conference. This will bring representatives from the installation level steering committees together with others in the chain of command including regional managers, IMCOM and Army Command representatives outside of the IMCOM chain of command.
- d. Establish job performance standards at each level of command. Individuals can have a significant impact on the installation energy program. Standards will recognize where individuals have made real effort and did what they could within resource constraints. Develop a weighted scorecard to rate energy performance across installations.
- e. Include tracking progress toward incorporating energy accountability in job descriptions and conduction of installation energy committee meetings into the annual report process.

##### **1.4.5 Funding Strategies and Sources**

Achieve desired performance through existing manpower funding resources.

##### **1.4.6 Description of End State**

An Army culture where all personnel have a stake in responsible, efficient use of energy and water resources.

##### **1.4.7 Metrics of Success**

Measurable metrics of success include:

## Army Energy and Water Campaign Plan for Installations

- a. The percentage of installations that have established an active energy management accountability network as demonstrated by conducting quarterly energy committee meetings.
- b. The percentage of installations that report at the annual DPW break out session.
- c. Scoring on a weighted scorecard across installations.

### 1.4.8 Milestones (actions by FY)

Guidance on energy steering committees	FY08
Establishment of DPW breakout review session	FY08
Establishment of job performance standards	FY10
All major installations have an energy steering committee	FY09
Annual tracking of energy steering committee guidance, job performance standards, and annual reporting	FY10-30

# Army Energy and Water Campaign Plan for Installations

## **Initiative #1: Eliminate energy waste in existing facilities**

### **1.5 Action #5: Develop and implement information and knowledge management systems**

#### **1.5.1 Approaches to Meet Actions and Priorities (S, M, L)**

The gathering and distillation of utility information is essential to understanding if we are progressing in the desired direction with energy and water stewardship. It is an effort that highlights the opportunities for improvement and enables substantial savings. To this end, the Army will verify its installation level and Army level consumption baseline, increase the integrity of gathered data, identify appropriate additional data gathering requirements, expand metering of utility flows to the building level, and implement automated, integrated metering monitoring and controls.

Conduct annual energy analysis assessments to include facility end use and with increasing levels of detail. Increased metering and advanced modeling will result in higher levels of accuracy in building inventory consumption.

Utility consumption patterns form the basis for assessing if utility rate schedules are appropriate. Time of use, demand charges and uninterruptible status charges can far exceed commodity consumption charges. The Army will engage in periodic review of all utility rate tariffs for installations to determine that the installations are receiving the best rate for the load profile of the installation.

The management of intellectual assets is vital to organizational productivity. It allows groups to do more with fewer resources, at a higher quality level and a faster pace. Building on the current AEWRS expansion effort, the Army will develop a Centralized Knowledge Management System. This system will combine existing databases, streamline data retrieval options, increase on-line analysis capabilities, expand the breadth of the knowledge base, enable information sharing, and provide Army resource managers with the information and insight they need. Resource information will be available through the Performance Metric Warehouse, currently under development by the Office of the Assistant Secretary of the Army for Financial Management and Comptroller. System users would be able to make one stop to decipher who (people), what (data and knowledge), why (objectives and rationales), where (locations), and how (strategies and technology) of energy and water management.

#### **1.5.2 Technologies and Tools Required**

Information and knowledge management efforts will make use of Army databases (AEWRS, HQEIS, ISR, and IFS), pertinent websites (including those of the Army Energy Program, OSD and IMCOM), appropriate energy profiles and models (CBECS/Energy Star®, FEDS, REEP and Energy-10) and evolving knowledge management web systems (Army Knowledge Online and Engineering Knowledge Online). Planned energy performance benchmarking studies by ASHRAE, OSD, DOE, USACE and IEA will highly influence these efforts. OCONUS installations will use HOST NATION energy studies and labeling in an effort to read Army and FEMP goals. In all OCONUS cases, adhere to SOFA agreement and applicable HOST NATION laws. Present guidance on metering and controls will need to be updated and expanded and commissioning guidance will need to be developed.

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### 1.5.3 Policies, Management, and Institutional Issues

#### Energy Policy Act of 2005

There is no direct requirement in the Energy Policy Act of 2005 related to development of knowledge management systems. The requirement of the Energy Policy Act of 2005 found in Section 103: “Energy Use Measurement and Accountability” indirectly requires all buildings, for the purpose of efficient use of energy and reduction in the cost of electricity used, have meters by FY 2012, which can be an element of the knowledge management system. EAct 2005 directs the incorporation of metered data into federal energy tracking systems and be made available to federal facility managers.

#### Management and Institutional Issues

Installations are required to submit energy and water consumption data to AEWRS monthly. Installations will report real property data, water use and installation operations cost and condition information into HQEIS and ISR quarterly. The result is a roll-up and insertion of all utility information for the Annual Report to Congress on Federal Government Energy Management. However, currently only OACSIM has accountability for reporting energy and water consumption for the Annual Report to Congress. Short-staffed installations may report to Army databases sporadically, incorrectly, or not at all. Linking reporting requirements to funding approval or job performance elements, or shifting reporting requirements to utility providers will reduce reporting gaps. Providing immediate on-line feedback that flags suspect data will reduce data inconsistencies.

### 1.5.4 Specific Projects to Meet Action

Several projects will be necessary to meet the intent of this Action. These include:

- a. Data validation and database expansion and integration will be high priorities for short-term completion. Deferral of these actions will make future attempts to track efficiency progress difficult or irrelevant. Augmentation of the AEWRS database will verify an FY03 energy and FY07 water baseline, effect timely input of data, increase the integrity of the dataset for more meaningful interpretation and provide online trending analysis. Evaluation of data capture requirements will add data fields (such as facility usage characteristics) not currently being populated but will significantly improve our ability to benchmark the energy performance of our facilities. Integration of databases will allow for easier data retrieval and consistency of information.
- b. Utility metering and control, cost schedule review and message dissemination will be ongoing efforts that begin as soon as funding allows and continue incrementally for the long-term. Development of a metering, control and commissioning plan will systematically address the metering requirements of Energy Policy Act of 2005 and tap into the abundant saving opportunity of appropriately controlled buildings. It will establish an action schedule and a process for sustaining capabilities.
- c. Utility cost schedule review will take place at ten percent of installations per year to ensure that our limited funds are utilized as effectively as possible. The expansion of the Army energy website to include capabilities to interface with data stores and aggregate useful resources will continue to get information to those who need and will benefit from it.
- d. Energy analysis assessments and knowledge management will be mid- to long-term endeavors that will reap dividends. Energy analysis assessment of utility end use, which takes advantage of real time data and consumption models, put consumption trends into perspective. A knowledge management program will allow the Army to make the most of

## Army Energy and Water Campaign Plan for Installations

its collective skill set. Activities will include data access, libraries of pertinent reports, and collaborative communities of practice that share best practice methods and lessons learned.

### 1.5.5 Funding Strategies and Sources

A combination of in-house and out-of-house funding sources is possible for this action. Central funding is probably the most appropriate for data/knowledge management and metering and controls efforts. Collaboration with other groups working on metering/ monitoring/ energy performance metrics could leverage resources. Contracted rate reviewers and commissioning teams could take a percentage of the realized savings as payment.

### 1.5.6 Description of End State

This action will give the Army a solid understanding of its utility requirements and usage profiles by building function and climate. It will establish well-characterized energy performance metrics for all facilities. It will support installation energy managers with readily accessible information and tools. Interoperable metering, monitoring and control capability will posture us for ongoing efficiency improvements.

### 1.5.7 Metrics of Success

Quantifiable metrics of success are percentages of installations reporting to utility databases, percentages of automated utility reporting, percentages of installed automatic reading meters, percentage of utility rate review, and percentage of energy analysis assessments.

### 1.5.8 Milestones (actions by FY)

AEWRS FY07 (100% validated FY03 baseline data)	FY08
Additional data requirement	FY09
Knowledge Management Systems fully operational	FY09-30
Rate reviews of utility systems, 10%/yr recurring on 10-year cycles	FY08-30
Energy analysis assessments, 10%/yr, recurring on 10-year cycles	FY09-30

## Army Energy and Water Campaign Plan for Installations

### **Initiative #1: Eliminate energy waste in existing facilities**

#### **1.6 Action #6: Develop a Utilities Modernization and Recapitalization Program for 100% of Government-owned utilities systems**

##### **1.6.1 Approaches to Meet Actions and Priorities (S, M, L)**

- a. Determine overall requirement based on Integrated Facilities System (IFS), Installation Status Reports (ISR), force structure and stationing projections.(S)
- b. Prioritize installations and provide adequate funding to assess and implement 10% of projects each year. (S)
- c. Use ACSIM/IMCOM organization to guide, program and execute. (S)
- d. Viable UM/Recap program established. (S)
- e. Installations identify and submit UM/Recap projects. (S)
- f. Use criteria, including mission value, to select projects. Distribute equitably across spectrum to support fairly. (S)
- g. Establish management process and reevaluate priorities every 2 years. (M)

##### **1.6.2 Technologies and Tools Required**

- a. Integrated Facilities System (IFS).
- b. Installation Status Report (ISR).
- c. Force structure and stationing projections.

##### **1.6.3 Policies, Management, and Institutional Issues**

Create policy/criteria to establish the program.

##### **1.6.4 Specific Projects to Meet Action**

- a. Complete template to show utility system scope condition, age, modernization costs.
- b. Project identification at the installation level.

##### **1.6.5 Funding Strategies and Sources**

- a. Fund technical support at installations to develop initial list of projects and costs.
- b. Fund projects for evaluation and privatization, when economical to privatize.

##### **1.6.6 Description of End State**

- a. Reliable funding stream.
- b. Modernized government owned utility systems.
- c. All government owned systems modernized or recapitalized to meet efficiency goals by FY15.

##### **1.6.7 Metrics of Success**

- a. Data on 100% of qualifying government owned utility systems received from installations.
- b. Project funding of at least 90% of projects identified within a FY.
- c. Program execution of 100% within a FY.

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### 1.6.8 Milestones (actions by FY)

Develop program policy with definitions of qualifying systems	4Qtr FY08
Data call per program policy	4Qtr FY08
Review/select projects for FY11	1Qtr FY09
Develop project list for FY10-15 POM	1Qtr FY08
Execution of Utilities Modernization and Recapitalization Program projects	FY09-30

## **Initiative #1: Eliminate energy waste in existing facilities**

### **1.7 Action #7: Develop an Energy Assessment Guide for energy managers and energy services contractors to use for conducting comprehensive energy assessments at Army installations**

#### **1.7.1 Approaches to Meet Objectives and Priorities (S with continuous updates)**

The Energy Assessment Guide will provide Army energy managers, energy auditors and ESPC and UESC contractors with a tool for conducting consistent and comprehensive energy assessments at Army installations. This Guide will document resource-consuming activities, and identify wasteful practices, prioritize conservation opportunities, implement best practices, and guide investment in resource conserving technology upgrades. The Guide will address different breadth of energy assessments: installation-wide, building-wide, system-wide or system components with several different levels of assessment:

- a. *Energy conservation opportunities analysis.* This uses basic analysis techniques to generate a list of top energy saving ideas without using instrumentation for data collection (Level 1).
- b. *Energy optimization analysis geared toward funds appropriation.* This calculates savings and uses partial instrumentation with cursory analysis (Level 2).
- c. *Detailed engineering analysis with implementation, M&V.* This includes performance measurement and verification assessment, and a fully instrumented diagnostic audit (Level 3)

The Guide will develop the rationale behind each of three levels of assessment. It will state the motivations behind undertaking each level, the expected results, and the degree of effort and instrumentation required. The Energy Assessment Guide will specify procedures and suggest the format of the report that will document the assessment findings.

#### **1.7.2 Technologies and Tools Required**

- a. The Energy Assessment Guide is a potential tool for the analysis for energy waste reduction and serves as a basis for the development of ECIP, OMA and ESPC and UESC projects.
- b. Energy conservation opportunities generated during the Level 1 analysis will be matched with the database of promising energy saving technologies and measures (current, proven, well known or underused) recommended for building retrofits (see Initiative 2, Action 2).
- c. Results of the engineering analysis of ECMs and retrofit options be assessed using an approved life-cycle costing analysis tool, such as the Building Life-cycle Costing (BLCC) tool during the Level 2 study.
- d. Use a building energy simulation tool to predict energy use when ECMs applied.

#### **1.7.3 Policies, Management, and Institutional Issues**

- a. Incorporate quantitative measurable energy performance requirements to buildings with area over 10 thousand square feet (KSF) gross, when they undergo major renovation.
- b. To complement the LEED certification program, develop details and format of building energy certification program. Link results of energy performance with the incentive program (retain savings, reward and recognize champions, etc.).
- c. Army installations conduct Level 1 and Level 2 energy assessments by an independent team of experts.
- d. Request that Army installations conduct regular inspection of AC systems with an effective rated output of more than 3.5 tons (12kW), Inspections shall include an assessment of AC efficiency and the sizing compared to the cooling requirements of the building.

## Army Energy and Water Campaign Plan for Installations

- e. Request, that Army installations conduct a regular inspection of boilers fired by non-renewable liquid or solid fuel of an effective rated output of 70 kBtu/hr to 340 kBtu/hr (20kW to 100kW). Inspect boilers with an effective output of more than 340 kBtu/hr (100kW) at least every two years. Extend the period to four years for gas boilers. All high-pressure steam boilers (pressure greater than 15 pounds per square inch) and all high temperature hot water boilers (temperature greater than 250 degrees Fahrenheit) in active use will be inspected by certified boiler inspectors at least twice annually.
- f. For heating systems with boilers of an effective rated output of more than 70 kBtu/hr (20kW), which are older than 15 years, establish a one-time inspection of the whole heating system. On the basis of this inspection, which will include an assessment of the boiler efficiency and the boiler sizing compared to heating requirements of the building(s) the experts shall provide advice to the users on the replacement of the boilers, other modifications to the heating system and other alternative solutions.

### 1.7.4 Specific Projects to Meet Action

Develop an energy assessment guide. Development of the guide would be through participation in a joint effort with recognized energy efficiency experts, such as the U.S. Department of Energy (DOE) Federal Energy Management Program (FEMP), DOE Office of Industrial Technologies Energy Assessment Centers, USACE Huntsville Center of Excellence and an international consortium of energy experts.

### 1.7.5 Funding Strategies and Sources

Funding for this action will be through HQDA and OACSIM. As a possible alternative, develop and fund the Energy Assessment Guide through Army participation and leadership in a collaborative effort with other federal agencies and the international community. Use leverage for this effort through labor contributions from DOE/ FEMP, DOE Office of Industrial Technologies Energy Assessment Centers, USACE Huntsville Center of Excellence as well as international energy experts.

### 1.7.6 Description of End State

Active use of the Energy Assessment Guide to identify energy inefficiency at all Army installations and to create energy retrofit projects.

### 1.7.7 Metrics of Success

Establishing quantitative measurable energy performance requirements in combination with the consistent energy assessment methodology and a balanced funding strategy to execute energy projects will result in better Army energy usage, efficient allocation of limited funds and better management of energy and financial resources.

### 1.7.8 Milestones (actions by FY)

Produce first draft of the Energy Assessment Guide	FY09
Develop a pool of energy assessment experts to guide Army-wide energy assessment process.	FY09-10
Produce final draft of Energy Assessment Guide	FY10
Implementation of the energy assessment process Army-wide using the Energy Assessment Guide	FY11-30

# Army Energy and Water Campaign Plan for Installations

## **Initiative #1: Eliminate energy waste in existing facilities**

### **1.8 Action #8: Develop a funding stream for energy projects**

Facility managers face many facility infrastructure improvement demands, with energy projects competing with immediate facility repair needs. A significant barrier to developing and implementing energy projects is funding, in an environment of shrinking facility operations budgets. Installations must be able to identify energy improvement requirements and pursue appropriate funding programs to execute energy projects.

#### **1.8.1 Approaches to Meet Actions and Priorities**

##### **Energy Audits (S - HQ IMCOM w/centralized contract)**

Conduct energy audits to assess energy use, cost-effective energy system retrofits with energy efficient equipment, water conservation and renewable energy opportunities. The Army will use a program such as the Energy Engineering Analysis Program (EEAP) with an initial target of conducting energy end use assessments at 10% of installations with high energy use facilities annually to identify energy efficiency, water and renewable energy opportunities. An important EEAP deliverable to include preliminary recommendation of funding strategies for energy projects identified. Recommended prioritization of site selection for EEAP program activity would be:

- a. largest deviation from annual energy reduction goal;
- b. largest annual energy use;
- c. largest annual energy cost; and/or
- d. most energy intensive per unit area of buildings.

The Army will supplement building audit programs with limited audits conducted during Energy Awareness and Conservation Assessments (EACA). Discussion of the program follows as a separate Action later in this section.

##### **Web-based Training for Energy Project Development (S - OACSIM)**

- a. **Building Life-cycle Cost Analysis.** Submission of candidate projects for appropriated funding of energy conservation projects under the Energy Conservation Investment Program (ECIP) requires life-cycle cost analysis to project discounted payback and savings to investment ratios (SIR) to rank projects by economic benefit over the project life. Anticipating some level of turnover of Army energy managers, web based Federal Building Life-cycle Cost (BLCC) analysis training should be readily available at little cost. Additionally, include travel and off-site time to attend training workshops and provide internet access to National Institute of Standards and Technology (NIST) BLCC training staff for technical support.
- b. **Alternative Financing.** Despite the existence of some level of appropriated funds for energy projects (i.e., ECIP), to achieve the energy reduction, water conservation and renewable energy goals of the Energy Policy Act of 2005, Army energy managers will need to aggressively pursue private sector financed mechanisms for energy project funding. Web-based training on alternative financing approaches such as Energy Savings Performance Contracting (ESPC), Utility Energy Savings Contracts (UESC) and the unique DOD authority provided by Enhanced Use Leases (EUL) can expose facility energy managers and installation acquisition team personnel (contracts, legal, environmental, building managers)

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to the contracting processes and contractual/technical requirements for successful private financed energy project contracts.

Energy Project Funding Guidance (S-OACSIM): A key step in expanding efforts to implement energy saving projects is the publishing and distribution of guidance on appropriate financing mechanisms. OACSIM will provide this capability through the Army Energy Webpage, reference to the DOD Energy Managers Handbook, and development of any supplemental guidance to clarify or emphasize specific funding mechanisms as needed.

Centralized Procurement of Alternative Financing Project Expertise (S- OACSIM) includes: Military Construction (MILCON) and ECIP building projects usually provide funding for design and construction contracting and supervision, inspection and overhead funds for project implementation and acceptance. All of the alternative financing procurement approaches (ESPC, UESC, EUL) typically only provide funding for project development and construction, leaving the installation to bear the overhead costs. Despite the Army and other federal agency success in using alternative financing approaches for energy projects, the lack of dedicated funding for broad centralized program management has slowed procurement timelines. With direct funding to energy project technical and acquisition teams, significant reduction in the procurement timeline and quicker energy project savings are possible.

There are private sector and federal agencies with extensive experience and specific technical and contractual expertise available to support and enhance the capability and effectiveness of the Army acquisition team developing and implementing alternative financed energy projects. A centralized team with capability to procure external expertise can rapidly provide a valuable resource to accelerate on the job training and success of the Army energy project acquisition teams, resulting in streamlined procurement timeline.

### 1.8.2 Technologies and Tools Required

#### *Appropriated Fund Projects*

**Energy Conservation Investment Program (ECIP):** Annually DoD appropriates capital funds to the Army for ECIP projects. Army installations submit energy project funding requests on DD Form 1391 (Military Construction) for consideration and selection, primarily based on the project's savings to investment ratio. Defense policy also directs the Army and other DOD services to allocate a portion of the ECIP appropriated funds for renewable energy projects, allowing a discounted payback of up to 25 years.

#### *Alternatively Financed Projects – Public/Private Partnership Approaches*

**Energy Saving Performance Contracting (ESPC):** ESPC allows the Army to obtain energy project services from an energy services company in exchange for the utility cost avoidance generated by the projects, under 42 USC 8287. Services received include energy project scoping, design, financing, installation, and equipment operations and maintenance. ESPC offers the opportunity to bundle multiple energy efficiency, water conservation, and renewable energy projects into a collective cost-effective project within a multi-year contract term up to maximum of 25 years (current average is 15 years). Through fiscal year 2007, this public/private partnership approach has delivered over \$1.7 B in private sector investment at federal facilities in the US and overseas. Due to the manpower and administrative resources to execute an ESPC project, application is best suited for projects with moderate to high private capital investment.

## Army Energy and Water Campaign Plan for Installations

ESPC projects are not subject to the Office of Management and Budget scoring requirements (OMB Circular A-11), meaning the Army may enter an ESPC contract without funding the total cost of the contract at award. Experience in the ESPC program exists at the Army Corps of Engineers, Huntsville Division and the DOE FEMP, which both manage indefinite delivery indefinite quantity (IDIQ) ESPC contracts that are usable by any Federal agency. Use of an existing IDIQ contract can significantly reduce execution timelines.

**Utility Energy Services Contracts (UESC):** UESCs authorized by 42 USC 8256, are similar to ESPCs, but the service provider is the Army installation serving utility company. The UESC process involves the utility company conducting a preliminary audit at no expense to the Army installation to identify the energy project potential. If an economically attractive project exists, the utility and Army will execute a contract to conduct a feasibility study at a negotiated study price. If the feasibility study confirms an economically feasible energy project, the utility and Army may negotiate a contract, where the utility company will then study, design, finance and install the energy saving project. The utility company may also maintain the installed equipment, subject to agreement between the two parties. Army payment for utility investment, services and financing results from annual utility & O&M cost savings. UESCs do not require guaranteed annual cost savings, although OACSIM policy requires demonstration of savings measurement and verification (M&V) prior to project approval. The terms of the contract will include M&V terminology. Not all serving utilities offer UESC programs, however UESCs have been implemented with investments as low as \$200K and up to \$50M. The contract term of a UESC cannot exceed 10 years. Like ESPCs, UESCs can incorporate bundling of energy efficiency, water conservation or renewable energy measures. The result of the authorization of UESCs in the Energy Policy Act of 1992 is that the utility industry has invested nearly \$1B for energy projects at Federal facilities. Similar to ESPC projects, UESC projects are not subject to OMB scoring requirements.

The General Services Administration (GSA), DOE, DoD and the utility industry collaborated to develop model contract documents for UESCs, enhancing site specific adaptation and less costly than developing a UESC from scratch.

**Enhanced Use Leasing (EUL):** Within DoD, EUL is authorized by 10 USC 2667, which allows DoD installations to lease land (land considered non-excess) to a private developer for some consideration up to a term of 50 years. In the energy arena, the use of EUL is for privately financed installation, operation and maintenance of large cogeneration systems to provide commercially available electrical and thermal energy.

The key consideration of EUL is to ensure the perception of the agreement as a capital lease rather than an operational lease. With an operational lease, the government and the private developer partner for mutual benefit, but also mutual commitment. With a capital lease, the government avoids risk by maintaining a strict landlord-tenant relationship. Under a capital lease, the government's benefit is limited to the leased value of the property the private developer occupies, however this arrangement avoids any commitment by the government to support the developer's financial endeavors, thereby relieving the government of any risk and eliminates any need of OMB scoring requirements.

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### *Centralized procurement of alternatively financed project technical expertise*

There are several existing procurement methods to acquire expertise for alternatively financed project technical expertise. Key action for Army centralized procurement team action is to develop a scope of work for the technical expertise required and a Government estimate.

- a. GSA Federal Supply Schedule – Energy Management Program Support, Category 871 at: <http://www.gsaelibrary.gsa.gov/ElibMain/ScheduleSummary?scheduleNumber=03FAC>
- b. Army Corps of Engineers, Huntsville – Requires MIPR for ESPC/UESC expertise.
- c. DOE FEMP’s Golden Field Office – Requires Interagency Agreements for ESPC/UESC/EUL expertise.

### **1.8.3 Policies, Management, and Institutional Issues**

**Financial Incentive Program for Energy Projects at Army Installations:** Despite the expectation that Army installations should pursue energy project implementation to support Army energy and water reduction and renewable energy use goals, an incentive program benefiting the Army installation energy program or other Commanding Officer program for military or civilian program helps to prioritize energy management and project development activities. The Army (OACSIM) is developing a clear policy to implement the energy savings retention authority per 10 USC 2865. That authority currently allows:

- a. Half of energy cost savings unobligated at fiscal year end, to be accrued into an account for reinvesting in energy projects, installation training, and acquisition of energy project expertise until expended;
- b. Half retained at the installation for discretionary use by the installation commander.

### **Top Down Support and Policy Guidance for Alternatively Financed Energy Projects.**

Army installation acquisition team development of alternatively financed energy projects are time intensive and financially and contractually higher risk than normal service or supply procurements, particularly due to long contract terms. Army HQ, OACSIM, IMCOM policy to garrison commanders encourages increased use of energy projects using alternatively financed projects. Army leadership strongly supports installation pursuit of alternatively financed projects. Such encouragement would significantly mitigate any reluctance by the site acquisition team, particularly the Contracting Officer, to implement projects with greater complexity and higher financial risk.

### **1.8.4 Specific Projects to Meet Action**

- a. Methodical process of conducting detailed energy audits at prioritized locations, determining appropriate funding strategies for recommended energy projects and providing detailed project documentation for projects prior to submission for funding with appropriated funds.
- b. Increase availability of alternative financing training resources for installation personnel.
- c. Centrally funded manpower resources for developing and executing alternatively funded energy projects.

### **1.8.5 Funding Strategies and Sources**

MDEP funds allocated for energy audit and project development, alternatively financed project contract administration, and oversight/validation of ESPC measurement and verification procedures.

## Army Energy and Water Campaign Plan for Installations

Unobligated utility funds attributable to energy savings carried over to subsequent fiscal years and used for energy saving projects of smaller scale than those typically executed through ECIP or alternative financing.

### 1.8.6 Description of End State

Energy efficiency goals (KBTU/sf) required by Executive Order and Legislation (e.g., the Energy Policy Act of 2005) achieved.

### 1.8.7 Metrics of Success

At least ten percent of Army facility inventory audited for energy saving projects annually; timely execution of all projects funded by appropriated funds; successful implementation of all projects pursuing alternative financing that have developers offering funding.

### 1.8.8 Milestones (actions by FY)

#### Non Project Actions

Develop Energy Project Funding Guidance	FY09
Develop Web-based Training Program	FY09
Centralized Procurement, Alternative Financing Project Expertise	FY10

#### Projects (Army-wide totals)

FY	10	11	02	13	14	15
EEAP Studies	10	10	10	10	10	10
ESPC Awards	3	3	3	3	3	3
UESC Awards	1	1	1	1	1	1
EUL Awards	1	1	1	1	1	1
ECIP 1391s	10	10	10	10	10	10

# Army Energy and Water Campaign Plan for Installations

## **Initiative #1: Eliminate energy waste in existing facilities**

### **1.9 Action #9: Establish an effective energy and water management incentive awards program**

#### **1.9.1 Approaches to Meet Actions and Priorities (S,M,L)**

- a. Continue cash incentives for regions and installations that lead the way in reducing energy consumption. Model the program on the ACOE program where Garrison commanders receive a check for coming in first, second, and third place for having reduced energy consumption the greatest amount from the previous FY. (M)
- b. Continuously review the mixture of awards that maximize use of monetary and non-monetary incentives (e.g., cash, TDY funding for energy related workshops and conferences, plaques, medals, certificates, etc.). (S)

#### **1.9.2 Technologies and Tools Required**

- a. Information resources to promote and publicize award programs.
- b. Qualified evaluators to determine reward worthiness.
- c. Funding for monetary awards to accompany recognition.

#### **1.9.3 Policies, Management, and Institutional Issues**

The Department of Energy conducts an annual award ceremony to recognize individuals and small groups for energy conservation accomplishments, typically related to implementing specific energy saving projects. The Army's award program recognizes broad energy management programs that reach deep into the community. The Secretary of the Army Energy and Water Management Award Program recognizes those responsible for executing installation and regional energy management programs for their progress toward achieving energy goals based on their level of innovation, savings, quality and effort.

Nominations to the Army program undergo screening by a small team represented by the Active, Reserve and National Guard Components. For those determined as viable award candidates, a representative of the Army Energy and Water Management Office at OACSIM will conduct site visits to validate recognition worthiness.

Installations are capable of establishing limited-scale energy award programs offering rewards within their local level of authority, such as items related to administrative leave and free services at morale, welfare and recreation facilities.

Central funding for moderate reward at the installation level would continue to enhance community interest in saving energy. Awards for "best" and "runner-up" energy saving installation in the range of \$250 to \$400 thousand would provide great incentive and generate substantial energy conservation effort throughout the Army. The program stimulates community interest and the general public will develop better energy conservation habits; however, personnel turnover will cause an ongoing need for an active recognition/reward program.

#### **1.9.4 Specific Projects to Meet Action**

- a. Revise Secretary of the Army Energy and Water Management Award criteria.
- b. Participate on DOE's annual award nomination evaluation panel and conduct site visits of qualified candidates for the Secretary of the Army Energy and Water Management Awards.

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- c. Continue central funding for annual substantial monetary recognition for performance achieved during current FY and recognized in a ceremony in the following FY.

### 1.9.5 Funding Strategies and Sources

- a. Execute basic overall award program oversight and management through existing manpower resources.
- b. Incorporate energy award funding into proposed energy MDEP.

### 1.9.6 Description of End State

A widely recognized energy/water management awards recognition program.

### 1.9.7 Metrics of Success

- a. Develop and publish revised Secretary of the Army award and evaluation criteria prior to the current FY nomination cycle.
- b. Establishment of a funding source for energy award competition.

### 1.9.8 Milestones (actions by FY)

Continue central funding source for significant reward of accomplishments recognized in the Secretary of the Army Energy and Water Management Awards Program	FY09-30
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# Army Energy and Water Campaign Plan for Installations

## **Initiative #1: Eliminate energy waste in existing facilities**

### **1.10 Action #10: Execute an Energy Awareness Program**

#### **1.10.1 Approaches to Meet Actions and Priorities (S, M, L)**

- a. The Army Energy Office within the Office of the Assistant Chief of Staff for Installation Management (OACSIM) will promote information on energy awareness to Army installations, Army Reserve organizations and National Guard Bureau facilities. (S,M)
- b. HQDA / OACSIM will promote energy awareness site visits by qualified energy survey teams to boost installation understanding of energy conservation principles.

#### **1.10.2 Technologies and Tools Required**

- a. Use list servers for distributing information throughout the Regions, NGB and USAR.
- b. Maximize the use of existing web sites to post information and materials.
- c. Contract services for facility energy surveys and on-site presentations on savings opportunities and requirements to community assemblies.

#### **1.10.3 Policies, Management, and Institutional Issues**

- a. OACSIM to centrally manage the update of existing procedures and publications on energy awareness and all responsibilities for the Army's Energy Awareness Program.
- b. Partner with DOE for awareness material development and distribution.
- c. Coordinate with Environmental offices to align Energy Awareness Month, Energy Conservation Week and Earth Day activities.

#### **1.10.4 Specific Projects to Meet Action**

- a. Partner with DOE and DoD for ideas on specific projects.
- b. Develop method for prioritizing requirements and conduct energy awareness and conservation assessments at all major Army sites over a ten year period.
- c. Conduct Energy Awareness and Conservation Assessments at selected installations.
- d. Provide means to measure savings from awareness programs.

#### **1.10.5 Funding Strategies and Sources**

- a. The current funding stream will remain in effect until OACSIM has been able to get HQDA to increase the level of support for this activity. OACSIM will continue to collaborate with DOE on purchase and distribution of awareness materials.
- b. IMCOM, USARC and NGB need to program long-term requirements for conducting energy awareness site visits.

#### **1.10.6 Description of End State**

- a. All Army facilities and staff will gain a better understanding of how to help eliminate energy waste through education and training.
- b. Enhanced awareness will enhance/improve conservation efforts and installation level programs.

#### **1.10.7 Metrics of Success**

Energy consumption is at or below the new glide path established by the Energy Policy Act of 2005.

## Army Energy and Water Campaign Plan for Installations

### 1.10.8 Milestones (actions by FY)

ICW FEMP/DOE develop list of appropriate literature and publications for energy awareness	FY08
Conduct Energy Awareness and Conservation Assessments (EACA) annually at selected installations	FY 08-30
Report energy awareness progress in annual report to OSD each year	FY 08-30

## Army Energy and Water Campaign Plan for Installations

### **Initiative #1: Eliminate energy waste in existing facilities**

#### **1.11 Action #11: Establish effective utilities procurement strategies.**

##### **1.11.1 Approaches to Meet Actions and Priorities (S, M, L)**

###### **Discussion:**

Utilities services will be procured from other Federal, local, municipal, regional, or private utility distribution companies or suppliers, as allowed by laws and regulations, at the lowest overall total life-cycle cost (or best value) to the Army, consistent with appropriate regard for high health and sanitation, adequacy to support needs, efficiency of operations, and reliability of service.

Establish an effective utilities procurement system by: (M)

- a. Educating staff.
- b. Providing tools.
- c. Periodic reviews of utility costs/contracts (by internal or contracted experts).

##### **1.11.2 Technologies and Tools Required**

- a. Updated utilities contracting and utilities reimbursement regulations and guidance.
- b. Develop an introductory utilities contracting course or incorporate into existing utilities training programs.
- c. Develop an information repository for utilities contract information.

##### **1.11.3 Policies, Management, and Institutional Issues**

- a. Installations have the lead on procuring utility services, in collaboration and coordination with their region and at HQ-IMCOM. They must be aware of the ever-changing practices of the utility industry to take full advantage of the opportunities available to reduce energy costs. Awareness of the procedures contained in acquisition directives pertaining to utility procurement is essential.
- b. Management must provide guidance and information on utilities procurement through central knowledge databases and adequate training to all levels and personnel involved in the procurement of utility services.
- c. Prior to award of utility contracts installations should review standard utilities contract provisions for inclusion and take action to identify requirements to include any known out year changes; determine actual demand versus contract demand; determine availability service suppliers by conducting a market survey; and prepare an acquisition plan.
- d. Determine the most appropriate utility rates and options, such as interruptible vs. fixed rates; availability of power from Federal power agencies and open markets: if services can be aggregated by purchasing multiple commodities from the same supplier or by combining requirements with other customers to leverage buying power for more attractive rates; or if considerations such as granting utility suppliers right-of-ways for service to customers off the installation will improve utility rates.
- e. Consider renewable energy opportunities through different other services and/or agencies (Western Area Power Administration (WAPA), FEMP, etc.).

## Army Energy and Water Campaign Plan for Installations

### 1.11.4 Specific Projects to Meet Action

- a. Update utilities procurement guidance found in Department of Defense Instruction (DoDI) 4000.19, *Interservice and Intragovernmental Support*; AR 420-41, *Acquisition and Sales of Utilities Services*; and develop an Army Utilities Acquisition and Sales Handbook.
- b. Develop an “Introduction to Utilities Contracting” Course.
- c. Develop a standard utilities contract and utility rate template.
- d. Develop a web-based resource for utilities contracting information. Encourage development at installation level to assure usefulness and utilize lessons learned from others (USACE – Engineering Knowledge Online (EKO)).

### 1.11.5 Funding Strategies and Sources

Incorporate increased manpower requirements for commercial utilities program oversight and rate review into program staffing requirements.

### 1.11.6 Description of End State

Utility commodities acquired at the lowest appropriate rates.

### 1.11.7 Metrics of Success

- a. Completion of the evaluation of requirements.
- b. Have installations taken steps to obtain lowest cost utility service by:
  - i. Reviewing utility invoices;
  - ii. Analyzing alternative rate possibilities;
  - iii. Considering peak shaving to avoid high demand charges; and
  - iv. Taking advantage of competition where available.
- c. Establishment of the best value purchase options.

### 1.11.8 Milestones (actions by FY)

Update DoDI 4000.19 and AR 420-41	FY08
Develop basic utilities contracting instruction	FY09
Update utility contract and rate templates	FY09-30
Update/develop Army utilities contracting program policy website	FY10-30

## Army Energy and Water Campaign Plan for Installations

### **Initiative #1: Eliminate energy waste in existing facilities**

#### **1.12 Action #12: Procure energy efficient equipment and products**

##### **1.12.1 Approaches to Meet Actions and Priorities (S, M, L)**

The procurement process for purchase or replacement of all energy consuming devices will require the use of products that are either Energy Star® compliant or designated by FEMP to be among the highest 25 percent of equivalent for energy efficiency. The use of ASHRAE-recommended HVAC equipment efficiencies that equal or exceed Energy Star® compliant values is required. Incorporate the use of energy efficient equipment into technical requirements for credit card purchases, O&M contracts, and other procurements methodologies. OCONUS installations will work with HOST NATION to procure equipment that is among the highest 25 percent of equivalent devices with respect to energy efficiency. In all cases, adhere to the SOFA agreement and HOST NATION laws or U.S. requirements, whichever is more stringent. (S, M, & L)

##### **1.12.2 Technologies and Tools Required**

Guidance for products purchased is provided by the Energy Policy Act of 2005, DOE, ASHRAE, EPA, E-Source and other relevant publications.

##### **1.12.3 Policies, Management, and Institutional Issues**

- a. Supply contract guidelines shall be modified to require Energy Star® compliant products.
- b. Assemble Army working group to review supply/O&M contracts.
- c. Existing supplies will likely be consumed prior to purchasing new products. Amount of existing supplies may delay implementation.
- d. All contracts and supporting criteria documents should be reviewed annually and modified, as required, for changes in DOE, ASHRAE, and E Source recommendations.
- e. All base operating system contracts shall be modified to specify use of Energy Star® or highest efficiency repair or replacement products.
- f. Section 131 of the Energy Policy Act of 2005 requires DOE to establish new Energy Star® qualifying levels for clothes washers and dishwashers by 1 January 2006, to be effective by 1 January 2007. The same Section requires DOE to re-establish new Energy Star® qualifying levels for clothes washers by 1 January 2008, to be effective by 1 January 2010.

##### **1.12.4 Specific Projects to Meet Action**

- a. Incorporate requirement in construction, maintenance, and repair guidance documents.
- b. Update Uniform Facility Guide Specifications (UFGS) to require use of high efficiency heating, ventilating and air conditioning (HVAC) equipment.
- c. Add requirement in UFGS to require all equipment submittals to be routed for review and approval by the Energy Manager.

##### **1.12.5 Funding Strategies and Sources**

Existing funding sources will remain but may require modification. The budget request process for supply and O&M contracts should consider potential increases in first cost for high efficiency products.

## Army Energy and Water Campaign Plan for Installations

### 1.12.6 Description of End State

Energy consuming devices purchased and installed by the Army will comply with the DOE standards for energy conservation. Energy consumption will be reduced and lower efficiency products will be phased out and no longer be accepted for procurement.

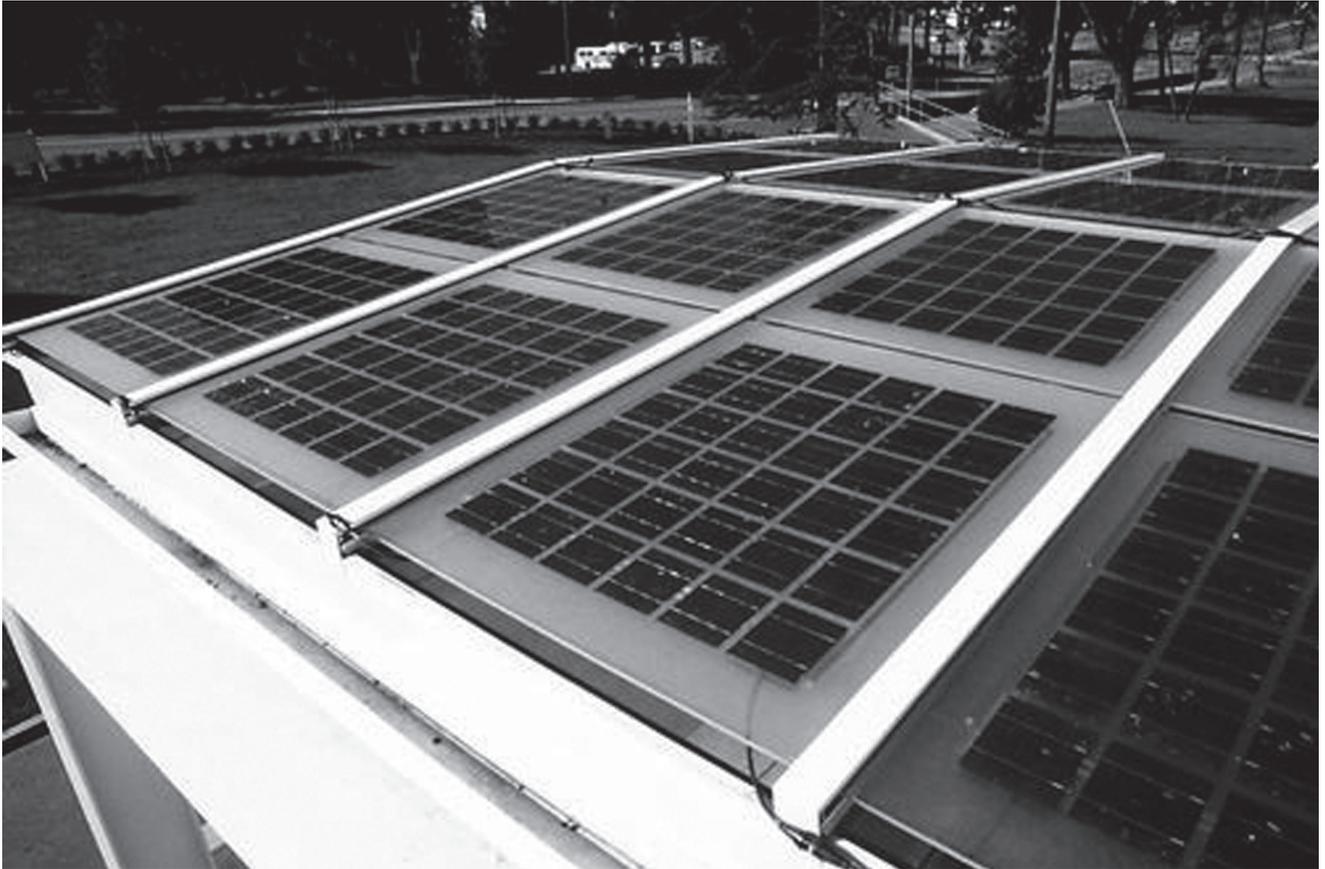
### 1.12.7 Metrics of Success

- a. All O&M funded contracts modified.
- b. All HVAC UFGS reviewed and modified, phased over a four-year period, then updated biennially.

### 1.12.8 Milestones (actions by FY)

Modify OMA budgets annually as needed to allow for the purchase of energy efficient equipment:	1Qtr FY
Incorporate requirement in construction, maintenance, and repair guidance documents.	FY08
75% of all O&M contracts will comply with Energy Star® criteria:	FY08
100% of all O&M contracts will comply with Energy Star® criteria	FY13
Review and modify 100% O&M contracts annually after FY13 for changes in DOE and ASHRAE guidance	1Qtr FY
Modify criteria update program budgets annually as needed for modifying criteria documents for the specification of energy efficient equipment	1Qtr FY
Review and modify 25% of HVAC UFGS each year FY	1Qtr FY08
Review and modify 25% of HVAC UFGS each year FY	1Qtr FY09
Review and modify 25% of HVAC UFGS each year FY	1Qtr FY10
Review and modify 25% of HVAC UFGS each year FY	1Qtr FY11
Review and modify HVAC UFGS biennially	FY12-30

# Army Energy and Water Campaign Plan for Installations



## Army Energy and Water Campaign Plan for Installations

### **Initiative #2: Increase energy efficiency in new construction and renovations**

*Increase the use of energy technologies in construction and major renovation projects that provide the greatest cost-effectiveness, energy efficiency and support the Army's environmental objectives.*

<u>Action</u>	<u>Page</u>
2.1: Develop energy performance requirements, BTU/ft <sup>2</sup> /degrees heating and cooling per year for new construction and renovations, including support facilities for utility systems.	34
2.2: Develop energy design standards for new and renovated facilities to meet or exceed federal energy performance requirements.	37
2.3: Improve energy efficiency in sustainable design of new and renovated construction through LEED.	41
2.4: Provide training in building design or renovations with energy efficiency technologies.	43
2.5: Increase management tools for utility systems to meet the Energy Use Measurement and Accountability goals of the Energy Policy Act of 2005.	45
2.6: Minimize the impact of fuel cost and availability at installations.	47
2.7: Establish an Army utility (electricity, natural gas and other fuels) source evaluation program that selects a cost effective and secure energy source option that includes alternative sources.	51
2.8: Implement authorization that allows retention of money at the installation based on utility savings—for use on utility projects.	53
2.9: Increase performance verification in the use of alternative financing and available appropriated funds	55

## Army Energy and Water Campaign Plan for Installations

### ***Initiative #2: Increase energy efficiency in new construction and renovations***

#### **2.1 Action #1: Develop energy performance requirements, BTU/ft<sup>2</sup>/degrees heating and cooling per year for new construction and renovations, including support facilities for utility systems.**

##### **2.1.1 Approaches to Meet Actions and Priorities (S, M, L)**

Develop energy performance requirements, in BTU/ft<sup>2</sup> /degrees heating cooling/year for all new and renovated facilities for the different DOE climate zones. List quantifiable ventilation rate requirements, thermal comfort levels and indoor air quality (IAQ) with the energy performance requirements.

##### **2.1.2 Technologies and Tools Required**

Establish analysis and development of the energy performance requirements in collaboration with the Army, EPA Energy Star® Program, U.S. Green Building Council and DOE with input from the International Energy Agency. Requirements must be consistent with provisions of the Energy Policy Act of 2005, E.O. 13423, and assure incorporation of sustainable design principles.

##### **2.1.3 Policies, Management, and Institutional Issues**

###### **Energy Policy Act of 2005**

The requirements of the Energy Policy Act of 2005 impacting this Action include:

Section 109 “Federal Building Performance Standards” for new Federal residential or non-residential buildings:

- a. Be designed to use 30% less energy than the level established by ASHRAE 90.1-2004 Code (<http://www.ashrae.org/>) or the International Energy Conservation Code (IECC <http://www.iccsafe.org/>), if life-cycle cost-effective.
- b. Requires application of sustainable design principles to the siting, design, and construction of all new and replacement buildings.
- c. Requires water conservation technologies be applied to the extent that the technologies are life-cycle cost-effective, if water is used to achieve energy efficiency.

Section 107 of the Energy Policy Act of 2005 “Advanced Building Test Bed” requires DOE, in consultation with the Administrator of General Services, shall establish an Advanced Building Efficiency Testbed program for the development, testing, and demonstration of advanced engineering systems, components, and materials to enable innovations in building technologies. The program shall evaluate efficiency concepts for government and industry buildings, and demonstrate the ability of the next generation buildings to support individual and organizational productivity and health as well as flexibility and technological change to improve environmental sustainability.

**Energy Performance Requirements:** Energy performance requirements for new buildings shall be included in standard designs and requests for proposal (RFP). Building performance will be validated by design engineers, architectural-engineering firms or design/build contractors as appropriate prior to construction. Post-construction tracking will validate performance.

## Army Energy and Water Campaign Plan for Installations

Energy performance requirements for renovated buildings with area over 10,000 ft<sup>2</sup> when they are undergoing major renovation (cost greater than 25% of the building's value) shall be included in MILCON, OMA, ECIP, ESPC and other Army funded building retrofit projects. Contractor shall meet these requirements through analysis/calculation of energy performance of building using standardized methodology prior to funding approval and proven through measurement of energy use upon the projects completion.

The Army will coordinate the development of energy performance requirements with OSD-DOE energy benchmarking effort.

The Army will also coordinate requirements with energy performance with the leadership of the MILCON Transformation Program. The Army will collaborate with the U.S. Army Corps of Engineers (USACE) for implementation requirements.

**Sustainable Design:** Sustainable design input will require minimum levels of facility and equipment performance. The Army will work with DoD to assure implementation of the requirements of the Energy Policy Act of 2005 and E.O. 13423.

### 2.1.4 Specific Projects to Meet Action

- a. Create a table of average BTU/ft<sup>2</sup>/degrees heating cooling/year for each of the DOE climate zones (Southeast, Southwest, Northeast, Mid-Atlantic, Mid-West, West Coast, Northwest, North Central, Pacific Islands and Alaska).
- b. Create a standard for each area based on the results of the table.

### 2.1.5 Funding Strategies and Sources

Funding from POM cycles budgeted for initial design, creation, then annual upkeep, and reviews. Additional funding is possible through collaboration with DOE/FEMP, and EPA Energy Star<sup>®</sup> Program.

Evaluate Army construction budgets and revise to incorporate the necessary design and construction funds to assure incorporation of life-cycle cost-effective energy technologies and features in all new Army buildings and major renovation projects.

Evaluate to the greatest extent possible all alternative financing opportunities such as installing life-cycle cost-effective energy efficient equipment in new construction through performance contracts.

### 2.1.6 Description of End State

All newly constructed, renovated facilities, and utility system upgrades will meet energy performance standards and conform to the Energy Policy Act of 2005, as a minimum.

### 2.1.7 Metrics of Success

All newly constructed and renovated buildings will be as a minimum 30% more efficient than that prescribed by the current ASHRAE Standard 90.1-(current is 2004) per the requirements of the Energy Policy Act of 2005.

## Army Energy and Water Campaign Plan for Installations

### 2.1.8 Milestones (actions by FY)

Develop energy performance requirements (EPR) for new facilities for the first of five representative Army types of facilities: barracks, company operation facilities, large office buildings, dining facilities and tactical equipment maintenance facilities.	FY08
Integrate EPRs developed for the building types above into standards of MILCON Transformation	FY08
Integrate energy performance requirements developed for remodeled facilities above into requirements for ECIP and ESPC projects	FY08
Develop EPRs for other types of new and remodeled facilities and incorporate them in the Army construction requirements & documents	FY08
Annually update and integrate EPRs based on new technologies and knowledge, which becomes available with updated ASHRAE standards and IECC.	FY09-30

## Army Energy and Water Campaign Plan for Installations

### ***Initiative #2: Increase energy efficiency in new construction and renovations***

#### **2.2 Action #2: Develop energy design standards for new and renovated facilities to meet or exceed federal energy performance requirements.**

##### **2.2.1 Approaches to Meet Actions and Priorities (S, M, L)**

Provide designers, architects, energy managers and contractors with advanced energy design standards for new and renovated facilities. This document will have standards which will support energy performance requirements and will address different technologies and measures related to the potential building envelope, advanced HVAC systems, lighting, plug loads, water heating, decentralized energy supply systems, central heating plants (CHP), centralized heating and cooling systems, heat pumps, renewable technologies, etc. Coordinate incorporation of advanced energy design standards into Army Standard Designs annually through the Army Construction Standards Board. (M)

##### **2.2.2 Technologies and Tools Required**

Base standards on best practices collected into a database of energy saving technologies and measures (current, proven, well known or underused). These will include technologies/measures that relate to building envelope, internal load reduction, lighting, HVAC systems, renewable technologies, energy-consuming processes in buildings, supplemental energy systems (e.g., compressed air, steam system), etc.

Candidate technologies/ measures presented in the database go through screening for representative conditions (building type, standard climatic conditions, energy costs, etc) and application (new design and/or remodel).

The database shall include technical description of presented technologies and measures and case studies illustrated their implementation in representative conditions.

##### **2.2.3 Policies, Management, and Institutional Issues**

###### **Energy Policy Act of 2005**

The requirements of the Energy Policy Act of 2005 impacting this Action include:

Section 109 “Federal Building Performance Standards” for new Federal residential or non-residential buildings:

- a. Be designed to use 30% less energy than the level established by ASHRAE 90.1-2004 Code (<http://www.ashrae.org/>) or the International Energy Conservation Code (IECC <http://www.iccsafe.org/>), if life-cycle cost-effective.
- b. Requires application of sustainable design principles to the siting, design, and construction of all new and replacement buildings.
- c. Requires water conservation technologies be applied to the extent that the technologies are life-cycle cost-effective, if water is used to achieve energy efficiency.

Section 131 “Energy Star® Program” ([www.energystar.gov](http://www.energystar.gov)) will be codified and the responsibility will be divided between the Environmental Protection Agency (EPA) and DOE. Energy Star® product criteria will be regularly updated and appropriate lead-time be provided prior to the effective date for new or significant revisions to a product category.

## Army Energy and Water Campaign Plan for Installations

Section 135 “Energy Conservation Standards for Additional Products” requires DOE to engage in rulemaking to create national energy efficiency standards and test procedures for additional products. These products include refrigerated vending machines; distribution transformers; low-voltage dry-type transformers; traffic signal and pedestrian module light fixtures; fluorescent lamp ballasts; compact fluorescent lamps; illuminated exit signs; lamp stand (torchiere) light fixtures; commercial unit heaters; furnace fans; dehumidifiers; commercial pre-rinse (water) spray arms; battery chargers and external power supplies. See [http://www.eere.energy.gov/buildings/appliance\\_standards/](http://www.eere.energy.gov/buildings/appliance_standards/).

Section 136: “Energy Conservation Standards for Commercial Equipment” requires DOE to engage in rulemaking to create national energy efficiency standards for a number of commercial appliances and equipment. These products include packaged air conditioning and heating equipment; various types of commercial refrigerators, freezers and refrigerator-freezers; commercial icemakers; and commercial clothes washers. See [http://www.eere.energy.gov/buildings/appliance\\_standards/](http://www.eere.energy.gov/buildings/appliance_standards/).

Section 911 “Energy Efficiency” requires DOE to conduct programs of energy efficiency research, development, demonstration, and commercial application. Such programs shall take into consideration the following objectives:

- a. Increasing the energy efficiency of vehicles, buildings, and industrial processes.
- b. Reducing the demand of the United States for energy, especially energy from foreign sources.
- c. Reducing the cost of energy and making the economy more efficient and competitive.
- d. Improving the energy security of the United States.
- e. Reducing the environmental impact of energy-related activities.

Programs shall include research, development, demonstration, and commercial application of advanced, cost-effective technologies to improve the energy efficiency and environmental performance of vehicles; cost-effective technologies for new construction and retrofit to improve the energy efficiency and environmental performance of buildings using a whole-buildings approach including onsite renewable energy generation; advanced technologies to improve the energy efficiency, environmental performance, and process efficiency of energy-intensive and waste-intensive industries; and advanced control devices to improve the energy efficiency of electric motors, including those used in industrial processes, heating, ventilation, and cooling.

Section 912 “Next Generation Lighting Initiative” requires DOE to carry out a Next Generation Lighting Initiative in accordance with this section to support research, development, demonstration, and commercial application activities related to advanced solid-state lighting technologies based on white light emitting diodes. See <http://www.netl.doe.gov/ssl>.

Section 1331 “Energy Efficient Commercial Buildings Deduction” allows, as a deduction, an amount equal to the cost of energy efficient commercial building property placed in service during the taxable year. The deduction under with respect to any building for any taxable year shall not exceed the excess (if any) of the product of \$1.80 and the square footage of the building. The following are the requirements:

- a. An energy efficient commercial building property means property with respect to which depreciation (or amortization in lieu of depreciation) is allowable, which is installed on or in any building which is located in the United States, and within the scope of ASHRAE

## Army Energy and Water Campaign Plan for Installations

Standard 90.1-2001, which is installed as part of the interior lighting systems, the heating, cooling, ventilation, and hot water systems, or the building envelope, to reduce the total annual energy and power costs with respect to the interior lighting systems, heating, cooling, ventilation, and hot water systems of the building by 50 percent or more in comparison to a reference building which meets the minimum requirements of ASHRAE Standard 90.1-2001.

- b. In the case of energy efficient commercial building property installed on or in property owned by a Federal, State, or local government or a political subdivision thereof, the Secretary shall promulgate a regulation to allow the allocation of the deduction to the person primarily responsible for designing the property in lieu of the owner of such property. Such person shall be treated as the taxpayer for purposes of this section.

The amendments made by this section shall apply to property placed in service after December 31, 2005. The lead agency is DOE. DOE shall promulgate regulations that describe in detail methods for calculating and verifying energy and power consumption and cost, based on the provisions of the 2005 California Nonresidential Alternative Calculation Method Approval Manual (see [http://www.energy.ca.gov/title24/2005standards/nonresidential\\_acm/](http://www.energy.ca.gov/title24/2005standards/nonresidential_acm/)).

### 2.2.4 Specific Projects to Meet Action

- a. Gather information on proven efficient and renewable technologies from installations, DOE, other federal agencies, other services, state agencies, utility companies, laboratories, vendors and implementing agencies. Incorporate regional and economic issues regarding technologies in the database as a factor.
- b. Integrate the selected best practices to incorporate into Army Sustainability Standards on an annual basis.
- c. Evaluate applicability of including new and renewable technologies within the context of the MILCON transformation goals.
- d. Conduct annual workshops with focus on energy technologies. Invite participation by USACE, OACSIM, IMCOM, other services, DOE and National Laboratories, ASHRAE community, and international energy experts to share knowledge on available energy efficient technologies and measures and discuss emerging technologies and R&D needs.

### 2.2.5 Funding Strategies and Sources

Funding from POM cycles budgeted for initial database design. Funding budgeted for upkeep, reviews and knowledge transfer conferences. Funds may be available through collaborative efforts between the Army, DOE/FEMP and the EPA Energy Star® Program.

Evaluate and revise Army construction budgets annually to incorporate the required design and construction funds for life-cycle cost-effective energy technologies and features.

### 2.2.6 Description of End State

USACE districts, installations, A&E firms and ESPC contractors will have the design standards that will help meet energy performance requirements with new building designs and renovations.

### 2.2.7 Metrics of Success

All facilities designed under the Advanced Energy Design Standards will be at least 30% more energy efficient than the requirements of the current industry standards and will provide better energy performance and meet the requirements of the Energy Policy Act of 2005.

## Army Energy and Water Campaign Plan for Installations

### 2.2.8 Milestones (actions by FY)

Advanced Energy Standards (30% better than current ASHRAE) developed	FY08
Policy developed to allow alternative financing of energy efficiency and renewable improvements in MILCON projects	FY08
Requirement to evaluate efficiency and renewable technologies for all MILCON projects	FY08
Annual development and update of Advanced Energy Standards	FY08-30
Annual energy technology workshops	FY08-30

## Army Energy and Water Campaign Plan for Installations

### ***Initiative #2: Increase energy efficiency in new construction and renovations***

#### **2.3 Action #3: Improve energy efficiency in sustainable design of new and renovated construction through LEED.**

##### **2.3.1 Approaches to Meet Actions and Priorities (S, M, L)**

Create a minimum standard of required energy adoptions into all facilities as a minimum for LEED Silver rating by FY08. Higher ratings based on exceeding those minimum ratings are desirable. Advanced Energy Design Guidelines will complement Army Standard Designs and provide inspiration for building energy retrofits to meet LEED specifications. The Army Construction Standards Board will work these guidelines.

##### **2.3.2 Technologies and Tools Required**

Develop an Advanced Energy Guide based on best practice examples and promising energy saving technologies and measures (current, proven, well known or underused). These will include technologies/measures that relate to building envelope, internal load reduction, lighting, HVAC systems, energy consuming processes in the building, supplemental energy systems (e.g., compressed air, steam system), etc.

##### **2.3.3 Policies, Management, and Institutional Issues Energy Policy Act of 2005**

Applicable requirements of the Energy Policy Act of 2005 are the same as those shown for Action 2.2.

##### **2.3.4 Specific Projects to Meet Action**

- a. Provide support to designers and contractors through Advanced Energy Guidelines and design guide.
- b. Incorporate energy experts to share and promote knowledge and methodologies in available energy efficient technologies and measures and for emerging technologies and R&D needs in this area.

##### **2.3.5 Funding Strategies and Sources**

Funding is through a POM line identification participation in the Advanced Energy Guides and the Army Standard Design Development.

##### **2.3.6 Description of End State**

All new construction and major renovation will meet LEED Platinum certification by FY20.

##### **2.3.7 Metrics of Success**

This program will have all new and major construction LEED Silver certification by FY08, LEED Gold certification by FY15, and LEED Platinum by FY20.

## Army Energy and Water Campaign Plan for Installations

### 2.3.8 Milestones (actions by FY)

Silver certification standards of Energy Guides incorporated into design standards	FY08-09
Gold certification standards of Energy Guides incorporated into design standards	FY10-15
Platinum certification standards of Energy Guides incorporated into design standards	FY15-20
Review certification standards annually to ensure that platinum level is maintained and incorporated into design standards	FY21-30

## Army Energy and Water Campaign Plan for Installations

### ***Initiative #2: Increase energy efficiency in new construction and renovations***

#### **2.4 Action #4: Provide training in building design and renovations with energy efficiency technologies.**

##### **2.4.1 Approaches to Meet Actions and Priorities (S, M, L)**

- a. Improve LCCA training and provide training to installations to include personnel in the design arena. (S)
- b. Continue Certified Energy Manager (CEM) training for all personnel in the energy and design arena. (S)
- c. Collaborate with other federal agencies and other services to provide training in the following subject areas: (S, M)
  - i. Metering design and installation.
  - ii. Heating, ventilation and air-conditioning (HVAC) efficiencies technology.
  - iii. Evaluation and measurement techniques for commercial and residential facilities.
  - iv. Commissioning.
  - v. Energy savings measurement and verification.
  - vi. Operation and maintenance of facilities for energy efficiency improvement.
  - vii. Various codes (electric, plumbing, etc) as they relate to utility efficiencies.
  - viii. Technical principles of electrical and thermal energy.
  - ix. Energy auditing.
  - x. Mechanical refrigeration and chillers.
  - xi. Building automation systems, controls and utility monitoring and control systems (UMCS).
  - xii. Renewable energy technologies.
  - xiii. Building orientation and passive energy.
  - xiv. Heat recovery and free cooling technology.

##### **2.4.2 Technologies and Tools Required**

Review and select technologies that will help achieve training objectives.

##### **2.4.3 Policies, Management and Institutional Issues**

- a. Develop a standard list of training required to ensure fully trained design engineers in the area of energy engineering.
- b. Determine training requirements based on number of untrained/under-trained personnel.

##### **2.4.4 Specific Projects to Meet Action**

- a. Training development plan incorporated into OACSIM energy program and budgeted annually.
- b. Continuation in POM 10-15 for energy required training.

##### **2.4.5 Funding Strategies and Sources**

Develop and administer funding stream through IMCOM. This funding is separate from that already provided by USACE for PROSPECT courses and may be used for outside government training sources.

## Army Energy and Water Campaign Plan for Installations

### 2.4.6 Description of End State

- a. A qualified/trained utility energy team that adopts a forward thinking approach to design of facilities.
- b. Design team knowledgeable about state-of-the-art technologies and design principles applicable to DOD facilities and motivated to apply them in “whole building,” sustainable practice.

### 2.4.7 Metrics of Success

Designs for new Army buildings will incorporate increased energy management principles, strategies, and equipment, and will adopt better energy performance for building retrofit projects.

### 2.4.8 Milestones (actions by FY)

Training requirements developed	FY09
Approved training requirements by HQ	FY09
Funding support provided	FY10
Begin training schedule	FY10

## Army Energy and Water Campaign Plan for Installations

### ***Initiative #2: Increase energy efficiency in new construction and renovations***

#### **2.5 Action #5: Increase management tools for utility systems to meet the Energy Use Measurement and Accountability goals of the Energy Policy Act of 2005.**

##### **2.5.1 Approaches to Meet Objectives and Priorities**

Establish policies to install metering in all facilities where life-cycle cost-effective. Provide requirement and funding avenues to retrofit existing facilities.

##### **2.5.2 Technologies and Tools Required**

Use advanced, automated and remote metering technologies to collect and organize meter data into useful information. The most advanced systems will include connection of meters to energy system controlling equipment for rapid response to potential energy use problems identified through metering. Capabilities of the UMCS may include monitoring, metering, supervisory control of building automation systems on open (non-proprietary) standard industry communication protocols.

##### **2.5.3 Policies, Management, and Institutional Issues Energy Policy Act of 2005**

The requirement of the Energy Policy Act of 2005 Section 103: “Energy Use Measurement and Accountability” requires all buildings, for the purpose of efficient use of energy and reduction in the cost of electricity used, be metered by FY12. Advanced metering or advanced metering devices that provide data at least daily and electric meters that provide hourly data shall be used. Such data shall be incorporated into federal energy tracking systems and be made available to federal facility managers.

##### **Management and Institutional Issues**

- a. Include utility monitoring and control system requirements in the Advanced Energy Design Guidelines.
- b. Address automated meter reading equipment and UMCS monitoring equipment and controls in energy management training programs and standardization policies.

##### **2.5.4 Initiatives to Meet Objective**

- a. Develop requirements to implement existing metering standards such as standard industry communications protocols and metering hardware requirements in support of multiple products and installation-wide device interoperability.
- b. Where cost-effective, use UMCS to monitor system parameters and automatically adjust control devices to maintain peak operating efficiency.
- c. Establish a team of controls/software experts to survey/appraise facilities for applicability, or effectiveness if already there. Experts would be capable of providing local training.

##### **2.5.5 Funding Strategies and Sources**

- a. Require metering and/or use of UMCS equipment as part of any ESPC package, as an energy saving measure and as the primary component of the M&V process.
- b. Partner with private agencies to evaluate and retrofit facilities for scheduled commissioning capabilities.
- c. Establish central funding for approved commissioning initiatives with short paybacks.

## Army Energy and Water Campaign Plan for Installations

- d. Implement Army Metering Implementation Plan with central funding program for facilities of sufficient size ( $\geq 29K$  square feet) and/or consumption profile (energy intensive operations).

### 2.5.6 Description of End State

All facilities of sufficient size ( $\geq 29K$  square feet) and/or consumption profile (energy intensive operations) will be metered, with major installations making extensive use of central UMCS to assist energy management decisions.

### 2.5.7 Metrics of Success

- a. All appropriate buildings are metered in accordance with the Energy Policy Act of 2005.
- b. All major installations have central UMCS connected to all of their highest energy use buildings.

### 2.5.8 Milestones (actions by FY)

Strategy developed by HQDA, and policy issued for metering existing facilities.	FY08
Install utility meters in facilities not covered by EPACT 05 and EISA 07	FY08-12
All existing facilities metered per the Energy Policy Act of 2005 and EISA 07	FY12
Continue installing meters on utility systems until all facilities are metered	FY13-30
All facilities metered	FY30

## Army Energy and Water Campaign Plan for Installations

### ***Initiative #2: Increase energy efficiency in new construction and renovations***

#### **2.6 Action #6: Minimize the impact of fuel cost and availability at installations.**

The volatility of liquid fuels and natural gas has caused considerable difficulty in budgeting and paying for the continued upward price trend of these fuels. Installations with agreements to purchase short-term or spot-market supplies of natural gas are faced with rapidly increasing natural gas costs.

Electricity prices (rates) are much less volatile and have been historically less severe than natural gas. Even though electricity is increasingly being generated from natural gas fired combustion turbines, most utilities serving installations have a mix of generating resources (coal, nuclear, hydro, natural gas, wind, etc.) that somewhat dampens the impact of increased natural gas prices due to the stability of the other fuels in the generation mix.

##### **2.6.1 Approaches to Meet Action and Priorities**

The short-term (S), mid-term (M) and long-term (L) approaches to meet these actions are described below.

- a. **Develop guidelines and identify technologies that can help mitigate price volatility. (S)**  
The Army will develop guidelines and methods for installations to evaluate an installation for applications of technologies to help mitigate fuel price volatility. The guidelines will include options for procuring long-term alternative fuel contracts as well as identify appropriate technologies.
- b. **Maximize the use of existing and new technologies that offer fuel flexibility (S)** The Army will identify and evaluate the most appropriate and cost-effective applications for proven *fuel-flexible* or *dual-fuel* technologies for buildings and facilities. These will be evaluated at the time of new construction, major renovation or repair/replacement projects. Examples of these technologies include, but are not limited to:
  - i. Dual gas-fired and electric cooling (gas-engine driven air conditioners).
  - ii. Natural gas/propane-air mixing stations.
  - iii. Solar or natural gas or electric water heating.
- c. **Evaluate cost-effectiveness of high performance electric technologies that mitigate the potential volatility of direct-combustion fuels such as natural gas and propane. (S)** The Army will identify and evaluate proven highly efficient and cost-effective *electric* technologies that can provide the same level of service (heat, cool, hot water) as cost-effectively as gas technologies. Examples of these technologies include, but are not limited to:
  - i. High performance air-source heat pumps of up to 18 SEER.
  - ii. Geo-exchange heat pumps (ground source/ground water source) of up to 25 SEER.
  - iii. Heat pump water heaters.
  - iv. Distributed electric boilers.
  - v. Microwave/flash cooking and curing.
  - vi. Point of use electric water heaters.
  - vii. Electric ovens, stoves, etc., used in dining facilities and government owned housing.
- d. **Evaluate and implement technologies that minimize electric demand (S)**  
The Army will identify and evaluate proven and cost-effective electric demand reduction technologies that will mitigate the current and expected increases in electric demand prices. The Army will identify where these technologies have been successfully applied. Examples of these technologies include, but are not limited to:

## Army Energy and Water Campaign Plan for Installations

- i. Refrigerant—based ice storage.
  - ii. Central cooling ice storage.
  - iii. On-site generation including use of renewable fuels.
  - iv. Highly efficient evaporative cooling or hybrid evaporative/mechanical cooling.
  - v. Low-temperature waste heat A/C.
- e. Install a significant amount (10-15%) of primary and back-up renewable cost-effective technologies in addition to that already installed. Seek and take advantage of third-party funding and financing for these technologies (M).** The Army will accelerate the installation of primary and back-up cost-effective proven renewable technologies, focusing primarily on those that substitute for the most volatile fuels. Due to the highly regional and localized nature of renewable resources, the Army will work in concert with other DoD and Federal agencies to identify the most appropriate installations to apply these technologies. Examples of these technologies include, but are not limited to:
- i. Photovoltaic (PV)/solar water heating (domestic and swimming pools).
  - ii. PV/solar lighting (interior and exterior).
  - iii. Biomass fuel from landfills and agricultural waste.
  - iv. Wind energy.
  - v. PV/solar pumping.
- f. Work in cooperation with other federal agencies to promote and procure long-term alternative fuel resources such as gas, liquid fuels and hydrogen from coal gasification and biomass fuel. (M)** The Army, working in cooperation with other DoD agencies and the Defense Energy Support Center, will establish a plan to identify and procure alternative fuels. These fuels will be primarily coal-based and biomass-based. Coal based fuels would be generated through methane-gas extraction from coalfield or from processes that are clean (i.e., “green” coal) and that sequester the carbon at the time of production. Biomass-based fuels would likely be more localized such as landfill gas or a cooperative effort with the local community to use agricultural or processing waste to produce ethanol and/or methane.

### 2.6.2 Technologies and Tools Required

The Army will use proven technologies and rely on the public and private sector R&D community for development of new technologies. Technologies and tools required include but are not limited to:

- a. Mature and proven refrigerant-based ice storage technology.
- b. Lower-cost and more efficient solar/PV and other renewable technologies.
- c. Mature and reliable technology for coal gasification.
- d. Decision-making tool and/or process for installations to identify alternative strategies to maximize fuel flexibility and minimize risks of volatility.

### 2.6.3 Policies, Management and Institutional Issues

#### Energy Policy Act of 2005

The requirements of the Energy Policy Act of 2005 on this Action is Section 401 “Clean Coal Power Initiative” At least 70 percent of the allocated funds for the clean coal power initiative will be used to fund projects on coal-based gasification technologies, including:

- a. gasification combined cycle;
- b. gasification fuel cells and turbine combined cycle;
- c. gasification co-production;
- d. hybrid gasification and combustion; and

## Army Energy and Water Campaign Plan for Installations

- e. other advanced coal based technologies capable of producing a concentrated stream of carbon dioxide.

The Army will work with other agencies to ensure that there is continued legislation, authorization and guidelines for use of all sources of alternative financing-- including ESPC, UESC and Federal Agencies such as the Bonneville Power Administration (BPA.) The technology focus and financing structure of alternative financing programs needs to consider the dollar savings of projects as well as the energy/demand savings, and unique technology and economics of renewable technologies.

The Army will also seek out and take advantage of any utility, regional, state, or federal programs for technology development, demonstration, or incentives, or for supply of alternative fuels.

### 2.6.4 Specific Projects to Meet Action

The following initiatives will be taken to meet this Action.

- a. The Army will develop guidance for an installation-level Strategy. The guidance will include the current and future options for mitigating fuel price volatility. The Army will make a decision on the appropriateness of including this Strategy as a part of the installation Energy Security Plan.
- b. The Army will undertake a program to identify those installations that: 1) are particularly vulnerable to the price volatility of natural gas; 2) have high potential for use of alternative or renewable energy sources; 3) are in areas with chronic high natural gas prices but relatively low and historically stable electricity prices (on delivered BTU basis); and 3) have high summer electricity demand but relatively stable summer natural gas prices. Each of the installations surveyed will be screened and prioritized for development of a Strategy to mitigate fuel price volatility. The format and content of the Strategy will be developed by OACSIM and included as an Appendix in the installation Energy Security Plan.
- c. The Army will identify and seek out opportunities to participate with the public and/or private sector in demonstration programs for commercially available but underused technologies that hold promise for mitigating fuel price volatility.
- d. The Army will work with DESC, DoD and other Federal agencies to identify sources of future supplies of alternative fuels such as coal gas and other coal-derived liquid and gaseous fuels. The Army will consider entering into long-term contracts for these fuels.

### 2.6.5 Funding Strategies and Sources

The following are the funding/financing strategies and sources

- a. OACSIM will establish a budget for selected evaluations and/or demonstrations of approaches and technologies for cost-effectively minimizing fuel price volatility.
- b. Alternative financing will be the source for the majority of projects implemented.

### 2.6.6 Description of End State

Installations make fuel source and technology decisions to minimize impact of fuel price increases.

### 2.6.7 Metrics of Success

The following are quantifiable metrics for achieving success in this Action.

## Army Energy and Water Campaign Plan for Installations

- a. Each installation includes a strategy in their installation energy plan for using energy sources with low price volatility.
- b. Installations' higher headquarters offices will verify price volatility is a consideration in fuel source and technology decisions in facility projects managed by the installation.
- c. Army average energy costs increase at a slower rate than the national average.

### 2.6.8 Milestones (actions by FY)

Guidance developed by OACSIM for how to develop an installations-level strategy for minimizing fuel price volatility	FY08
OACSIM begins dialog with DESC and other DOD and federal agencies about securing sources of alternative fuel sources	FY08
Tool(s) developed to assist sites in making decisions. Thorough Army-wide technical evaluation of technical and institutional issues of alternative fuel supplies that meet objective.	FY09
OACSIM joins with other DOD and federal agencies to identify and enter into demonstration projects	FY10
Annually review methodology and strategy for minimize impact of price increases; revise guidance as required	FY10-30

## Army Energy and Water Campaign Plan for Installations

### ***Initiative #2: Increase energy efficiency in new construction and renovations***

#### **2.7 Action #7: Establish an Army utility (electric, natural gas and other fuels) source evaluation program that selects a cost-effective and secure energy source option that includes alternative sources.**

##### **2.7.1 Approaches to Meet Actions and Priorities (S, M, L)**

###### **Short-term**

- a. Develop a comprehensive utility source evaluation process that would allow evaluation of existing utility supply costs and alternative sources to assure lowest cost consistent with adequate supply assurance, security, and minimal price volatility exposure.
- b. Prioritize evaluation implementation and program funds, beginning in FY 08 to provide necessary resources at all levels to establish a continual evaluation process.

###### **Medium to Long-term**

- a. Continually reevaluate energy supply opportunities and rates in light of changing installation requirements, developing technologies, and source opportunities to assure all major Army installations are taking advantage of the lowest cost alternative utility source consistent with supply assurance, security and minimal price volatility exposure.
- b. Refine evaluation process to reflect lessons learned and changing constraints and technologies.

##### **2.7.2 Technologies and Tools Required**

- a. A comprehensive utility source evaluation process that would allow evaluation of existing utility supply costs and alternative sources to assure lowest cost consistent with adequate supply assurance, security, and minimal price volatility exposure.
- b. Resources (either in-house or contract expertise) necessary to apply the process appropriately to meet the end state timing goals.

##### **2.7.3 Policies, Management, and Institutional Issues**

- a. Army leadership must understand and appreciate the energy security and cost savings benefits of providing necessary resources to accomplish utility supply evaluation process.
- b. Establish a joint DOD services and/or federal agency utility source acquisition process.
- c. Establish organizational responsibilities within the Army for who funds and manages rate review and source evaluation.

##### **2.7.4 Specific Projects to Meet Action**

- a. Establishment of installation utility source evaluation process guide that includes existing supply rate evaluation - as well as evaluation of the cost-effectiveness, reliability, and security of alternative supply options, including on-site generation and renewable energy sources.
- b. Provision of necessary resources to allow application of the utility source evaluation process to meet the proposed end state schedule, through either in-house and/or private sector personnel.
- c. Commitment of necessary resources to accomplish installation review schedule.

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### 2.7.5 Funding Strategies and Sources

Identify O&M funds necessary to establish the evaluation process and resource the needed continuing evaluation teams.

### 2.7.6 Description of End State

Establishment and implementation of a utility source evaluation program process that assures that all major installations ( $\geq 5$  million square feet of facilities) receive a comprehensive utility source review every two years and all other installations not less frequent than once every four years.

### 2.7.7 Metrics of Success

- a. Establishment of the evaluation process.
- b. Accomplishment of initial evaluation process at all major installations.
- c. Accomplishment of all initial evaluations.
- d. Identification of resultant cost savings and supply security improvements from initial evaluations.
- e. Regular installation evaluations accomplished on the recommended schedule.

### 2.7.8 Milestones (actions by FY)

Constitute an Advisory Team to prioritize evaluation activities, develop an objective action plan, and initiate evaluation process	FY08
Refine evaluation process	FY08
Initiate installation process at highest priority installations	FY09
Identify cost savings and supply security improvements from initial valuations	FY10
Refine evaluation process and continual execution of on-going process	FY11-30

## Army Energy and Water Campaign Plan for Installations

### ***Initiative #2: Increase energy efficiency in new construction and renovations***

#### **2.8 Action #8: Implement authorization that allows retention of money at the installation level based on utility savings—for use on utility projects.**

##### **2.8.1 Approaches to Meet Actions and Priorities (S, M, L)**

- a. Research current policies and laws. (S)
- b. Provide memorandum and coordinate with appropriate office. (S)
- c. Quality control/follow-up with initial pilot sites. (M)

##### **2.8.2 Technologies and Tools Required**

No special technologies or tools required for this administrative action.

##### **2.8.3 Policies, Management, and Institutional Issues**

###### **Energy Policy Act of 2005**

Section 102 “Energy Management Requirements” contains the requirements of the Energy Policy Act of 2005 that relate to this action. This section allows retention of unexpended funds appropriated for energy, water and wastewater expenditures or from revenue generated by sale of electricity from alternate energy and cogeneration production facilities. Retained funds may only be used for energy efficiency, water conservation or unconventional and renewable energy resources projects.

Per 10 U.S.C. 2865, funds appropriated for utilities for a fiscal year and unobligated as a result of energy cost savings shall remain available for obligation until expended; and one-half of the amount shall be used for implementation of additional energy conservation measures. Use of the remainder is at the discretion of the head of the department or agency that realized the savings.

Savings from decreased consumption shall cover energy projects, training of employees, management of cost reduction program (e.g. energy hotlines, advertisement items, promotional materials, etc), and any other eligible costs.

##### **2.8.4 Specific Projects to Meet Action**

Define policies that will comply with the National Energy Conservation Policy Act (42 U.S.C. 8256), which authorizes retention of savings, and the Energy Policy Act of 2005 which further defines implementation requirements.

Coordinate with OSD and Comptroller for implementation of policy.

##### **2.8.5 Funding Strategies and Sources**

Funding for this effort is not required. Only administrative changes (revision of policies) are required to allow retention of savings at the organization level in which the savings were created.

##### **2.8.6 Description of End State**

Available and qualifying funds provide benefit to installations attributed to saving energy and reducing energy costs to a level below programmed utility funding levels. This action will be determined to be successful when the retention of savings is in compliance with the Energy Policy Act of 2005 which grants statutory authority to retain a portion of savings generated from efficient energy and water management practices and a budgetary mechanism established for the

## Army Energy and Water Campaign Plan for Installations

retention of those savings at the facility or site where the savings occur. This will provide greater incentive for that facility and its site managers to undertake more energy management initiatives, invest in renewable energy systems, and purchase electricity from renewable energy sources.

### 2.8.7 Metrics of Success

- a. Increased number of installations making use of this authority.
- b. Percent of installations' utility budgets retained and spent on energy initiatives.

### 2.8.8 Milestones (actions by FY)

Develop and issue policy for savings retention	FY08
Implement policy to take advantage of this authority	FY09-30

## Army Energy and Water Campaign Plan for Installations

### ***Initiative #2: Increase energy efficiency in new construction and renovations***

#### **2.9 Action #9: Increase performance verification in the use of alternative financing and available appropriated funds.**

##### **2.9.1 Approaches to Meet Actions and Priorities (S, M, L)**

- a. Increase training on the use of the performance measurement and verification procedures. (S).
- b. Require well-defined and thorough review of measurement verification plans in alternative financed project proposals. (S)
- c. Validate performance of a sample of alternatively financed and ECIP projects. (M)

##### **2.9.2 Technologies and Tools Required**

DOE has developed measurement and verification (M&V) guidance and published them in their FEMP M&V Guidelines. The document is based on and fully compatible with the International Performance Measurement and Verification Protocol.

##### **2.9.3 Policies, Management, and Institutional Issues**

Policies must support use of alternative financing and be periodically reviewed and updated to improve implementation processes and execution schedules. Policies supporting alternative financing must incorporate consideration of operation and maintenance programs to potential alternative financing opportunities.

##### **2.9.4 Specific Projects to Meet Action**

- a. Review current training curriculum to determine adequacy of training to energy managers on alternatively financed energy projects.
- b. Require ESPC projects to use Project Facilitators, trained to DOE standards, to verify that proposed M&V plans are adequate to validate savings.
- c. Provide resources and capabilities for review and acceptance of initial annual reconciliation reports.
- d. Review O&M renovation programs for ESPC potential.
- e. Validate project performance and M&V plan adequacy at a sample of alternatively financed projects.
- f. Issue follow-up guidance and revalidate and/or validate another sample of alternatively financed projects as needed.

##### **2.9.5 Funding Strategies and Sources**

Typically, appropriated funds are used for training to support installation energy management programs and to validate performance of ESPC projects. As an alternative, a portion of the first year utility cost avoidance from alternative financed projects can be set aside to cover the cost of reviewing and validating the initial savings reconciliation report.

##### **2.9.6 Description of End State**

Validated performance of all alternatively financed energy projects such that the utility and O&M cost avoidance is measured and verified.

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### 2.9.7 Metrics of Success

Decrease in the number of alternatively financed projects found with deficient M&V plans with which project performance and savings cannot be validated.

### 2.9.8 Milestones (actions by FY)

Issue updated guidance on validating performance of alternatively financed projects	FY08
Validate performance of three alternatively financed projects and issue revised guidance as needed.	FY08 FY12 FY16 FY20 FY24 FY28 FY30

# Army Energy and Water Campaign Plan for Installations

# Army Energy and Water Campaign Plan for Installations



## Army Energy and Water Campaign Plan for Installations

### **Initiative #3: Reduce dependence on fossil fuels**

*Reduce the dependency on fossil fuels by increasing the use of clean, renewable energy, reducing waste, increasing efficiencies, and improving environmental benefits.*

<u>Action</u>	<u>Page</u>
3.1: Substitute renewable resources for purchases of electricity from fossil fuel sources when life-cycle cost-effective.	60
3.2: Develop all cost-effective on-site renewable power generation consistent with mission requirements and create a “Zero Energy” initiative program.	66
3.3: Modernize and sustain central energy systems to reduce fossil fuel consumption.	72
3.4: Reduce on-site fossil fuel use for building space heating and domestic hot water.	76
3.5: Reduce fossil fuel usage in non-tactical vehicles (NTV)	79

## Army Energy and Water Campaign Plan for Installations

### ***Initiative #3: Reduce dependence on fossil fuels***

#### **3.1 Action #1: Substitute renewable resources for purchases of electricity from fossil fuel sources when life-cycle cost-effective.**

##### **3.1.1 Approaches to Meet Actions and Priorities (S, M, L)**

Procure renewable resources from utilities, marketers, federal power administrations, and third party producers, using long-term contracts for energy from new renewable resources using Power Marketing Administrations (e.g. Bonneville Power Administration, Western Area Power Administration, or Tennessee Valley Authority), the Economy Act, existing utility tariffs, utility contracts, ESPC, UESC, and authority under 10 USC 2394.

Actions during the next 5 to 10 years will require procurement of renewable energy in “deregulated” utility areas where retail competition is allowable under state law pursuant to section 8093 of Public Law 100-102 (which prohibits energy procurements that are at odds with state utility law, such as procuring energy as a wholesale rather than retail customer). Differences in state deregulation rules require different procurement approaches. Different procurement agents may be better suited for procurements in different areas, so a “one size fits all” procurement recommendation is inappropriate at this time. As a result, energy procurements in deregulated areas are already underway using DESC, GSA, and the BPA and WAPA federal power marketing administrations as procurement agents. Procure renewable energy resources from third-party suppliers of bio-gas and power from biomass fuels through the above agents and through public-private partnerships where possible. Installations will pool renewable energy requirements and collaborate with project developers, utilities and state agencies, regulatory and legislative bodies to stimulate development of local renewable resources where local utilities and/or energy markets have not developed. (S)

Actions during the next 11 to 15 years will require execution of energy procurements in areas opening to retail competition, such as customers of BPA and TVA and potentially California, and to capitalize on collaborative market development with utilities and developers in the Plains states, Gulf states, and potentially southern states. (M)

In the long-term, procurements will be expanded to areas where rising energy costs will make renewables life-cycle cost-effective, by using competitive long-term contracts where possible, and utility collaborations and public-private partnerships where retail markets are not open to competition.(L)

##### **3.1.2 Technologies and Tools Required**

Training of appropriate procurement personnel, including energy managers, contracts and legal support staff, public works personnel, and command staff on this objective and available procurement mechanisms.

##### **3.1.3 Policies, Management, and Institutional Issues Energy Policy Act of 2005**

Section 203 “Federal Purchase Requirement” of the Energy Policy Act of 2005 sets out goals for renewable energy purchase by the federal sector. Specifically, The President, acting through the Secretary, shall seek to ensure that, to the extent economically feasible and technically

## Army Energy and Water Campaign Plan for Installations

practicable, of the total amount of electric energy the federal government consumes during any fiscal year, the following amounts shall be renewable energy:

- a. Not less than 3 percent in FY 2007 through FY 2009.
- b. Not less than 5 percent in FY 2010 through FY 2012.
- c. Not less than 7.5 percent in FY 2013 and each fiscal year thereafter.

For renewable energy production 1) on site, 2) on federal lands, or 3) produced on Indian land and used by the installation, double the production amount for purposes of compliance with these goals. Section 203 of the Energy Policy Act of 2005 defines “renewable energy”.

The developers of renewable electrical energy may structure purchase agreements to differentiate between the commodity produced and the value of “renewable energy certificates” (REC) accompanying the commodity. RECs are considered to be the environmental attributes of the renewable energy produced, calculated as the incremental cost of developing or producing the renewable electrical power. Some regulatory agencies track utility providers’ compliance with meeting local renewable energy generation requirements with RECs, and in some locations, RECs can have substantial value in avoiding financial penalties levied by regulatory agencies for not meeting state mandated requirements supporting production of electrical energy from renewable sources. In these areas, the cost of including the REC in the total cost of the commodity may make purchase of renewable electrical energy uneconomical.

The Department of Energy is developing guidance for tracking progress toward the Energy Policy Act of 2005 renewable energy goal that will likely exclude electrical energy generated at “facilitated projects” from counting toward renewable energy goals. Facilitated projects are privately funded projects on federal land, where the developer retains ownership and responsibility of the equipment installed and facilities constructed. The developer may have interest in retaining the RECs for their resale value or for use in meeting state renewable requirements, in order to improve the economics of the project and allow them quicker recovery of their investment.

Section 204, “Use of Photovoltaic Energy in Public Buildings” directs the General Services Administration (GSA) to establish a photovoltaic energy commercialization program for the procurement and installation of photovoltaic solar electric systems for electric production in new and existing public buildings. The purposes of this program are to accelerate the growth of a commercially viable photovoltaic industry; reduce the fossil fuel consumption and costs of the Federal Government; attain the goal of installing solar energy systems in 20,000 Federal buildings by 2010, as contained in the Federal Government’s Million Solar Roof Initiative of 1997 (concluded in 2006; see now <http://www1.eere.energy.gov/solar/deployment.html>); stimulate the general use within the Federal Government of life-cycle costing and innovative procurement methods; and develop program performance data to support policy decisions on future incentive programs with respect to energy.

### **Management and Institutional Issues**

The Army will strive to meet the federal renewable energy goals established by the Energy Policy Act of 2005. Entering into long-term (up to 30 year) energy supply contracts will help to achieve this goal. Long-term contracts will improve life-cycle cost economics, such contracts may have higher near-term costs compared to conventional power supply options, although the cost will be the same or lower on a life-cycle basis. Both long-term contracting authority and

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life-cycle cost justification are necessary to execute these actions because renewable power price premiums over conventional power costs are minimized by longer contract terms, and near-term price premiums are offset by out-year savings using life-cycle cost calculations. 10 USC 2394 appears to provide authority for long-term (up to 30 years) purchases of renewable power (10 USC 8689 for geothermal power). Accordingly, clear guidelines on its application will need to be provided as well as that for appropriate application of life-cycle cost calculations to comply with Congressional and Department life-cycle cost directives.

These assumptions require verification. Lacking that, new authorities and policies may be required. Policy alternatives that would otherwise facilitate these actions include repeal of section 8093 of Public Law 100-102 and conversion of DOD installations from retail to wholesale electric customer status through legislative action. Both appear unnecessary if 10 USC 2394 can be used. Wholesale status would greatly accelerate DOD purchases of renewable power and potentially enhance facility energy security; however, conversion from retail to wholesale status would likely be opposed by the utility providers.

Recommended policy changes include changes to ECIP payback and utility UESC contract terms from the current 10-years to terms equal to the life of the renewable resource, consistent with life-cycle costing methodology. This will allow utilities to develop renewable resources on behalf of Army customers without use of 10 USC 2394. Further, 10 USC 2394 was developed and has been primarily used to contract directly with energy project developers. Changes in federal and state electric utility regulations have created competitive markets and power marketers that broker relations between developers and power purchasers. Modifications of 10 USC 2394 may be necessary to extend coverage to power marketers consistent with current utility laws and regulations.

Finally, progress in deregulated energy supply markets make current third-party financing vehicles, such as ESPC, inadequate for many on-site renewable energy projects. Many on-site renewable energy projects are more economic if they are structured as energy purchase contracts or public-private partnerships where ownership of the energy producing assets remains with a private sector party for tax and other incentive purposes. There exists a need for a new third-party financing vehicle for renewable energy supplies to Army facilities. This vehicle should be based on and consistent with current utility laws and regulations for independent power producers (IPPs), a specific legal entity in the deregulated power industry.

Address the following management issues in order to execute all of the recommended actions (some, but not all, procurements can be executed without resolution of these issues):

- a. Streamlining contract approval using 10 USC 2394. This authority requires Secretary of Defense approval and Congressional notification, although Service Secretaries have been delegated substantive approval authority. Power purchase contracts are sensitive to hourly fluctuations in energy markets and, therefore, must be signed as soon as possible. This may require an up-front, pre-approval process based on expected prices.
- b. Central funding of initial price premiums over conventional power prices. Renewable power often costs more than conventional power because renewable power requires high up-front capital investments, which are offset by low operating and no fuel costs. Higher initial power costs increase facility operating costs.
- c. Development of Army capabilities and technology, industry, and market knowledge to execute renewable contracts. Knowledge of renewable energy technologies and resources

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are critical to smart procurement of renewables on long-term contracts, as is knowledge and expertise dealing with various procurement agents, especially federal power marketing administrations. This knowledge is not wide-spread in the Army or even other federal agencies and very limited capability exists within DOD.

- d. Development of joint-service strategies for renewable power purchasing and development of on-site resources using purchase contracts. Economies of scale may be available for renewable power purchases that require coordination and collaboration among DOD components. Joint basing reinforces this need. This coordination could be managed by DESC, although as the largest electricity user, the Army has more of a vested interest in timely and effective execution that may make it a more logical coordinator, at least in many regions.
- e. Finally, management will need to identify funds for this strategy and a process for management of strategy execution. Because execution of this strategy is expected to be life-cycle cost-effective, near term funding requirements will be offset by future savings. In addition, long-term contracts will reduce the administrative costs of power procurement over the long run by increasing the period between re-contracting for these services.

The primary institutional issue is training on the new approach to power procurement including:

- a. Status of renewable energy technologies, resources, and local markets,
- b. Preference for renewable electricity when life-cycle cost-effective,
- c. Preference for joint-service procurements when economies of scale are possible,
- d. Use of long-term contracts,
- e. Use of long-term contracting authorities,
- f. Use of non-base (and potentially non-Army) procurement personnel to execute contracts,
- g. Application of life-cycle cost-effectiveness criteria to renewable purchases, and
- h. Use of new third-party financing approaches for on-site renewable projects (if any).

### 3.1.4 Specific Projects to Meet Action

The Army will participate in joint Service renewable power procurements. The specific procurements identified in the Renewable Resource Assessment Implementation Plan are as follows:

- a. Near-term procurements:
  - i. New Mexico
  - ii. California Central Valley
  - iii. Texas
  - iv. Penn., NJ, MD, DC purchase through DESC (at least 2 planned)
  - v. Florida biomass
  - vi. NJ biomass NE US purchase through DESC
  - vii. Carolina biomass
  - viii. Alaska
- b. Mid-term procurements
  - i. Florida wind purchase
  - ii. Colorado wind purchase
  - iii. Arizona
  - iv. California if Direct Access allowed (after 2011)
  - v. BPA and TVA customers (after 2010)
  - vi. Plains and Gulf states
- c. Long-term procurements

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- i. North-central manufacturing-belt states
- ii. Virginia
- iii. Western US if Direct Access allowed
- iv. Southeastern wind

In each case, the Army will collaborate with other services in specific regional purchases of renewable energy using various contracting mechanisms (as appropriate), including:

- a. Utility contracts,
- b. Procurements by federal power marketing authorities on behalf of Army installations,
- c. Contracts under 10 USC 2394 executed by DESC and others,
- d. Third-party financing of on and near-base projects using current authorities, and finally,
- e. Use of new third-party financing vehicles specific to on and near base renewable projects based on long-term purchase contracts.

Document each of the initial purchases as a case study to identify its suitability as a procurement approach, to facilitate streamlining of the procurement process, and to educate other staff and facilities.

The Army will not pursue the purchase of RECs for the sole purpose of meeting renewable energy requirements. If RECs accrue from renewable projects, the Army may sell these to improve project economics.

### 3.1.5 Funding Strategies and Sources

This activity is expected to be budget neutral to positive (saves money) over the mid- to long-term. Higher prices on long-term contracts are expected to average three-tenths of a cent per kilowatt hour in the early years of purchase contracts. The DoD Renewables Assessment Implementation Plan proposed renewable energy purchase targets for 2025 based on three different levels of effort. The Army share of the maximum target is approximately 2,000,000 MWh, or roughly 25% of the Army's current electricity purchases. Initially a premium would be paid in the early years of long-term contracts. As conventional power prices increase, this premium would be offset and eventually the Army electricity budget would be reduced resulting in out-year savings. Additional savings would result from less frequent power procurements due to the longer contract terms for renewable power purchases. The budget for higher initial costs, although modest, would have to be covered from additional appropriations or reallocation of existing utility or other O&M funds. Contracts for the full 2,000,000 MWh cannot be placed at once and will instead, be placed over a multi-year period (well into the next decade), minimizing the impact on near-term budgets.

An alternative approach would be to structure purchase contracts with no initial premium (or potentially a price discount) and to allow prices to escalate over time. This approach could reduce near-term budget impacts, but is likely to reduce or eliminate out-year savings. Nevertheless, either approach results in a significant increase in Army use of renewable energy.

The DoD Renewables Assessment also identified potential for on-site renewable power production, of which the Army's portion could be up to 740,000 MWh annually. These projects are expected to be life-cycle cost-effective and therefore, pay for themselves. ECIP funding for the number and scale of projects identified is inadequate and may not be consistent with the least-cost development strategy or the Army's privatization policies. Therefore, most of these

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projects are expected to be financed through public-private partnerships based on power sales contracts, essentially power purchases. On-site project activities are covered under Action 2, but enabling financing will be through power purchases.

### 3.1.6 Description of End State

Up to 50% of Army electricity is purchased from renewable resources by FY30. This is equal to approximately 4,000,000 MWh annually at current electricity consumption levels. Additionally, up to 15% of Army electricity will be supplied by on and/or near base renewable projects by FY30, much of which will be financed through power purchase contracts.

### 3.1.7 Metrics of Success

Renewable power purchases will meet or exceed the following levels by the specified dates:

10% by FY10

15% by FY15

25% by FY25

50% by FY30

### 3.1.8 Milestones (actions by FY)

Program at least 7% of Army electricity (approx 560,000 MWh) from renewable resources annually	FY08
Program at least 10% of Army electricity (approx 800,000 MWh) from renewable resources annually	FY10
Program at least 15% of Army electricity (approx 2,400,000 MWh) from renewable resources annually	FY15
Program at least 25% of Army electricity (approx 3,200,000 MWh) from renewable resources annually	FY25
Program at least 50% of Army electricity (approx 4,000,000 MWh) from renewable resources annually	FY30

Electricity purchases from current electricity providers will also be displaced by power produced from on- and near-base renewable resources much of which will be secured through power purchase contracts from on- and near-base project owners as discussed further in this section.

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### ***Initiative #3: Reduce dependence on fossil fuels***

#### **3.2 Action #2: Develop all cost-effective on-site renewable generation consistent with mission requirements and create a “Zero Energy” initiative program.**

##### **3.2.1 Approaches to Meet Actions and Priorities (S, M, L)**

The DoD Renewables Assessment identified potential for on-site and near-base renewable power production and estimated the potential for renewable energy production at Army sites of 740,000 MWh annually. These projects are expected to be life-cycle cost-effective and therefore, pay for themselves. ECIP funding for the number and scale of on-base projects identified is inadequate and may not be consistent with the least-cost development strategy or the Army’s privatization policies. Consequently, most of the larger projects are expected to be financed through public-private partnerships based on power sales contracts, essentially power purchases. Power purchasing activities are covered under Action 1, which describes how financing for these projects will be enabled through power purchase contracts.

In addition, create a “Zero Energy” program where short, medium and long term goals and projects are established to support facilities and installations that create as much energy as they consume.

##### **Short-term Actions (S)**

Representatives from OACSIM, HQIMCOM and the IMCOM regions will comprise a Renewable Project Implementation Team, whose goal is to cost-effectively implement the DoD Renewables Assessment. The team will make use of technical services available from ERDC/CERL, FEMP and DOE national laboratories as needed.

An OACSIM and/or IMCOM team member will assure coordination and policy compliance among the other members of the team. The Team will provide technical recommendations and evaluations of proposed renewable energy projects. The Team will also help installations develop their renewable energy project proposals, advise what funding strategies to consider, participate in review of developer/contractor solicitations, and if available serve on source selection boards. The Team will request contracting support from Huntsville District and DESC representatives as needed.

The Army will participate with other services in the Tri-Service Renewable Energy Committee (TREC). The Team will coordinate and partner through the TREC with OSD, other DOD Services, other federal agencies, state/local government and the private sector as needed to streamline projects and reduce costs. In addition, the Army will support OSD and DOE “Zero Energy” or “Energy Islanding” efforts and committee actions.

Public-private partnerships are a likely scenario for large projects. Such partnerships may improve life-cycle cost-effectiveness since private companies may be able to take advantage of various tax incentives (investment tax credit, property tax exemption, production tax credit, accelerated depreciation, etc). Other considerations include energy security issues, back-up power needs, whether the electricity will be used on-site, offsetting retail rates, or sold to outside entities at a wholesale power rate. The team lead will develop a draft project implementation timeline.

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A table with potential sites identified through the DoD Renewable Assessment report is included at the end of this section. The PV opportunities are subject to the availability of private sector partner/developers and/or state and utility incentives since PV project costs of an estimated \$7 million per installed MW would quickly deplete the existing annual Energy Conservation Investment Program (ECIP) budget for the Army. Public entities are better able to take advantage of tax incentives – thus reducing project cost.

The expected short-term projects based on DOD Renewable Assessment report are as follows:

- a. Develop one large wind project.
- b. Develop 2 small wind projects, probably using ECIP funding

The Zero Energy Initiative will:

- a. Develop one Zero Energy building
- b. Develop one technology project that can support the Zero Energy Initiative (i.e., hydro-cooling system)

The Team will develop a project brief fact sheet for each project. This fact sheet will be sent to the installation and meetings will be set up with site decision-makers, the energy manager, sustainability/environmental staff and other appropriate staff to discuss the recommended project(s) and determine project viability based on any potential mission constraints. The project implementation timeline will be modified based on site interaction. The Team will facilitate project implementation.

The Team will explore opportunities to participate in the OSD/FEMP renewable ESPC initiative<sup>1</sup>. The Team will consolidate and combine projects where possible to result in a streamlined, large volume buy – for the renewable hardware and/or turnkey projects. This will help to minimize project management and other costs. Similar to a regional ESPC project, the designated Energy Service Company (ESCO) can do the engineering and feasibility studies as part of the detailed energy survey once all of the best sites are identified. Another potential ESPC approach is to bundle renewable energy with energy efficiency work for one large project. This may make the most sense for PV projects, to improve overall project cost-effectiveness. Solar water heating and solar walls will be cost-effective as stand-alone projects at some locations.

The Team will also determine methods to reduce solar project costs. The Army will consider partnering with other services for large purchases of solar equipment and/or will utilize lessons learned from other Service purchases that will help the Army replicate the process at their sites. There are cost reduction opportunities in several different areas:

- a. Solar energy cost (cost/kWh is a function of module efficiency, material cost and manufacturing cost).
- b. Balance-of-system costs. Module area effects cost since the rack and foundation costs increase with larger modules, thus higher efficiency solar panels may be the lowest cost alternative since they provide higher energy output per unit area.
- c. Installation cost.

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<sup>1</sup> There are several tech specific ESPC's, including PV and parabolic trough. See [http://www.eere.energy.gov/femp/financing/superespics\\_solar.cfm](http://www.eere.energy.gov/femp/financing/superespics_solar.cfm)  
[http://www.eere.energy.gov/femp/financing/superespics\\_photovoltaics.cfm](http://www.eere.energy.gov/femp/financing/superespics_photovoltaics.cfm)

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- d. Procurement cost (for example, if a general contractor is used, the subcontract cost will include additional overhead/profit costs).

The Team will evaluate demonstration and pilot project ideas for new technologies and advanced concepts such as renewable hydrogen/fuel cells, microgrids and/or a Sustainable Renewable Communities pilot. The Team will explore small wind turbines and vertical axis wind turbine opportunities since they reduce or eliminate mission conflict issues, require less space and can be sited in areas closer to electrical infrastructure (along roads, in residential areas, etc.). The Team will also collaborate with DOE's geothermal program to demonstrate technologies for utilization of geopressure resources.

The Team will coordinate with each site to ensure renewables (including passive solar) are considered in any energy/new construction project. This will involve coordination with Initiatives 1 and 2. This coordination should occur throughout the medium and long-term actions as well. Four installations will be selected in different areas of the country to demonstrate the Zero Energy concepts.

### ***Medium Term Actions (M)***

Medium term actions include:

- a. Continue project implementation. This involves:
  - i. Develop multiple mid to large-scale wind projects.
  - ii. Drill exploratory well at one location.
  - iii. Develop at least one geothermal project.
  - iv. Develop several small wind projects.
- b. Continue to identify, validate and test the full range of emerging renewable technologies. Implement technology demonstration projects as appropriate.
- c. Continue coordination with DOD and DOE laboratories and other entities on research needs.
- d. Increase the Zero Energy area from facilities to whole community or installation to capitalize on the output of larger renewable energy production projects.

### ***Long-term Actions (L)***

Long-term actions include:

- a. Develop new implementation plan. This will likely include:
  - i. Develop multiple mid-to-large scale wind projects.
  - ii. Develop multiple geothermal projects.
  - iii. Develop numerous small wind projects.
- b. Undertake a technology and cost-effectiveness re-assessment of cost-effective projects.
- c. Continue coordination with DOD and DOE laboratories and other entities on research needs.
- d. Increase Zero Energy to include 25% of all installations in 25 years.

### **3.2.2 Technologies and Tools Required**

Renewable technology expertise will be required in the following areas: wind, solar, geothermal, biomass, wave/tidal/ocean thermal, hydrogen/fuel cell and incremental hydro. A variety of renewable assessment tools will be required. Some of the currently available tools:

- a. The solar software Excel spreadsheet that was developed for the DOD Renewables Assessment.
- b. NREL's Dynamic Maps, GIS Data, & Analysis Tools <http://www.nrel.gov/gis>.

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- c. Other renewable assessment software such as the DOE Federal Renewable Energy Screening Assistant, or FRESA, ([http://www1.eere.energy.gov/femp/renewable\\_energy/renewable\\_resources.html](http://www1.eere.energy.gov/femp/renewable_energy/renewable_resources.html)), HOMER (<http://www.nrel.gov/homer/>), and others.

### 3.2.3 Policies, Management, and Institutional Issues

#### Energy Policy Act of 2005

The Army will require installations within each CONUS IMCOM region to collectively comply with the Energy Policy Act of 2005 renewable goals as described in paragraph 3.1.3, subparagraphs a through c of this document. The Army will ensure consideration of renewable ECM evaluations in all ESPC and UESC projects, as well as all new construction projects.

#### Management and Institutional Issues

The Army will assess all projects based on life-cycle cost instead of just first cost. This is critical for renewable projects since their costs are front-loaded, but they have the potential to provide significant long-term cost and other benefits. The Army will support ECIP projects whose life-cycle cost and economic life for renewable projects exceeds 25 years. An SIR of greater than 1.0 is allowable for renewable projects.

The Army will evaluate other benefits into life-cycle costing. These benefits include emission credits, energy security, etc.

### 3.2.4 Specific Projects to Meet Action

Section 3.2.1 describes the Army initiatives, including types of projects, to meet this Action. In addition to those in 3.2.1, the Army will develop pilot projects using an RFP for a third party provider to own, design, build, operate, and maintain the project.

### 3.2.5 Funding Strategies and Sources

The on-site renewable projects are expected to be life-cycle cost-effective to justify implementation. Joint service partnerships may reduce costs. Assuming a 10¢/kWh electric rate, an estimated \$12.5 million/year will be offset in the short-term and \$40 million/year will be saved in the mid-term through on-site generation projects. There are a variety of funding sources and contracting mechanisms that could be used for these projects. These include:

- a. Public-private partnerships tied to long-term power contracts (see Action 3.1), such as the Independent Energy Provider (IEP) concept.
- b. Appropriated funding such as MCA, ECIP, and OMA. Note that ECIP funding will be inadequate to meet the target end-state for on-site renewable projects.
- c. Special Congressional appropriations for demand reduction, other specific goals.
- d. ESPC/UESC (need expanded contract terms to 30 years).
- e. Bonneville Power Administration (BPA can do turnkey projects in their region, financing elsewhere).
- f. Enhanced Use Lease (EUL).
- g. 10 USC 2394 and/or 10 USC 8689.
- h. State and utility renewable incentives. The Database of State Incentives for Renewable Energy (DSIRE) database (<http://www.dsireusa.org/>) includes helpful incentive and renewable policy information by state.
- i. A DOD research organization grants such the Defense Advanced Research Projects Agency (DARPA), Strategic Environmental Research and Development Program (SERDP) /

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Environmental Security Technology Certification Program (ESTCP), Benet Laboratories. SERDP Solicitations are in November and the ESTCP call for proposals is in January.

- j. Other outside funding/grant opportunities such as National Science Foundation, State Technologies Advancement Collaborative (STAC, <http://www.stacenergy.org>, although funding may not be available after 2005).
- k. Army Sustainability and/or environmental program funding.

### 3.2.6 Description of End State

All cost-effective renewable technologies developed on or near Army installations by FY30 (50% of total Army load). One quarter of Army installations are “Zero Energy” islands by 2030.

### 3.2.7 Metrics of Success

On-site renewable projects that meet or exceed the following levels by the specified dates:

Short range: 3 to 10 percent of total electricity consumption by FY10

Mid range: 15 to 20 percent of total electricity consumption by FY15

Long range: 40 to 50 percent of total electricity consumption by FY30

These projects combined with the renewable electrical power purchases must meet the Energy Policy Act of 2005 goals.

### 3.2.8 Milestones (actions by FY)

Renewable team formed. Short-term implementation plan developed that includes project, construction timeline, funding source, and contractual arrangement	FY08
Produce 105,000 MWh/year from on-site renewable projects	FY10
Determine need for reassessment based on changes in technology cost and performance	FY15
Produce 400,000 MWh/year (cumulative)	FY15
Conduct reassessment	FY15
Produce 450,000 MWh/year (cumulative)	FY20
Produce 650,000 MWh/year (cumulative)	FY25
Conduct reassessment	FY25
Produce 740,000 MWh/year (cumulative)	FY30

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### Army Sites with Wind and Solar Potential

#### Wind Potential

<b>Installation</b>	<b>State</b>	<b>Max. MW</b>
FORT RICHARDSON	AK	15
BLACK RAPIDS TRAINING SITE	AK	TBD
FORT GREELY	AK	TBD
GULKANA ARMY SITE	AK	TBD
FORT HUACHUCA	AZ	5
YUMA PROVING GROUND	AZ	1
NTC AND FORT IRWIN; CA	CA	30
NTC AND FORT IRWIN; CA own use	CA	3
FORT HUNTER LIGGETT	CA	TBD
FORT CARSON	CO	1.5
PINON CANYON	CO	1
JOHNSTON MTA CAMP DODGE	IA	TBD
FORT RILEY	KS	20
ABERDEEN PROVING GROUND	MD	0.01
FORT LEONARD WOOD	MO	TBD
MILITARY OCEAN TML SUNNY POINT	NC	TBD
NG CAMP ASHLAND MTA	NE	TBD
NG HASTINGS MTA	NE	TBD
NG MEAD MTA	NE	TBD
FORT BLISS AAA RANGES (Filmore Gap)	NM	1.5
WHITE SANDS MISSILE RANGE NM	NM	0.05
HAWTHORNE ARMY DEPOT	NV	1.0
WEST POINT MIL RESERVATION	NY	TBD
FORT SILL OK	OK	20
DUGWAY PROVING GROUND	UT	TBD
TOOELE ARMY DEPOT	UT	TBD
YAKIMA TRAINING CENTER	WA	40
FORT MCCOY	WS	TBD

#### Solar Potential

<b>Installation</b>	<b>State</b>	<b>Max. MWh</b>
FORT IRWIN	CA	91,112
PRESIDIO OF MONTEREY	CA	26,258
SIERRA ARMY DEPOT	CA	11,659
FORT HUNTER LIGGETT	CA	8,632
<b>POTENTIAL</b>		<b>137,661</b>

## Army Energy and Water Campaign Plan for Installations

### ***Initiative #3: Reduce dependence on fossil fuels***

#### **3.3 Action #3: Modernize and sustain central energy systems to reduce fossil fuel consumption**

The Army has many aging central energy systems (central heating/cooling plants and distribution systems) that are not cost effective for privatization. Many of these systems have exceeded their expected useful lives, are threatening mission performance and readiness, increasing operation & maintenance costs, and could result in a catastrophic failure. In the Army IMCOM Southeast Region alone, it is estimated that 1.25 trillion BTU per year are lost in the central heating and cooling distribution systems. This costs the Army nearly \$7.5 million each year in wasted energy costs. Extrapolating this to the entire Army, this wasted energy is costing the Army at least \$40-50 million per year.

The Army Central Heat Plant Modernization program from FY 1998-2002 provided \$300 million to fix the most urgent central systems. The installations were prioritized largely based on the Installation Status Report (ISR) condition, cost of service, and mission performance impacts. Most of the central heating plants and distribution systems were replaced with similar systems. A few installations decentralized the heating systems by installing individual boilers in the buildings. Since the end of this program little has been done to reduce the cost of service at the central heating/cooling plants as the economics of modernization using alternative financing is not attractive.

##### **3.3.1 Approaches to Meet Actions and Priorities (S, M, L)**

In order to ensure safe, reliable systems that fully support mission requirements, and reduce operating and maintenance costs, OACSIM will establish a systematic approach for Army central energy system (CES) modernization to:

- a. Ensure that the installations consider a broad set of technical alternatives (replacement, decentralization, co-generation, thermal storage, etc.),
- b. Select from the alternatives based upon life-cycle cost analysis (LCCA), and
- c. Utilize third party financing to leverage the Army investment requirements.

In the short-term, Army installations would be prioritized for initial consideration in this program, and CES modernization proposals prepared. The criterion for prioritization includes, but is not limited to:

- a. Mission criticality for that CES
- b. Installation status report (ISR)/equipment condition,
- c. Cost of service including O&M costs,
- d. Annual energy load/fuel consumption
- e. System efficiency,
- f. Square footage of conditioned space
- g. Weather severity
- h. Marginal energy costs
- i. Existing unit cost per area and unit energy use per area
- j. The status of ongoing modernization activities.

Each selected installation would prepare a CES modernization proposal and submit it to IMCOM HQ. The modernization proposal would include a business plan that addresses how third party financing can be used to leverage the Army investment. The installation would identify

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feasible alternatives for CES modernization, collect data to develop the life-cycle cost for these alternatives, and develop the proposal according to IMCOM HQ guidance.

In the mid-term, the most life-cycle cost-effective modernization projects would be implemented using a combination of appropriated funds and alternative financing. The use of conventional coal plants and coal use would be reduced, especially in non-attainment areas, focusing on renewable alternatives and/or coal gasification.

In the long-term, advanced operations and maintenance technologies would be used to keep the systems working at peak efficiency, and extend the life of the CES. Advanced O&M, through predictive or optimized maintenance, would provide real time feedback on system performance and identify potential maintenance problems prior to failure. Advanced monitoring and maintenance could be included in performance contracts if plant operations are out-sourced.

### 3.3.2 Technologies and Tools Required

A consistent methodology for the installation prioritization and site assessments is required. The Facility Energy Decision System (FEDS) or other commercially available life-cycle cost analysis (LCCA) software can provide the framework for assessing energy efficiency retrofit opportunities and evaluating central heating and cooling decentralization options. The new central heating and cooling module provides the LCCA for each full or partial decentralization option under consideration.

### 3.3.3 Policies, Management, and Institutional Issues

**Current Policies:** Confirm that funding decisions will be based on lowest life-cycle cost rather than lowest first cost.

**Proposed Policy:** Allow both third party and appropriated funds to complete the modernization projects.

The following are management issues that need to be resolved and policies developed:

- a. How to prioritize projects to insure equity between installations?
- b. How to ensure that projects are completed at specific installations?
- c. How to handle CES that are operated by contractors?
- d. How to determine when to use third party versus appropriated funds?
- e. Can CES be privatized?
- f. Should the Army require all new central heating systems to be low temperature hot water?

### 3.3.4 Specific Projects to Meet Action

The following are the projects to meet this action.

**Establish a technical team.** To ensure a consistent approach to CES modernization, a technical team would be established to work with the installations and assist in the assessment of CES options and current O&M practices, and development of modernization proposals. The technical team would develop the detailed approach for the installation prioritization, site assessments, and project implementation.

**Prioritize Installations.** The technical team would prioritize the candidate Army installations for initial consideration in this program. The criteria for prioritization would include mission

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criticality for that CES, installation status report (ISR)/equipment condition, cost of service including O&M costs, annual energy load/fuel consumption, system efficiency, and the status of ongoing modernization activities. The technical team would recommend installations for initial evaluation, the number based upon budget constraints and direction from IMCOM HQ.

**Develop a Modernization Proposal.** IMCOM HQ would provide guidance to the selected installations for development of CES modernization proposals. This guidance would detail the scope of the program, expectations for the alternatives to consider, LCCA requirements, explicit proposal format, documentation requirements, and project selection criteria. The modernization proposal would have two distinct parts:

- a. **Business Plan** - This plan would provide the business case for selecting from the feasible alternatives and recommending a course of action that maximizes the value to the Army, while meeting the current and future mission requirements. The business plan would include the LCCA for each alternative, and the funding/third party financing requirements to cost-effectively implement the selected alternative.
- b. **Execution Plan** - The Execution Plan would be similar to a project or construction management plan with a phased construction schedule, critical milestones, estimated budgets, procurement requirements, and team roles and responsibilities.

**Undertake Installation Assessment.** Each installation would prepare its CES modernization proposal and submit it to IMCOM HQ. The installation would identify feasible alternatives for CES modernization, collect data to develop the LCCA for these alternatives, and develop the proposal according to IMCOM HQ guidance. Alternatives to be considered in the proposal could include, but are not limited to:

- a. Complete refurbishment or replacement of existing CESs and distribution systems
- b. Full or partial decentralization of heating and/or cooling systems
- c. Conversion from steam to hot water in the distribution systems
- d. New central chilled water systems (satellite plants) or additions to existing systems
- e. Combined heat and power (co-generation) capability
- f. Thermal energy storage
- g. Renewable energy sources (wood, landfill gas, biomass, geothermal, etc.)

**Develop an Optimized O&M Plan.** The technical team would also develop the detailed approach for the installation to optimize the maintenance of existing CES to ensure systems continuously operate at or near peak efficiency.

### 3.3.5 Funding Strategies and Sources

The CES program would utilize third-party financing to the extent possible based on the energy and maintenance savings. Third party financing would be available through ESPC or UESC arrangements. Appropriated funds could be used to reduce the amount of third party financing, and thus minimize the financing term.

In addition, appropriated funds would be used for infrastructure improvements (repair or replace central plant and distribution system) when the CES must be replaced (high priority due to condition) and dollar savings are too low to cover loan payments. Third party financing would primarily be used for efficiency improvements (upgrade central plant, decentralize), and new capabilities (combined heat and power, thermal energy storage, etc.).

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### 3.3.6 Description of End State

- a. All CES rated in ISR at condition two (C2) or better, using the lowest LCC technologies.
- b. All current steam CES converted to hot water except where steam is required for process needs.
- c. Control systems upgraded to use advanced maintenance technologies.
- d. O&M procedures optimized at each site to maintain peak efficiency in operation of CES.

### 3.3.7 Metrics of Success

- a. Improvement in ISR rating (to less than 5% red and at least 75% green)
- b. Reduced cost of service (\$/MBTU basis)
- c. Fully funded modernization projects at specific installations (no partially modernized or incomplete projects)
- d. Long-term and sustained program

### 3.3.8 Milestones (actions by FY)

Prioritize installations	FY08
Prepare modernization proposals	FY08-09
Modernize top priority installations	FY10-14
Modernize remaining installations	FY15-20
Review condition of CES and modernize to meet future standards and requirements	FY21-30

## Army Energy and Water Campaign Plan for Installations

### ***Initiative #3: Reduce dependence on fossil fuels***

#### **3.4 Action #4: Reduce on-site fossil fuel use for building space heating and domestic hot water.**

This action addresses the reduction of fuel oil as a primary heating fuel in existing buildings through increased use of life-cycle cost-effective renewable technologies.

Fuel oil will continue to become increasingly unattractive as a building heating fuel. Fuel oil heating equipment is energy inefficient and maintenance intensive. As the cost of fossil fuels continue to rise and renewable energy costs continue to decrease, the Army must strive to eliminate fuel oil usage as much as practical. Presently heating fuel oil accounts for 12% of Army thermal energy usage.

Ground-source heat pumps (GSHP) have become a proven technology that can have a large impact on fossil fuel (particularly natural gas) usage in existing buildings. Many Army installations have well-sited buildings with adequate space and/or parking lots for ground-loop installations. Historically, high initial costs have prevented GSHP from being considered for HVAC retrofit. However, improvements in GSHP technology and techniques, increased usage of GSHP, and the recent significant increases in natural gas costs will make GSHP increasingly life-cycle cost-effective as a retrofit for many Army facilities.

Similarly, new, innovative renewable technologies that can easily be retrofitted into existing buildings are continually being developed. At least two of these, passive solar walls and daylighting, have been sufficiently proven to be considered for retrofit into existing Army buildings and should prove to be cost-effective alternatives in many locations.

For implementation of this action, Army policy requiring evaluation of alternatives for reduction of fossil fuel usage for existing buildings needs to be developed. To implement this policy, knowledge of GSHP and other renewable technologies will need to be increased either through training or by partnering with experts or both. Also prior to implementation, assessment tools such as FEDS 5.0 and/or FRESA will be needed to determine the feasibility of implementation at each installation. After feasible alternatives have been determined, there are two possible methods for implementation. Either a centrally-funded implementation plan will need to be developed, or a plan to provide funding assistance for local implementation projects will need to be executed. Local project development and implementation could use ECIP funding and/or third party financing through ESPC or UESC. Centrally-funded assistance would likely be needed to assist installations in development of local projects.

#### **3.4.1 Approaches to Meet Actions and Priorities (S, M, L)**

- a. Reduce on-site fossil fuel use by retrofit of conventional fossil fuel HVAC systems with ground-source heat pumps (GSHP). Many facilities such as barracks, admin buildings, and Army-owned housing are candidates for GSHP. (S)
- b. Retrofit passive solar day lighting and other renewable technology retrofits such as solar hot water heating and/or transpired solar walls into existing buildings where appropriate. Conduct LCC analysis to screen data and technology. Conduct on-site assessments for top candidates. (S/M)
- c. Eliminate fuel oil as the primary fuel for building heating. Initially validate data and establish existing heating system types. Assess LCC effective alternatives, prioritize requirements, and execute program. (L)

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### 3.4.2 Technologies and Tools Required

Installations will need GSHP, day lighting, and passive solar expertise to determine site feasibility. Installations will also need a life-cycle cost-effective-based assessment tools such as FEDS and FRESA to determine LCC-effectiveness.

### 3.4.3 Policies, Management, and Institutional Issues

Army policy has established a standard for minimum energy efficiency for new construction. A similar standard will be established for minimum energy efficiency for existing buildings similar to requirement for new buildings. A database of energy conservation measures to be evaluated for retrofit projects will also be established.

The Army will include discussion of GSHP or other renewable retrofit technologies in the curriculum for installation energy manager training and will collaborate with knowledgeable experts from DOE national labs or industry to assist with assessment and project development.

The Army will establish policy to eliminate fuel oil as the primary fuel for building heating unless a waiver (approved by ACSIM or IMCOM region) is justified due to lack of alternatives. It is recognized that there may be isolated instances where there is not a current cost-effective alternative to use of fuel oil for building heating. Fuel oil heating equipment is maintenance intensive. Lack of adequate maintenance on fuel oil heating equipment exacerbates the poor energy efficiency of this equipment.

The Army will establish a goal to reduce fossil fuel use for heating by 50% by FY 2030, from a baseline of FY 2003. The reduction of unnecessary consumption and increase in efficiencies of buildings and facilities combined with development of alternative fuels can have a significant impact on the overall use of fossil fuel for heating.

### 3.4.4 Specific Projects to Meet Action

An evaluation will be performed to determine the minimum energy efficiency standards for existing buildings based on the type of facility and the climate zone. Once this standard has been determined, a database of potential / proven energy retrofit alternatives for existing buildings will be developed as described in Initiative #2. An assessment tool such as FEDS will be used to evaluate buildings at each installation to determine which retrofit alternatives from the database are life-cycle cost-effective. Individual projects will be developed using the database of alternatives to bring existing buildings up to the minimum energy efficiency standard. Once the projects are identified and developed, a determination will be made regarding the best method for implementation of feasible retrofits – either through centrally funded program or through assistance to installations for local project development for implementation of feasible alternatives.

### 3.4.5 Funding Strategies and Sources

The funding strategy for implementation of feasible retrofits at each installation depends on the determination of best method at the time installation projects are identified and developed. The least cost of central funding would be to provide central funding to assist installations in development of local projects. Local projects could be executed using third party (ESPC/UESC) financing or ECIP funds if qualified. A centrally-funded program for project implementation will be established only if it is determined that a centrally-funded program would be the most successful approach.

## Army Energy and Water Campaign Plan for Installations

Central funding can be used for development of minimum energy efficiency standards for existing buildings and development of a database of potential / proven energy retrofit alternatives. Funding requirements for this action will be minimal. To the maximum extent possible, the Army will partner with DOE to share information and help defray costs. Training in renewable retrofit technologies or for technology expert partners will also be a low-cost centrally-funded action.

Central funds will also be provided for development/fielding of an assessment tool (such as FEDS) and determination of feasible retrofit alternatives at each installation. This action will require POM programming. Unless already programmed, the next POM cycle is FY10-15 to incorporate new projects or changes to the existing funded project list.

### 3.4.6 Description of End State

Wherever determined to be life-cycle cost-effective, Army building heating/cooling systems will be converted to GSHP. Not only will implementation of this action alone dramatically reduce the Army's consumption of fossil fuels, it will greatly reduce the Army's overall building energy usage. Additionally, utilizing the database of potential / proven energy retrofit alternatives, the Army will install all life-cycle cost-effective solar HW systems, solar walls for hangars & warehouses, solar pool heating, day lighting, and other renewable retrofit technologies in existing buildings. The Army will no longer use fuel oil as the primary fuel for building heating needs. Existing buildings that utilize fuel oil for heating will be converted to alternate heating fuel and/or system. Execution of these actions will allow the Army to meet a minimum energy efficiency standard for all of its existing buildings.

### 3.4.7 Metrics of Success

- a. Successful development of retrofit database for existing buildings (from Initiative #2).
- b. More than 95 percent of installations with completed assessment of feasible renewable technology retrofits.
- c. More than 70 percent of installations with implemented renewable retrofits.
- d. More than 50 percent of Army energy usage from renewable sources
- e. Less than 3 percent of Army energy usage for heating fuel oil.
- f. Less than 20 percent of Army energy usage fossil fuels for heating
- g. Compliance with new energy consumption (efficiency) standards for existing buildings per the requirements of the Energy Policy Act of 2005.

### 3.4.8 Milestones (actions by FY)

Establish policy changes. Develop database and provide training of renewable energy retrofits. Apply assessment tool such as FEDS for determining feasibility at each Installation. (Minimal funding)	FY08
Determination of retrofits feasible at each installation	FY09-10
Development and execution of implementation projects for top 50% ranked by SIR or overall impact to Army energy consumption. Develop and execute projects to reduce heating fuel oil usage to no more than 5% of Army energy usage.	FY10-15
Develop and implement remaining projects to eliminate heating fuel oil usage and reduce fossil fuel use for heating by 50%.	FY13-30

## Army Energy and Water Campaign Plan for Installations

### ***Initiative #3: Reduce dependence on fossil fuels***

#### **3.5 Action #5: Reduce fossil fuel usage in non-tactical vehicles (NTV)**

The Army must increase the use of Alternative Fuel Vehicles (AFV) for non-tactical purposes in order to meet Public Law and Executive Order requirements, reduce dependence on petroleum from foreign sources, increase energy security with diversification, free up existing petroleum supplies for the war fighter, and improve air quality (reduce CO, NO<sub>x</sub>, and Ozone Forming Potential, OFP).

The Federal Energy Policy Act of 1992 (EPAAct) defines an alternative fuel as any fuel that is substantially non-petroleum and yields energy security and environmental benefits. EPAAct recognizes the following as alternative fuels:

- a. Alcohol fuels such as methanol (methyl alcohol), denatured ethanol (ethyl alcohol) and other alcohols, in pure form (called “neat” alcohols) or in mixtures that contain no less than 70 percent alcohol fuel
- b. Compressed Natural Gas (CNG)
- c. Electricity
- d. Hydrogen
- e. Liquefied Natural Gas (LNG)
- f. Liquefied Petroleum Gas (LPG)
- g. Coal-derived Liquid Fuels
- h. Fuels other than alcohols derived from biological materials: like soybean, rapeseed and other vegetable oil-based fuels

In January 2001, the Biodiesel Final Rule made it possible for fleets to earn EPAAct credits for use of biodiesel blends of at least 20%. This rule does not make B20 (a 20% blend of biodiesel with diesel) an alternative fuel, but gives one credit for every 450 gallons of pure biodiesel used in biodiesel blends.

Note that clean fuels must be combined with advanced emission control technologies. Gasoline has been favored because of its high energy content per volume. Alternative fuels require more frequent refueling (less miles per gallon rating).

#### **3.5.1 Approaches to Meet Actions and Priorities (S, M, L)**

Work in cooperation with GSA and other federal agencies to promote and procure alternative fuel vehicles for non-tactical applications. Specifically, the Army will support this action through:

- a. the use of alternative fuels in light, medium, and heavy-duty vehicles (S);
- b. the acquisition of vehicles with higher fuel economy, including hybrid vehicles (S);
- c. the substitution of cars for light trucks (S);
- d. an increase in vehicle load factors (use smallest sized vehicles appropriate) (S);
- e. a decrease in vehicle miles traveled (M);
- f. a decrease in fleet size (M); and
- g. use of fuel cell cars to support the transition to hydrogen economy (L).

When selecting alternative fueled vehicles for use by an activity the organization must consider the state of the technology, current and potential refueling infrastructure, the available supply of fuel, and environmental, health & safety knowledge.

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### 3.5.2 Technologies and Tools Required

The Army will require development of a Motor Vehicle Management Information System to capture NTV and Base Level Commercial Equipment (BCE) and fuel use by type.

### 3.5.3 Policies, Management, and Institutional Issues

#### **Energy Policy Act of 2005**

The Energy Policy Act of 2005, Section 703 “Use of Alternative Fuels by Dual- Fuel Vehicles” requires Section 400AA(a)(3)(E) of the Energy Policy and Conservation Act (42 U.S.C. 6374(a)(3)(E)) to be amended to read as follows:

“Dual fueled vehicles acquired pursuant to this section shall be operated on alternative fuels unless the Secretary determines that an agency qualifies for a waiver of such requirement for vehicles operated by the agency in a particular geographic area in which

- a. The alternative fuel otherwise required to be used in the vehicle is not reasonably available to retail purchasers of the fuel, as certified to the Secretary by the head of the agency; or
- b. The cost of the alternative fuel otherwise required to be used in the vehicle is unreasonably more expensive compared to gasoline, as certified to the Secretary by the head of the agency.”

The Secretary [of Energy] shall monitor compliance with this subparagraph by all such fleets and shall report annually to Congress on the extent to which the requirements of this subparagraph are being achieved. The report shall include information on annual reductions achieved from the use of petroleum-based fuels and the problems, if any, encountered in acquiring alternative fuels.

In addition, Section 303(c) of the Energy Policy Act of 1992 (42 U.S.C. 13212(c)) is amended by striking ‘may’ and inserting ‘shall’.

#### **The Energy Policy Act of 1992, (EPAct 1992)**

EPAct 1992 requires federal agencies when acquiring by purchase or lease EPACT covered vehicles, that 75 percent of those EPACT covered vehicles be alternative fueled vehicles (AFV).

#### **Executive Order 13423 “*Strengthening Federal Environmental, Energy, and Transportation Management*” (EO 13423)**

EO 13423 requires each agency to: Increase use of Alternative Fuel in Alternative Fuel Vehicles at a rate equal to 10% greater than the previous year; reduce NTV Petroleum Consumption 2% per year relative to 2005 baseline through 2015, and use the Federal Automotive Statistical Tool (FAST) to report vehicle and fuel data.

#### **The National Defense Authorization Act of 2002 (Public Law 107-107)**

Public Law 107-107 requires that only hybrid vehicle light duty trucks are acquired for those fleets that are not covered by EPACT. In addition, five percent of the EPACT covered trucks procured in FY 05 and FY 06 were and are to be hybrid. Ten percent of the EPACT covered trucks procured in FY 07 and beyond should be hybrid trucks.

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## **Proposed Policy Changes**

Ensure that Army NTV Policy clearly articulates the requirements and methodologies to meet Public Laws and Executive Orders.

Ensure that Army establishes a Motor Vehicle Management Information System to capture vehicles types and sizes, alternative fuel type, alternative fuel used, and other related information by activity and installation. This system should capture Base Level Commercial Equipment (BCE) activity and fuel use, too.

Ensure that Army Policy requires the use of The Federal Automotive Statistical Tool (FAST). Executive Order 13423 requires FAST use by all Federal Agencies. This web based system, is the mechanism to record the number of AFV on hand and projected for an activity. In addition, the system permits the activity to update, annually, the amount of fuel used, by type. The data collected by FAST can be used to support other NTV/BCE program metrics.

Work with GSA to ensure that their policies do not negatively impact the implementation of transportation options that reduce oil use.

## **Management Issues**

To support the use of AFV, installations could arrange for fueling at commercial facilities that offer alternative fuels for sale to the public. Installations could team with state, local, and private entities to support the expansion and use of public access alternative fuel refueling stations or use the authority granted to them in section 304 of the Energy Policy Act of 1992 to establish nonpublic access alternative fuel infrastructure for fueling Federal AFV where public fueling is unavailable. Encourage AAFES to offer Alternative Fuels on Installations. Build the installation NTV fleet around a particular alternative fuel for maximum effect.

### **3.5.4 Specific Projects to Meet Action**

- a. Continue to work with GSA to provide hybrid & fuel efficient vehicles on lease
- b. Encourage the Army and Air Force Exchange Service (AAFES) to offer alternative fuels at their commercial fueling stations.
- c. Develop Army policy to reduce fossil fuel use in NTV.
- d. Explore new technology for hydrogen economy and assess potential benefits to Army. Establish a hydrogen refueling site at West Point, secure the hydrogen vehicles from the private sector and assess potential benefits.
- e. Replace sedans and work trucks with electric or motorized carts.

### **3.5.5 Funding Strategies and Sources**

Continue to use a surcharge for all Army NTV users to generate funding for reaching AFV goals.

### **3.5.6 Description of End State**

- a. All non-tactical vehicles are either AFV or hybrid vehicles.
- b. GSA provides complete fleet of hybrid and/or alternative fuel vehicles.
- c. Use of small and ultra-efficient cars.
- d. Smart base design to reduce transportation needs.

### **3.5.7 Metrics of Success**

- a. At least 30 percent of leased vehicles are hybrid and/or high mpg.

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- b. At least 80 percent of NTVs are alternative fuel vehicles.
- c. Average EPA fuel economy rating of non-tactical vehicles above 30 mpg.
- d. Attainment of Executive Order 13423 and Energy Policy Act of 2005 requirements.

### 3.5.8 Milestones (actions by FY)

30% hybrid /high mpg /alternative fuel NTV	FY10
80% hybrid /high mpg /alternative fuel NTV	FY15
100% hybrid high mpg /alternative fuel NTV	FY30

# Army Energy and Water Campaign Plan for Installations

# Army Energy and Water Campaign Plan for Installations



# Army Energy and Water Campaign Plan for Installations

## **Initiative #4: Conserve water resources**

*Reduce water use to conserve water resources for drinking and domestic purposes.*

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## Army Energy and Water Campaign Plan for Installations

### ***Initiative #4: Conserve water resources***

#### **4.1 Action #1: Assess the current water use, costs, and availability at Army installations to prioritize sites for analysis of water conservation opportunities.**

##### **4.1.1 Approaches to Meet Actions and Priorities (S, M, L)**

Understand the current state of water use at Army installations and prioritize sites for analysis of water conservation opportunities.

- a. Develop baseline per capita full time equivalents, taking into account National Guard and Reserve Component situations with large population fluctuation. (S)
- b. Meter and track usage by end-use (domestic, irrigation, industrial). (M-L)
- c. Determine water rates (and sewer rates) and whether sites produce water on-site or purchase water from a local utility. (S)
- d. Analyze for potential droughts or water shortages. (S)
- e. Consider commercial value as the value of water at installations where water is produced on-site and estimate commercial value. (M)
- f. Identify uses, quantities and potential for non-potable water. (M)
- g. Investigate feasibility of regional non-potable water system. (L)

##### **4.1.2 Technologies and Tools Required**

This task will require currently available data on building inventory, water use, water rates, and other associated information to be compiled. It will also require an assessment of which water uses could be non-potable or reclaimed water supplies, in place of treated potable water.

##### **4.1.3 Policies, Management, and Institutional Issues**

Current Policies: Executive Order 13423 requires Federal agencies beginning in FY2008 to reduce water consumption intensity, relative to a 2007 baseline, through life-cycle cost-effective measures, by 2 percent per year through FY2015, or 16 percent total by the end of FY2015. The ten best management practices (BMP) for water conservation, which DOE had developed to comply with the now revoked Executive Order 13123 requirement to establish of water conservation goals, are no longer mandatory. However, under DOE implementing instructions, now under development, the adoption of BMPs will be encouraged as indicators of good sound water management practices

##### **Proposed Policy Changes:**

- a. Adoption of BMP's no longer mandated, but encouraged under implementing guidance for E.O. 13423.
- b. Mandate the use of non-potable, reclaimed water for compatible uses such as fire fighting, irrigation, sanitary flushing, etc., when these processes can be supported by appropriate non-potable water distribution systems, unless cost-prohibitive.

For the National Guard and Reserve Components, this policy applies to training centers and Reserve Readiness Centers, which have a minimum of 250,000 square feet of facility space at a single location and are used intermittently.

##### **Management Issues:**

- a. Most installations lack metering.
- b. Lack of specific water conservation numeric target provides no incentive.

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- c. Ability to maintain safety and health requirements of dual water systems.

### **Institutional Issues:**

- a. Water is usually an abundant resource, which most people put little value to until a time of service interruption or shortage.
- b. Public health officials' and residents' acceptance of non-potable water systems that are in close proximity to potable systems without fear of cross-contamination or accidental misuse by installation residents.

#### **4.1.4 Specific Projects to Meet Action**

Completion of the database in the following steps:

- a. Building inventory compiled.
- b. Installation water use compiled.
- c. Water rate information researched and documented.
- d. Identify requirements for non-potable water use.
- e. Drought information researched and compiled regionally and mapped over Army installations.

#### **4.1.5 Funding Strategies and Sources**

Utilize annual SRM funding to assess the current water use, costs, and availability at Army installations for prioritization of sites for analysis of water conservation opportunities. Installations that have competed and “won” the A-76 process will have to secure additional funds to accomplish this. Privatized water distribution would be funded by the owner of the system. Priority for funding projects would be based on ISR Rating, detailed condition assessment, economic analysis, installation priority, any future water needs, and other project justifications.

#### **4.1.6 Description of End State**

Army has a populated database that enables the Army to prioritize efforts for water conservation and a list of prioritized sites for investigation.

#### **4.1.7 Metrics of Success**

Prioritized list of installations at which to conduct water surveys.

#### **4.1.8 Milestones (actions by FY)**

Database completed	FY08
Update water management guidance planning	FY09-30

## Army Energy and Water Campaign Plan for Installations

### ***Initiative #4: Conserve water resources***

#### **4.2 Action #2: Improve the water storage and distribution system integrity.**

**4.2.1 Approaches to Meet Actions and Priorities (S, M, L)** {NOTE: For Army-owned system, the installation has the action; for privatized systems, the system owner is expected to perform these tasks, with the installation providing oversight.}

- a. Map all water systems using GIS. (L)
- b. Perform condition survey of water distribution systems. (M)
- c. Rank system by ISR rating. (S)
- d. Perform periodic leak detection surveys. (S)
- e. Perform required repairs based on survey results. (M)
- f. Upgrade storage and distribution infrastructure to ISR C2 condition. (M)
- g. Conduct continuous commissioning through water balance analyses (see Initiative 1 for metering). (L)
- h. Implement corrosion protection monitoring program. (M)
- i. Provide readily available and easy-to-use mechanisms for installation residents and visitors to report leaks. (S)

#### **4.2.2 Technologies and Tools Required**

Develop Blanket Purchase Agreement-type contract for leak detection services. Program funds for surveying a minimum of 10% of installation water systems per year. Include maintenance and repair of valves, meters, and controls.

Include similar provisions in utility privatization contract actions for water distribution systems.

#### **4.2.3 Policies, Management, and Institutional Issues**

ISR standards for water storage and distribution systems should be updated, so that leaking systems receive an appropriate rating. Metering policies should also be in place that will enable identification of potential leaks. Implement annual water distribution flushing program and continuous program to identify areas of low or inadequate pressure, stagnation, or unusual water losses.

Utility infrastructure construction requirements receive very low priority when competed against other MILCON and SRM projects that directly support the military mission.

#### **4.2.4 Specific Projects to Meet Action**

- a. Identify sites with aging infrastructure.
- b. Train staff on distribution system auditing and leak detection (general knowledge so that staff can work with contractors).
- c. Perform distribution system audits at these sites.
- d. Develop contracts with regional leak detection services.
- e. Perform leak detection and repair leaks.
- f. Institute corrosion control standards.
- g. Update guide specifications to include leak testing in new water distribution system commissioning.
- h. Provide resources to achieve these water management actions.

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### 4.2.5 Funding Strategies and Sources

Utilize annual SRM funding to repair waterline breaks and leaks. Privatized water distribution would be funded by the owner of the system. Priority for funding projects would be based on ISR Rating, detailed condition assessment, economic analysis, installation priority, any future water needs, and other project justifications. Water storage and distribution system upgrades not life-cycle cost-effective would be captured and funded as utility modernization program projects.

### 4.2.6 Description of End State

- a. Less than 1.0% (or the American Waterworks Association standard) leak rate per mile of line.
- b. Replacement of aging infrastructure complete.
- c. Privatized systems will achieve an industry standard level of condition within three to five years of contract award.

### 4.2.7 Metrics of Success

- a. ISR storage and distribution system rated at least C1.
- b. Less than 5 percent leak rate across all sites.

### 4.2.8 Milestones (actions by FY)

100% initial surveys complete	FY11
Repairs complete	FY15
Corrosion programs in place	FY15
System upgrades complete	FY25
Continuous commissioning program in place	FY25

## Army Energy and Water Campaign Plan for Installations

### ***Initiative #4: Conserve water resources***

#### **4.3 Action #3: Increase water efficiency of all plumbing fixtures.**

Water efficiency standards currently in effect were established in the Energy Policy Act of 1992 (Public Law 102-486). The Energy Policy Act of 2005 (Public Law 109-58) did not strengthen water management provisions of EPA 1992 as pertaining to federal facilities.

##### **4.3.1 Approaches to Meet Actions and Priorities (S, M, L)**

###### **New Construction**

Plumbing fixtures, including toilets, urinals, faucets, and showerheads, shall meet or exceed the performance requirements of the Energy Policy Act of 1992, as amended, in all new construction and major renovations. This criteria will meet Leadership in Energy and Environmental Design New Construction (LEED-NC) 2.2 Water Efficiency Credit C 3.2 criteria. Install water meters in all new construction. (S)

###### **Existing Buildings**

For existing buildings, all domestic fixtures shall be replaced to meet provisions of EPA 1992 as amended, which have a simple payback of 10 years or less. In drought or water imperiled areas, maximum payback periods of 15 years may be used for water conservation projects. Phasing in compliant water fixtures over time, as buildings are renovated or rehabilitated, will have less budgetary impact. Install meters in existing buildings during major renovations. (M-L)

###### **All Buildings**

No potable water used for flushing toilets or urinals: either non-water using toilets and urinals or reuse of other water sources (such as gray water) to flush toilets and urinals that use water. This long-term goal requires federal regulatory changes, water industry and building code updating, and a paradigm shift in customer attitudes. (L)

##### **4.3.2 Technologies and Tools Required**

The key technology that is essential to making the action item a success is identification of cost-effective domestic fixtures that surpass EPA 1992 standards for toilets, urinals, faucets, and showerheads. Water-using appliances, such as clothes washers and dishwashers will be included and they should be at a minimum meet Energy Star® criteria.

Examples of current fixtures that exceed EPA 1992 Standards are 1.0 gallon per flush pressure assisted toilets, dual flush toilets, 0.5 gallon per flush urinals, waterless urinals, composting toilets, ultra-low flow faucets and showerheads that have a flow rate less than 1.8 gallon per minute. For clothes washers, these include horizontal axis washers that are Energy Star® rated.

Develop or identify an industry-based training program for repair and maintenance of water efficient fixtures and appliances to maintain these devices in peak performance.

###### **Acceptable Materials List**

The Army should collaborate with the other services, the Department of Energy and General Services Administration to participate in developing a technology database or approved purchase list of appropriate and well-performing plumbing fixtures. This list would provide the specifications and standards to assist sites in purchasing domestic fixtures that will have overall

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good performance and exceed EPA 1992 Standards. The list should also provide typical cost information and economics of the fixtures. This list will help Army installations make well informed decisions when purchasing domestic fixtures.

### **Prioritized Projects for Retrofits**

Installations that are good candidates for fixture replacement should be identified (as described in Action 4.1). This list should be based on which sites have expensive water rates, drought conditions, or other likely water supply constraints either currently or in the future. Audits can then be performed at these sites to determine the most appropriate fixture replacement.

### **Background Information**

To help determine which fixtures are appropriate for Army installations, there are current performance tests and “approved lists” offered by water utilities. For example, for toilets, the *Maximum Performance Testing of Popular Toilet Models* is an example of a study that identifies the actual performance of a variety of different toilet models and grades each model based on a standardized testing procedure. This study includes 1.0 gallon per flush toilets as well as dual flush toilets. (Information can be found at: [http://www.cuwcc.org/products\\_tech.lasso](http://www.cuwcc.org/products_tech.lasso))

Similar information should be researched or developed for the other domestic fixtures; urinals, showerheads, and faucets; so that Army planners and designers have guidelines for new construction, installation, and retrofit. For example, information should be researched on the performance and maintenance of no-water urinals so that decision makers can determine where this fixture is appropriate for the Army installations.

### **4.3.3 Policies, Management, and Institutional Issues** **Energy Policy Act of 2005**

The requirements of the Energy Policy Act of 2005 on this Action include:

Section 131: “Energy Star® Program”. The provisions of this section include:

- a. The Energy Star® program ([www.energystar.gov](http://www.energystar.gov)) will be codified and the responsibility will be divided between the Environmental Protection Agency (EPA) and DOE.
- b. Energy Star® product criteria will be regularly updated and appropriate lead-time be provided prior to the effective date for new or significant revisions to a product category.
- c. DOE shall establish new Energy Star® qualifying levels for clothes washers and dishwashers effective by January 1, 2007. DOE shall establish new Energy Star® qualifying levels for clothes washers by January 1, 2008, to be effective by January 1, 2010.

Section 136: “Energy Conservation Standards for Commercial Equipment” requires DOE to engage in rulemaking to create national energy efficiency standards for a number of commercial appliances and equipment. These products include packaged air conditioning and heating equipment; various types of commercial refrigerators, freezers and refrigerator-freezers; commercial ice makers; and commercial clothes washers. See [http://www.eere.energy.gov/buildings/appliance\\_standards/](http://www.eere.energy.gov/buildings/appliance_standards/).

### **Management and Institutional Issues**

After the Acceptable Material List is developed, a policy will be established that requires all new construction and major retrofits to install domestic plumbing fixtures that exceed the efficiency standards established in the Energy Policy Act of 1992, as amended. Performance standards and

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cost-effectiveness can help make the case for this requirement. As a long-term goal, establish a policy that requires the Army to use only reclaimed sources of water for flushing toilets and urinals, or to use non-water using toilets and urinals.

New fixtures may have different operations and maintenance requirements than standard conventional fixtures. Education and training of staff may be needed to install and maintain these fixtures. Staff must understand any new requirements and how to best apply them to their particular location.

### 4.3.4 Specific Projects to Meet Action

- a. Research well performing fixtures and translate these into generic specifications that define good performance. (The purchase of specific name brands cannot be required.)
- b. Research typical federal costs for fixtures that meet these standards.
- c. Develop economic guidelines that reveal typical life-cycle cost-effectiveness of fixtures.
- d. Institute use of list that provides the specifications for well-performing fixtures.
- e. Establish policy that requires the use of fixtures that meet these standards.
- f. Measure compliance by addressing requirement in installations' annual report submittals.

### 4.3.5 Funding Strategies and Sources

Funding requirements for developing and disseminating Army efficiency standards for plumbing fixtures and disseminating government standards to Army installations are provided within the Office of the Assistant Chief of Staff for Installation Management operating budget. The expense to research federal plumbing efficiency requirements and availability of fixtures that meet those requirements would be included within costs for administrative actions listed in action 4.1. The replacement of existing fixtures with water efficient fixtures will be executed as part of the SRM program.

### 4.3.6 Description of End State

- a. Acceptable Materials List is developed and available to installations
- b. Policy is in place that requires use of fixtures that meet standard
- c. All fixtures exceed EPA 1992 or current standard
- d. No potable water used to flush toilets and urinals

### 4.3.7 Metrics of Success

The penetration rate of fixtures that exceed EPA 1992 standards is 20% by FY 2015, 50% by 2020, and 100% by FY 2025. This will require a reporting requirement by installations on the implementation of plumbing fixtures.

### 4.3.8 Milestones (actions by FY)

Identify fixture standards and Acceptable Materials List developed and policy in place	FY08
25% existing facilities meet criteria	FY15
50% existing facilities meet criteria	FY20
100% existing facilities meet criteria	FY25
SRM funds are expended on water efficient fixtures	FY09-30

## Army Energy and Water Campaign Plan for Installations

### **Initiative #4: Conserve water resources**

#### **4.4 Action #4: Limit potable water used for irrigation and increase use of native plants in landscapes.**

##### **4.4.1 Approaches to Meet Actions and Priorities (S, M, L)**

- a. Conduct surveys and develop prioritized list of installations (specify minimum acres) where water saving landscaping techniques are required. (S)
- b. Develop regional water saving landscaping plans with recommended plant list and water management plan requirements. (M)
- c. Develop O&M performance contract that emphasizes water efficiency. (S)
- d. Apply principles of water saving landscaping. (M)
- e. Reuse water from other sources (reclaimed effluent). Develop standard design for “gray-water”/reclaimed water systems for new and renovated buildings. (L)
- f. Install rain sensor switches on all irrigation controlled systems to prevent unnecessary irrigation when natural rainfall is occurring. (S)
- g. Develop and adopt water restriction landscape irrigation policies when drought conditions or limited water resources exist. (M)
- h. Institute community awareness, education, incentives and rebates. (M)
- i. Implement rainwater harvesting where appropriate and utilize non-potable sources (wells, surface, building cisterns, etc.). (L)

##### **4.4.2 Technologies and Tools Required**

Treatment, storage and distribution system materials and technologies are needed for reclaimed sanitary wastewaters to be reused as an irrigation water source or a separately piped sanitary flushing system. The system must be designed, constructed, operated and maintained in such a manner that human health is protected while irrigation and sanitary needs are satisfied. Small, dispersed reservoirs or cisterns, as well as larger, centralized storm water management ponds, should be evaluated.

An established methodology is needed to allow work crews to readily identify the reclaimed water piping system in the field if uncovered. A positive protection system from accidental cross connection to a potable water system is also needed.

##### **4.4.3 Policies, Management, and Institutional Issues**

Current Policies: AR 200-1, *Environmental Protection and Enhancement*, states that Army activities will evaluate the use of innovative / alternative technologies for the treatment of wastewater. Reclamation of treated wastewater for irrigation purposes in place of potable water certainly supports this mandate. AR 200-3, *Natural Resources – Land, Forest and Wildlife Management*, requires a comprehensive approach in designing and maintaining the built environment to minimize, as much as possible, landscaped areas requiring irrigation and grounds maintenance, in keeping with the military mission and aesthetic values. Native and low maintenance plants are preferable. Irrigation, using treated potable water, will not be used in arid areas to create or maintain environments to grow non-arid plants. Arid and semi-arid installations will make use of desert and low moisture (xeric) landscaping materials. Irrigation in arid areas will be limited to select high visibility areas or where required to maintain vegetative cover for a designated use (such as a golf course).

## Army Energy and Water Campaign Plan for Installations

Water saving landscaping plans need not be separate documents from installation water management plans. Depending on the location and specific landscaping and irrigation situation, these considerations could likely be included in an installation’s water management plan. Landscaping considerations must be consistent with the Installation Design Guide and sustainability considerations.

### 4.4.4 Specific Projects to Meet Action

- a. Ensure Installation Design Guides adequately address minimization of water usage for landscape considerations.
- b. Develop criteria for determining where water saving landscaping techniques will likely be cost-effective.
- c. Installation plans addressing low water landscape considerations are in place.
- d. O&M contracts that emphasize performance and water efficiency are in place.
- e. Low water usage landscaping training developed and disseminated on periodic basis.
- f. Low water usage landscape principals and practices in place.
- g. Water reuse, rainwater harvesting, rainfall sensor irrigation controls, and other techniques in common practice.

### 4.4.5 Funding Strategies and Sources

Use annual SRM funding to repair and maintain existing irrigation systems or replace with high efficiency systems and re-vegetate planting areas with native low-water using plants. Privatized housing areas would be funded by the owner of the system. Priority for funding projects would be based on ISR Rating, detailed condition assessment, economic analysis, installation priority, any future water needs, and other project justifications.

### 4.4.6 Description of End State

No sites use potable water for irrigation, except at sites where use of non-potable water for irrigation is demonstrated to be cost-prohibitive. High water efficiency practices in use at all installations.

### 4.4.7 Metrics of Success

- a. Penetration of efficient technology is 20% greater than previous reporting period.
- b. Reduction in the amount of potable water used in irrigation is 20% more than the previous year.

### 4.4.8 Milestones (actions by FY)

Evaluate sites for likelihood of cost-effectiveness of irrigation and water saving landscaping measures	FY08
All sites where water saving landscaping and irrigation measures show to be cost-effective have plans that address implementation	FY10
50% of sites have implemented best management practices for landscaping and irrigation	FY15
75% of sites have implemented best management practices for landscaping and irrigation	FY20
100% of sites have implemented best management practices for landscaping and irrigation	FY25

## Army Energy and Water Campaign Plan for Installations

### ***Initiative #4: Conserve water resources***

#### **4.5 Action #5: Increase efficiency and reduce losses in process water use (cooling towers, equipment that uses single pass cooling, boiler/steam systems, vehicle wash station, construction)**

##### **4.5.1 Approaches to Meet Actions and Priorities (S, M, L)**

- a. Audit process water use at installations. (S)
- b. Increase efficiency for cooling towers and boiler/steam systems with water treatment and automatic systems. (M)
- c. Institute a policy that restricts the purchase of systems that use single pass cooling. (S)
- d. Replace single pass cooling with closed loop systems and evaluate alternative treatment and operational processes that reduce blow down and make-up water. (M-L)
- e. Use high pressure/low volume nozzles in vehicle wash stations. (M)
- f. Reuse water in vehicle wash stations. (M)
- g. Minimize water use soil compaction for construction without compromising structural integrity of the roadbed or the service life of the finished ; replace with mechanical tamping. (S)

##### **4.5.2 Technologies and Tools Required**

A water management guide should be developed that addresses water chemistry issues, blow down, and proper selection of water using appliances. The guide should also discuss uses of water to be avoided and provide substitute methods of accomplishing same task. Redevelop and/or update a guide specification for contracting industrial water treatment programs at installations.

##### **4.5.3 Policies, Management, and Institutional Issues**

A policy will be established to prevent the use of single pass cooling systems using potable water and require replacement by FY 2010 using a phased approach (see below). A policy should also be developed to prevent the use of water for soil compaction on construction projects. Review design guidance for wash racks and stations to ensure water efficient design techniques are incorporated. Ensure that, as Army Regulations change and content is reduced, technical information and requirements are available in an appropriate format to guide proper operation of water systems, such as blow down and water chemistry techniques and programs for boiler/steam systems and cooling towers.

##### **4.5.4 Specific Projects to Meet Action**

- a. As part of general facility maintenance, plan for the removal and replacement of single pass cooling systems. Many of these may be “equipment in place” and not belong to the DPW. New and innovative techniques have been tried to reduce the amount of cooling tower blow-down, such as ozone treatment vs. chemical treatment. See policies above to address this problem. A phased program starting in FY 2008 and ending in FY 2012 to replace single pass cooling equipment (20% per year).
- b. Establish formal industrial water treatment program addressing cooling towers and water based conditioning systems.
- c. Establish an equipment/water conservation measure auditing program or expand current and/or proposed energy auditing programs to include water conservation audits.

## Army Energy and Water Campaign Plan for Installations

### 4.5.5 Funding Strategies and Sources

The Army will take advantage of any federal water-specific ESPC. If not available at the federal level, the Army should work with the other services to establish a water-specific ESPC that would be a vehicle to implement these types of projects that typically have high first cost. Require contractors and privatized utility systems to meet requirements as part of regular program. Establish a funding stream for systems that are not equipment in place, not privatized, and not contracted out. Funds should be \$4M per year FY 2009 thru FY 2013 to replace single pass equipment and implement effective industrial water treatment programs. Up to \$2M per year FY 2008 through FY 2012 could be spent on conducting comprehensive audits of water using systems.

### 4.5.6 Description of End State

- a. Prioritized list of installations with critical need for upgrades of systems that use process water.
- b. Policy in place that restricts the purchase of systems that use single pass cooling.
- c. All single pass cooling replaced by closed-loop systems.
- d. Functioning program for water treatment in cooling towers and boiler/steam systems at installations.
- e. All tactical and commercial vehicle wash stations are closed systems.
- f. Policy in place that limits and restricts the use of water in construction.

### 4.5.7 Metrics of Success

Increasing percentage of process water equipment replaced with new, more energy efficient, less water consuming equipment.

### 4.5.8 Milestones (actions by FY)

Policy changes implemented and sites identified with large potential for savings in process water using equipment	FY08
Water system audit program complete	FY12
All central vehicle wash facilities (tactical) converted to recycle water	FY16
All on-post vehicle wash facilities (including commercial) recycle water	FY22
Single pass cooling equipment out of inventory, industrial water program established at all installations	FY08-30

# Army Energy and Water Campaign Plan for Installations

## ***Initiative #4: Conserve water resources***

### **4.6 Action #6. Prioritize projects and develop implementation strategies**

#### **4.6.1 Approaches to Meet Actions and Priorities (S, M, L)**

- a. Compile results of water audits to develop a list of viable projects. (S)
- b. Identify financing options for projects (SRM, ECIP, UESC, ESPC, BPA, and EUL). (M)
- c. Develop a prioritization and evaluation tool for water saving projects with projected minimum of 2% reduction in potable water use per year. (S)
- d. Pursue bundling water saving measures with other energy conservation measures in ESPC and UESC projects. (S)
- e. Enhance financing of projects (S)
  - i. Provide incentives for and expand the recognition of water conservation achievements in the Secretary of the Army Energy and Water Management Award Program.
  - ii. Identify utility rebate programs.
  - iii. Identify other Federal Agency/state grant opportunities.

#### **4.6.2 Technologies and Tools Required**

Use the IMCOM Project Prioritization System (PPS) to capture water project requirements. Modify the PPS if necessary. Improve use of ESPC and UESC to implement water conservation projects, such as bundling water saving measures with those saving energy commodities with higher unit costs. Consider and pursue all viable financing and contracting tools to complete water projects. Communicate water management success stories on the Army Energy Program website.

#### **4.6.3 Policies, Management, and Institutional Issues**

OACSIM, IMCOM and Army installations shall evaluate the criteria for prioritizing water projects against other types of energy conservation projects. Water efficiency projects typically compete poorly against other installation projects for funding, mainly because of the relatively low cost of water in most locations. To improve life-cycle cost-effectiveness of water conservation projects, specific escalation rates for water should be developed and used in determining the life-cycle cost analysis of water saving projects. Currently, the NIST Annual Supplement to Handbook 135, *Energy Price Indices and Discount Factors for Life-Cycle Cost Analysis* does not contain factors for the commodity of water, water is simply considered as non-energy cost. Escalation rates for water should increase faster than those for energy commodities, to portray greater worth in the future value of water.

The method for prioritizing water projects should be based on the economic analysis, site level priority, and future water needs. The current PPS criteria for prioritizing projects are not suitable for water conservation projects and must be reviewed and updated.

#### **4.6.4 Specific Projects to Meet Action**

- a. Identify/establish a project tracking and prioritization system. (IMCOM HQ)
- b. Install metering and establish a baseline.
- c. Complete necessary project documentation (i.e., DA Form 4283 Work Request and/or DD Form 1391). (Installation or organizations that identified the project).
- d. Compile list of current viable water projects (IMCOM Regions and Installations).

## Army Energy and Water Campaign Plan for Installations

- e. Projects entered into the Priority Placement System (PPS).
- f. Update list when audits have been completed and additional projects have been identified.
- g. Program Objective Memorandum (POM) Submission completed and updated annually.
- h. Provide incentives for building occupants to reduce potable water usage.

### 4.6.5 Funding Strategies and Sources

The costs to actually prioritize projects and develop implementation strategies will be minimal. Installations will need to select the best and most appropriate funding sources (i.e., SRM, ECIP, UESC, ESPC, EUL, and MCA) for programmed projects. Determine funding priorities on the economic analysis, installation priorities, future water needs and other project justifications. Identify and take advantage of rebates being offered by water service providers. In addition to rebates potentially available from water service providers, installations may be able to free up water funding when their water and waste water services are from the same provider. If waste water treatment costs do not take into consideration the volume of water used for landscaping or other processes that divert used water from treatment, the provider may agree to reduce costs billed for treatment.

### 4.6.6 Description of End State

- a. Tools in place and funding plans developed for water projects at site level.
- b. Plans and strategies developed and in place for improving water use efficiency.

### 4.6.7 Metrics of Success

- a. Increase by 20% the amount of funding invested in water projects annually.
- b. Reduce per capita water use by 20 % over next 10 years.

### 4.6.8 Milestones (actions by FY)

Secretary of the Army Energy and Water Management Awards program revised to put increased emphasis on water saving initiatives	FY08
Financing guide developed	FY08
Prioritized project implementation	FY08-FY25

## Army Energy and Water Campaign Plan for Installations

### ***Initiative #4: Conserve water resources***

#### **4.7 Action #7: Develop technical standards and training to facilitate project development and implementation.**

##### **4.7.1 Approaches to Meet Actions and Priorities (S, M, L)**

Develop technical performance guidance based on: (S)

- a. Installation Design Guide Updates
- b. LEED
- c. Technical Assistance / Design review

Expand installation energy manager training programs to support water management requirements of this Campaign Plan. (S-M)

Although elements of this action are closely related to those covered in actions discussed in earlier sections of this Campaign Plan, such as those on efficient design and energy manager training, they are addressed in this section to increase focus on water management programs.

##### **4.7.2 Technologies and Tools Required**

Training for specific areas will need to be developed that should support the varying needs and budget constraints of the installations and their personnel. This program should join forces with other government agencies (such as DOE/FEMP and EPA), industry, and local utilities in developing and providing this training. The CEM training/certification is excellent in developing energy managers, but there is not an equivalent training/certification for water managers. The Water Resource Management Course provided by DOE/FEMP is a good training example.

##### **4.7.3 Policies, Management, and Institutional Issues**

The Army will adopt qualification standards established by DOE and/or EPA for all the various personnel currently accomplishing or being hired to accomplish water management responsibilities at installations. Where non-existent, the Army will collaborate with DOE, EPA and the other Defense Services to develop these qualification standards. A certification program for energy managers with specialization in water issues will be instituted. Technical performance guidance will be established for possible inclusion in IDG updates, landscape plans, water and/or water management plans. Require that energy/water managers also get LEED AP certification along with CEM certification.

##### **4.7.4 Specific Projects to Meet Action**

- a. Identify knowledge, skills, and abilities for various personnel performing water resource management.
- b. Develop/identify technical performance guidance, technical assistance sources, and design review assistance.
- c. Develop/identify water management training and certification program requirements as a special focus area for energy managers.
- d. Develop training plan for installation personnel accomplishing the various water management responsibilities.

## Army Energy and Water Campaign Plan for Installations

### 4.7.5 Funding Strategies and Sources

The level of training and technical assistance provided for an installation and its personnel would be based on site level priority, and any future water needs. Where appropriate, utilize web based technical sources and training to minimize costs. Joining forces with other government agencies, industry, and local utilities in developing and providing training would reduce training costs.

### 4.7.6 Description of End State

- a. All major installation energy managers trained in water conservation issues.
- b. Technical guidance in place on water-related projects, which require same level of detail, economic analysis, performance metrics, and viability as energy projects.

### 4.7.7 Metrics of Success

- a. Increased number of staff trained in water conservation by 10% per year.
- b. Increased number of projects developed, designed and implemented with measurable performance metrics by 20% of the number from the previous year for the next five years.

### 4.7.8 Milestones (actions by FY)

Training and technical guidance identified or established	FY08
KSA established, training plans developed and technical guidance available	FY09
All major installation energy managers trained and certified in water conservation projects	FY12

## Army Energy and Water Campaign Plan for Installations

### ***Initiative #4: Conserve water resources***

#### **4.8 Action #8: Identify water resources for future demands to meet mission critical needs (and plus ups).**

In certain instances, depending on the location and mission criticality of the installation, some installations may find that even implementing all applicable water conservation measures still may not be enough to meet the installation future water demand requirements. In those cases, and as normally part of an installation water management plan, it will be necessary to seek alternate sources of water.

##### **4.8.1 Approaches to Meet Actions and Priorities (S, M, L)**

- a. Identification of critical mission sites where water supplies may be limited or at risk to prioritize Army support efforts and available alternate water supply resources. (S, M, L)
- b. Identification of new and alternate water supplies in the installation region. (S, M, L)
- c. Identification of water reuse/recycling opportunities, rainwater harvesting, gray water techniques and any other possible conservation measurement that may prolong available water resources at the installation. (S, M, L)
- d. Above approaches should be repeated every five years.

##### **4.8.2 Technologies and Tools Required**

Technology and tools required for the implementation of above approaches are:

- a. Financial tools.
- b. Engineering, legal, contracting, and real estate services.
- c. Water processing and distribution related technologies (e.g., water filtration and purification technology, piping, environmental etc.).
- d. Water storage technologies.
- e. Water metering.

##### **4.8.3 Policies, Management, and Institutional Issues**

- a. May require legislation to ease up water rights opportunities for the federal government.
- b. May require tighter management oversight to ensure water conservation measurements are adequately implemented.
- c. Initiative implementation may be affected by limited funding.

##### **4.8.4 Specific Projects to Meet Action**

###### **Develop Army Critical Sites Prioritization List**

Determine:

- a. Sites where supply may be limited or at risk.
- b. Existing water rights.
- c. Possible regional sources of water.
- d. Current and alternate water rates in the region.
- e. Applicable water rights laws and regulations.
- f. Applicable environmental laws and regulations.
- g. When applicable, necessary permits.

###### **Identify Feasible Alternate Water Sources Opportunities**

In those installations/sites that are determined to be mission critical and water supplies are limited or at risk, conduct a life-cycle cost study and determine the installation specific most

## Army Energy and Water Campaign Plan for Installations

feasible, effective, and efficient alternate water sourcing opportunities among the following (but not limited to):

- a. Water conservation, reuse (recycling) opportunities, rainwater harvesting, gray water techniques, and other areas to cut demand in place of finding new supplies.
- b. Possibility of increasing water rights.
- c. Partnering with regional water municipal or state water communities.
- d. Feeding from other close Federal or military facilities with excess water capacity.
- e. Feeding from new and/or alternate water supplies in the region.

### **Identify Funding Strategy**

Based on the result of the identification and viability of alternate water sourcing opportunities section above, determine best funding strategy for implementation of the opportunities. If direct funding is needed, develop schedule of funding request for upcoming and future POM submissions.

### **Develop/Update Water Management Plan**

Based on the research performed to identify critical sites, feasible alternate water sources opportunities, and funding strategy, develop or update, as applicable the critical sites specific water management plans.

### **Obtain Necessary Permits**

Obtain any required real state, environmental, and safety permits.

### **Implement Alternate Water Sources Opportunities**

Once funding is available, implement the identified installation specific most viable, effective, and efficient alternate water sourcing opportunities projects.

#### **4.8.5 Funding Strategies and Sources**

- a. Implement opportunities that installations can implement through the regular operation and maintenance of the installation facilities.
- b. Consider use of ESPC, UESC and ECIP for funding project.
- c. Incorporate direct funding requirements in upcoming POM cycle.

#### **4.8.6 Description of End State**

Increased capability of installation to forecast future water needs, identify water resources or alternative means to meet water demand of mission critical areas is in place.

#### **4.8.7 Metrics of Success**

100% of all Army installations with sustainable water supply.

Increase number/percentage of installations participating in an area-wide regional water planning group and having in place a 25-year project development plan to meet further water demands by an amount 5% greater than previous year for 10 years.

## Army Energy and Water Campaign Plan for Installations

### 4.8.8 Milestones (actions by FY)

Development of Army critical sites prioritization list	FY10
Identification of feasible alternate water sources opportunities	FY11
Identification of funding strategy	FY11
Development/update of Water Management Plan	FY11
Obtain necessary permits.	FY13
Implementation of alternative water sources opportunities	FY15-30
Repeat cycle. *	

\* Because of the continual changes in mission and drought patterns, Army should reevaluate critical sites and their needs for alternate water sources opportunities at least every five years.

# Army Energy and Water Campaign Plan for Installations



## Army Energy and Water Campaign Plan for Installations

### **Initiative #5: Improve energy security**

*Improve the security and reliability of our energy and water systems in order to provide dependable utility service.*

<u>Action</u>	<u>Page</u>
5.1: Institute energy security concepts and methodologies in Army installation management operations.	106
5.2: Implement energy security plans and continuously improve the Army Energy Security Program.	109
5.3: Use current and projected energy sources with greatest potential for availability and economy.	113

## Army Energy and Water Campaign Plan for Installations

### ***Initiative #5: Improve energy security***

Energy security is the capacity to avoid adverse impact of energy disruptions caused either by natural, accidental or intentional events affecting energy and utility supply and distribution systems. Increasing energy security leads to improved reliability. Energy security programs take a different perspective than conventional energy management programs. Whereas energy management programs typically reduce energy consumption and cost, in most cases energy security is viewed as a cost obligation rather than cost avoidance. Cost avoidance or economic benefits of increased energy security are not easily quantified as we typically view baseline conditions as uninterrupted and reliable utility service.

#### **5.1 Action #1: Institute energy security concepts and methodologies in Army installation management operations.**

##### **5.1.1 Approaches to Meet Actions and Priorities (S, M, L)**

- a. Develop energy security survey methodology. (S)
- b. Develop standards for utility system and energy supply reliability. (S)
- c. Develop facilities prioritization methodology. (S)
- d. Update installation energy security plans and water vulnerability assessment and response plans. (M)
- e. Develop economic impact methodology for various energy interruption scenarios.

##### **5.1.2 Technologies and Tools Required**

- a. Energy security plan checklist.
- b. Energy security plan template.
- c. Survey methodology that quantifies apparent reliability.
- d. Energy security cost estimating and planning tool.
- e. Interface with existing facility systems.
  - i. ISR
  - ii. HQEIS
  - iii. Maintenance and repair historic information

##### **5.1.3 Policies, Management, and Institutional Issues**

- a. Army Regulation 420-49, Facilities Engineering Utility Services.
- b. Defense Energy Program Policy Memorandum 92-1, DoD Energy Security Policy.
- c. Army Regulation 525-26, Infrastructure Risk Management.
- d. DoD Directive 3020.40, Defense Critical Infrastructure Program.
- e. DoD Directive 2000.12, DoD Antiterrorism Program.
- f. DoD Instruction 2000.16, DoD Antiterrorism Standards.
- g. Critical infrastructure and facilities standards.
- h. Sensitivity of information contained in energy security plans.
- i. Energy security considerations of privatized utility systems.

##### **5.1.4 Specific Projects to Meet Action**

- a. Develop methodology for conducting energy security vulnerability assessments and remediation plans. Include a cost component to the vulnerability assessment, the potential expense or unacceptable impact of not mitigating the vulnerability in terms of lost service, productivity, operations, health costs, evacuation costs, ability to achieve mission, etc. The methodology needs to account for all potential sources of disruption short of localized, total

## Army Energy and Water Campaign Plan for Installations

destruction (e.g., from hurricane) or global disaster. This will yield a single survey tool that can evaluate both the threat of normal system failure or intentional disruption. Finally, the level of effort for the survey needs to be flexible to account for differing reliability goals – a highly critical facility would naturally require a more in-depth survey than a less critical facility. A dynamic software model to identify vulnerabilities may be appropriate for some applications.

- b. Establish Reliability Standards. A set of reliability requirements based on facility mission needs to be developed. The Army cannot afford for every “critical” facility to achieve the same high level of reliability. However, all facilities have some requirement for reliable energy. The Army needs to develop quantifiable goals for infrastructure based on the mission supported for a broad range of missions. Energy reliability standards will help justify proposed infrastructure improvements.
- c. Identify Critical Facilities. Develop a methodology to identify critical facilities in support of the Defense Critical Infrastructure Program. Prioritize facility types by mission and determine reliability goals for each installation/facility as appropriate.
- d. Develop a value analysis guide to enable installations to select remedial actions on a cost-effective basis. Methodology would include a cost estimating tool to help installations estimate costs for implementing remedial actions.
- e. Trained personnel identify critical assets and analyze vulnerabilities.
- f. Review and update energy security remedial action plans at least annually. Some potential remedial actions may be: secondary feeds from local utility companies; additional on-site generation (power and/or chilled water); redundant paths in the distribution system; diversity of source energy; fuels storage facilities; physical security and hardening measures for existing utilities infrastructure and associated facilities; modification of mission equipment to reduce infrastructure requirements.
- g. Conduct utility interruption tests to determine effectiveness of energy security plans.

### 5.1.5 Funding Strategies and Sources

Development of the survey methodology, reliability requirements and a facility prioritization methodology would be centrally funded. Updating of energy security plans and water vulnerability assessment and response plans is included in installations’ operation and maintenance budget.

### 5.1.6 Description of End State

Consistent understanding of installation level vulnerability/risk baselines, reliability requirements and priorities across installations, Army Commands, regions, subcommands and HQDA.

### 5.1.7 Metrics of Success

- a. Survey methodology developed and disseminated.
- b. Reliability requirements established.
- c. Establishment of facility criticality prioritization based on mission.
- d. Annual assurance that energy security and water vulnerability assessment and response plans are current. Assurance statement will be included in the Internal Control Checklist to be incorporated into the latest rewrite of the consolidated Army Regulation on utilities and energy.

## Army Energy and Water Campaign Plan for Installations

### 5.1.8 Milestones (actions by FY)

Survey methodology developed	FY08
Reliability requirements established	FY09
Facility criticality identification and prioritization methodology	FY09
Annual validation of updated energy security plans and water vulnerability assessment and response plans	FY10-30

# Army Energy and Water Campaign Plan for Installations

## ***Initiative #5: Improve energy security***

### **5.2 Action #2: Implement energy security plans and continuously improve the Army Energy Security Program.**

#### **5.2.1 Approaches to Meet Actions and Priorities (S, M, L)**

- a. Estimate local costs of implementing remedial action requirements. (M)
- b. Regions and Army Commands compile and prioritize installation requirements. (M)
- c. Command review of plans for quality and completeness. (S)
- d. Submit remediation cost requirements into budget. (M)
- e. Local execution of energy security projects. (L)
- f. Incorporate energy security considerations into the design process. (M)
- g. Conduct an annual review on the energy security program and disseminate results to field. (M)
- h. Better equip energy experts at installations to produce quality probabilistic risk analyses. (M)

#### **5.2.2 Technologies and Tools Required**

- a. Project cost estimating tools such as the Micro Computer Aided Cost Estimating System (MCACES) developed by the Corps of Engineers and the Energy Security Cost Estimating and Planning (ESCEP) tool developed by Oak Ridge National Laboratory.
- b. DD Form 1391 Processor System.
- c. Parametric Cost Estimating System (PACES) cost models for vertical construction used for program/budget estimates in the 1391 process.
- d. Remedial Action Cost Engineering and Requirements (RACER) for environmental, ordnance and demolition program estimates.
- e. Building Life-cycle Costing (BLCC) program developed by the National Institute of Standards and Technology for conducting life-cycle cost analysis for construction projects.
- f. Vulnerability Assessment Guide for assisting installation energy experts in preparing and/or reviewing probabilistic risk analyses.

#### **5.2.3 Policies, Management, and Institutional Issues**

- a. Prioritize funding based on mission objectives and threat level requirements.
- b. Assess tenants' share of cost for mitigating vulnerabilities.
- c. Apply new technologies to improve reliability and strength of energy systems, storage tanks and distribution lines.
- d. Staff must be available to interact effectively with designers/contractors to ensure that all energy security issues are adequately addressed.
- e. Institute accountability into the energy security planning process.
- f. Diversify energy requirements through increased use of distributed generation and renewable energy.

#### **5.2.4 Specific Projects to Meet Action**

- a. Incorporate a measure of apparent energy security into the ISR, based on the survey and rating methodology described in Action #1 of this Initiative.
- b. Develop prioritized implementation schedules.
- c. Compile historic cost data related to recent similar energy security projects.
- d. Develop a Vulnerability Assessment Guide to assist installation energy experts prepare/review probabilistic risk analyses either with or without the assistance of consultants.

## Army Energy and Water Campaign Plan for Installations

- e. Develop a comprehensive guide for planning and managing the implementation of remedial actions.
- f. Conduct command reviews of installation execution of energy security plans.
- g. Incorporate energy security considerations into utilities contracts and actions to privatize utility systems.
- h. Meet with utility suppliers and privatized utility service providers at least annually to discuss energy security and reliability considerations of installation utility systems.

### 5.2.5 Funding Strategies and Sources

- a. AT/FP funding.
- b. Potential for energy security improvements bundled with ESPC or UESC funded projects.
- c. Enhanced use lease authority appropriate for local power generating facilities.
- d. Budget for energy security improvements through O&M and MILCON funds.
- e. Research program grants to study technical issues such as renewable energy technologies that improve energy security and reliability.

### 5.2.6 Description of End State

Installations have secure, reliable energy and water supplies.

### 5.2.7 Metrics of Success

- a. Execution rate of funded energy security projects
- b. Effectiveness of implemented energy security measures
- c. Rating of apparent energy security based on vulnerability analyses

### 5.2.8 Milestones (actions by FY)

Identify cost requirements for energy security remediation projects	FY09
Command review of installation implementation of energy security program at 20 percent of installations annually	FY09-30
Incorporate energy security rating into ISR	FY10

# Army Energy and Water Campaign Plan for Installations

## Evaluate/Upgrade Privatized Utilities Distribution Systems For Energy Security Requirements

Inst Name	Utility System	Fiscal Year
Fort Bliss	Electricity	FY08
Fort Bliss	Natural gas	FY08
Fort Bliss	Water / wastewater	FY08
Fort Bragg	Electricity	FY08
Fort Campbell	Natural gas	FY08
Fort Campbell	Water / wastewater	FY08
Fort Irwin	Electricity	FY08
Fort Irwin	Water / wastewater	FY08
Fort Stewart / HAAF	Electricity	FY08
Fort Benning	Electricity	FY09
Fort Benning	Natural gas	FY09
Fort Benning	Water / wastewater	FY09
Fort Huachuca	Electricity	FY09
Fort Lee	Electricity	FY09
Fort Lee	Water / wastewater	FY09
Fort Leonard Wood	Electricity	FY09
Fort Leonard Wood	Natural gas	FY09
Fort Lewis	Natural gas	FY09
Fort Eustis	Water / wastewater	FY10
Fort Gordon	Natural gas	FY10
Fort Knox	Electricity	FY10
Fort Knox	Wastewater	FY10
Fort Leavenworth	Electricity	FY10
Fort Leavenworth	Water / wastewater	FY10
Fort McCoy	Electricity	FY10
Fort McCoy	Natural gas	FY10
Fort Rucker	Electricity	FY10
Fort Rucker	Natural gas	FY10
Fort Rucker	Water / wastewater	FY10
Picatinny Arsenal	Electricity	FY10
USAG-HI	Electricity	FY10
USAG-HI	Water / wastewater	FY10
Aberdeen PG	Water / wastewater	FY11
Adlephi Lab	Natural gas	FY11
Fort Belvoir	Natural gas	FY11
Fort Detrick	Natural gas	FY11
Fort Eustis	Electricity	FY11
Fort Eustis	Natural gas	FY11
Fort McNair	Natural gas	FY11
Fort Meade	Natural gas	FY11
Fort Myer	Natural gas	FY11
Fort Sill	Natural gas	FY11
Fort Sill	Water / wastewater	FY11

## Army Energy and Water Campaign Plan for Installations

### Evaluate/Upgrade Privatized Utilities Distribution Systems For Energy Security Requirements

<b>Inst Name</b>	<b>Utility System</b>	<b>Fiscal Year</b>
Fort A.P. Hill	Electricity	FY12
Fort Hamilton	Electricity	FY12
Fort Hamilton	Natural gas	FY12
Fort Hamilton	Water / wastewater	FY12
Fort Sam Houston	Electricity	FY12
Fort Sam Houston	Natural gas	FY12
Natick RDEC	Natural gas	FY12
Redstone Arsenal	Wastewater	FY12
Parks RFTA	Electricity	FY13
Parks RFTA	Natural gas	FY13
Parks RFTA	Water / wastewater	FY13
Presidio Monterey	Electricity	FY13
Presidio Monterey	Natural gas	FY13
Presidio Monterey	Water / wastewater	FY13
Tooele AD	Natural gas	FY13

## Army Energy and Water Campaign Plan for Installations

### ***Initiative #5: Improve energy security***

#### **5.3 Action #3: Use current and projected energy sources with greatest potential for availability and economy**

##### **5.3.1 Approaches to Meet Actions and Priorities (S, M, L)**

- a. Participate with other Defense and Federal agencies and academia in forums to assess energy supply trends in order to use technologies using abundant energy sources. (S)
- b. Partner with DOE and other Services to develop a facility energy source evaluation and implementation strategy to allow continuous application of the most secure and reliable energy sources at each facility. (M)
- c. Establish process to survey, test, evaluate and implement technologies. (M)

##### **5.3.2 Technologies and Tools Required**

Accurate projections of energy supplies and energy commodity costs.

##### **5.3.3 Policies, Management, and Institutional Issues**

- a. Current source selection is based on convenience to existing fuel supply and distribution systems.
- b. Energy Policy Act of 2005 directs increased use of distributed generation and renewable photovoltaic power.

##### **5.3.4 Specific Projects to Meet Action**

- a. Develop an evaluation/analysis methodology to assess current and projected energy availability and cost trends in order to assist installations to select the most secure, reliable and cost-effective energy source to match their regional constraints and opportunities.
- b. Incorporate recommended energy source selection criteria into design guidance.

##### **5.3.5 Funding Strategies and Sources**

Central funds executed at HQDA level to oversee and participate in development of energy cost and availability projections and energy source selection criteria.

##### **5.3.6 Description of End State**

A flexible, continuous energy supply evaluation process in use to identify and use the most appropriate energy supplies for each installation.

##### **5.3.7 Metrics of Success**

- a. A 30% decrease in frequency of disrupted operations at mission critical facilities due to lack of energy supplies.
- b. A 30% increase in amount of budget shortfall averted by using energy sources not impacted by fuel shortages and supply disruptions.

##### **5.3.8 Milestones (actions by FY)**

Develop method for using energy supply and cost projections to determine recommended building energy source selection	FY08
Periodic update energy source selection criteria to promote secure energy sources.	FY09 and every five years

## Army Energy and Water Campaign Plan for Installations

### Acronyms

AAFES	Army and Air Force Exchange Service
ACSIM	Assistant Chief of Staff for Installation Management
AEWRS	Army Energy and Water Reporting System
AFV	Alternate Fuel Vehicle
ASHRAE	American Society of Heating Refrigeration and Air Conditioning Engineers
BCE	Base Level Commercial Equipment
BLCC	Federal Building Life-Cycle Cost program
BPA	Bonneville Power Administration
BTU	British Thermal Unit, a measure of energy potential
CBECS	Commercial Buildings Energy Consumption Survey
CEM	Certified Energy Manager
CERL	Civil Engineering Research Laboratory
CES	Central Energy System
CNG	Compressed Natural Gas
CONUS	Continental United States
DA	Department of the Army
DARPA	Defense Advanced Research Projects Agency
DESC	Defense Energy Support Center
DoD	Department of Defense
DoDI	DoD Instruction
DOE	Department of Energy
DPW	Directorate of Public Works
EACA	Energy Awareness and Conservation Assessments

## Army Energy and Water Campaign Plan for Installations

ECIP	Energy Conservation Investment Program
ECM	energy conservation measure
EEAP	Energy Engineering Analysis Program
EMCS	Energy Monitoring and Control System
EPA	Environmental Protection Agency
ERDC	Engineer Research and Development Center of USACE
ESPC	Energy Savings Performance Contract
EUL	Enhanced Use Lease
FEDS	Federal Energy Decision Screening
FEMP	Federal Energy Management Program
FRESA	Federal Renewable Energy Screening Assistant
GIS	Graphical Interface System
GSA	General Services Administration
GSHP	Ground Source Heat Pump
HQDA	Headquarters, Department of the Army
HQEIS	Headquarters Executive Information System
HVAC	heating, ventilation and air conditioning
IDIQ	indefinite delivery, indefinite quantity contract type
IEA	International Energy Agency
IFS	Integrated Facility System
IMCOM	Installation Management Command
IPP	independent power producers
ISR	Installation Status Report
FAST	Federal Automotive Statistical Tool

## Army Energy and Water Campaign Plan for Installations

KBTU	thousands of British Thermal Units
LCCA	life-cycle cost analysis
LEED	Leadership in Energy and Environmental Design
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas (also known as propane)
MCA	Military Construction Army
MDEP	management decision package
M&V	measurement and verification
MILCON	military construction
NGB	National Guard Bureau
NIST	National Institute of Standards and Technology
NTV	Non-Tactical Vehicles
OFP	Ozone Forming Potential
OCONUS	Outside the Continental US
OSD	Office of the Secretary of Defense
POM	Program Objective Memorandum
PROSPECT	Proponent Sponsored Engineer Corps Training
PV	photovoltaic
REC	Renewable Energy Certificate
REEP	Renewable Energy and Efficiency Program
REM	Resource Efficiency Manager
SGO	Standard Garrison Organization
SIR	savings to investment ratio
SPiRiT	sustainable project rating tool

## Army Energy and Water Campaign Plan for Installations

SRM	Sustainment, Renovation and Modernization
TVA	Tennessee Valley Authority
UESC	Utilities Energy Services Contract
UFGS	Uniform Facility Guide Specifications
UMCS	Utility Monitoring and Control System
USACE	U.S. Army Corps of Engineers
WAPA	Western Area Power Administration

