
Paul M. Volkman, CEM
Energy Program Manager
Office of the Assistant Secretary of the Army for Installation & Environment
SURETY - preventing loss of access to power and fuel sources

SUPPLY - accessing alternative and renewable energy sources on installations

SUFFICIENCY - providing adequate power for critical missions

SURVIVABILITY - ensuring resilience in energy systems

SUSTAINABILITY - promoting support for the Army’s mission, its community, and the environment

* AESIS dated 13 JAN 09
“We're making our government's largest ever investment in renewable energy – an investment aimed at doubling the generating capacity from wind and other renewable[s]...”  9/23/09

- President Barack Obama

“…[T]he Army is actively supporting advanced technologies and increases in energy efficiencies at our installations, in our weapon systems, and in operations.”  10/09

Army Energy Awareness Month Letter

“As long as we're dependent on those fossil fuels, we're dependent on the Middle East. If we are not victims, we're certainly captives.”

- John McHugh, Secretary, U. S. Army
Quadrennial Defense Review
FEB 2010

Focused on four specific issues where reform is imperative:
- security assistance
- defense acquisition
- defense industrial base
- energy security and climate change

Energy Security – “assured access to reliable supplies of energy and the ability to protect and deliver sufficient energy to meet operational needs” – pg 87

- DoD will
  - promote investments in energy efficiency
  - ensure that critical installations are adequately prepared for prolonged outages caused by natural disasters, accidents, or attacks
- Balance energy production and transmission to preserve test and training ranges and operating areas needed to maintain readiness

“Energy efficiency can serve as a force multiplier, because it increases the range and endurance of forces in the field and can reduce the number of combat forces diverted to protect energy supply lines…” – pg 87

- DoD will fully implement the energy efficiency KPP and fully burdened cost of fuel
The Army has requirements for energy performance established by legislation, Presidential Executive Orders (EO), Office of the Secretary of Defense (OSD) mandates and Army policies.
# Federal Energy Mandates

<table>
<thead>
<tr>
<th>Mandate Topic</th>
<th>Energy Performance Target [Source]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy use in Federal buildings</td>
<td>• Reduce 3% per year to total by 30% by 2015 (2003 baseline) [EO 13423, EISA 2007]</td>
</tr>
<tr>
<td>GHG emission reduction</td>
<td>• Identify GHG emission reduction targets to be met by 2020 from 2008 baseline [EO 13514]</td>
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<tr>
<td></td>
<td>• Army target – 34% [SA Memo to OSD]</td>
</tr>
<tr>
<td>Energy metering for improved energy management</td>
<td>• Meter electricity by Oct 2012 [EPACT 2005]</td>
</tr>
<tr>
<td></td>
<td>• Meter natural gas and steam by Oct 2016 [EISA 2007]</td>
</tr>
<tr>
<td>Electricity use for federal government from renewable</td>
<td>• At least 3% of total electricity consumption (FY07-09), 5% (FY10-12), 7.5% (FY13 +) [EPACT 2005,</td>
</tr>
<tr>
<td>sources</td>
<td>NDAA 2007]</td>
</tr>
<tr>
<td>Total consumption from renewable sources</td>
<td>• At least 50% of required annual renewable energy consumed from “new” renewable sources [EO 13423]</td>
</tr>
<tr>
<td></td>
<td>• 25% by 2025 -“Sense of Congress” [ EISA 2007]</td>
</tr>
<tr>
<td>Hot water in new / renovated federal buildings from solar</td>
<td>• 30% by 2015 if life cycle cost-effective [EISA 2007]</td>
</tr>
<tr>
<td>power</td>
<td>Fossil fuel use in new / renovated Federal buildings</td>
</tr>
<tr>
<td>Net zero buildings</td>
<td>• All new buildings that enter design in 2020 and after achieve net zero energy by 2030 [EO 13514]</td>
</tr>
<tr>
<td></td>
<td>• New federal buildings achieve net zero by 2030 [EISA 2007]</td>
</tr>
<tr>
<td>Fleet vehicle petroleum consumption</td>
<td>• Reduce 20% by 2015 (Base 2005) [EISA 2007]</td>
</tr>
<tr>
<td></td>
<td>• Reduce by 2% per year thru FY2020 (Base 2005) [EO 13423, EO 13514]</td>
</tr>
<tr>
<td>Fleet vehicle alternative fuel use</td>
<td>• Increase 10% by 2015 (Base 2005) [EISA 2007]</td>
</tr>
<tr>
<td></td>
<td>• Increase by 10% annually to reach 100% (Base 2005) [EO 13423]</td>
</tr>
<tr>
<td>Water consumption</td>
<td>• Reduce consumption intensity by 2% annually FY 08-FY 15 (2007 baseline ) [EO 13423]</td>
</tr>
<tr>
<td></td>
<td>• Reduce consumption by 2% annually for 26% total by FY 2020 (2007 baseline ) [EO 13514]</td>
</tr>
</tbody>
</table>
U.S. Army Energy Consumption, 2009

United States
1.2%

Federal Government
80.3%

Department of Defense (DoD)
21.0%

U.S. = 94,578 Trillion Btu
Fed Gov = 1,095 Trillion Btu
DoD = 880 Trillion Btu
U.S. Army = 190 Trillion Btu

Federal Government
Facilities 35%
Vehicles & Equipment (Tactical and Non-tactical) 65%

DoD
Facilities 25%
Vehicles & Equipment (Tactical and Non-tactical) 75%

Army
Facilities 58%
Vehicles & Equipment (Tactical and Non-tactical) 42%

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

- The Army’s Governance Structure to review, align and confirm the Army energy security posture
- Provides enterprise leadership, strategy and accountability

**Army Directive 2008-04**
**Army Energy Enterprise**

Formalizes:
- Senior Energy Executive
- Senior Energy Council
- Energy Enterprise Strategic Plan

**Senior Energy Council Charter**
*(dated, 26 SEP 08)*

All aspects of Army energy consumption and utilization:
- Installations
- Facilities
- Weapon Systems
- Sustainable Contingency Operations Base Camps

**Army Energy Enterprise Governance Structure**

- **Secretary of the Army**
- **Chief of Staff of the Army**

**Senior Energy Council**
ASA / 3- and 4-star equivalents

- Co-Chairs - VCSA and ASA(I&E)
- Executive Secretary - SEE / DASA (E&P)
- Members

**SEC Advisory Board**
DASA / 2-star equivalents

- Chair - DASA(E&P)/SEE
- Members - SEC principal offices

**SEC Working Groups**
O-6 level

- Members - Reflects all SEC organizations Coordinates Army-wide to implement AESIS

**Offices of Primary Responsibility**

- Last met 10 MAR 10
- Met 21 JAN 10
- Meets bi-weekly

**SEC membership**
- VCSA – co-chair
- ASA(I&E) – co-chair
- DUSA G-1
- DAS G-2
- SMA G-3/5/7
- AMC G-4
- AASA G-8
- ACSIM G-8, PAE
- ASA(ALT) OCAR
- ASA(CW) OCLL
- ASA(FM&C) OCPA
- ASA(I&E) OGC
- ASA(M&RA) OTJAG
- CIO/ G-6
- DARNG TRADOC
- USACE FORSCOM
- MEDCOM ATEC
Army Energy Security Implementation Strategy

January 13, 2009

The Army Senior Energy Council and the Office of the Deputy Assistant Secretary of the Army for Energy and Partnerships

Washington, D.C. 20305-5140

Currently 57 Metrics

Energy Security Goals (ESGs)

1. Reduce Energy Consumption
2. Increase Energy Efficiency Across Platforms and Facilities
3. Increase Use of Renewable / Alternative Energy
4. Assure Access to Sufficient Energy Supplies
5. Reduce Adverse Impacts on the Environment

Legislation
- EPAct 2005
- EISA 2007
- NDAA

Executive Order
- EO 13423

OSD Policy
- DODI 4710.11, DOD Managers Handbook

Army Policy
- AR 420-1
- Army Energy & Water Campaign Plan

http://www.asaie.army.mil/Public/Partnerships/doc/AESIS_13JAN09_Approved%204-03-09.pdf
## ESG 1: Reduced Energy Consumption

**Objective 1.4** Execute modernization of Army facilities to reduce energy use.

<table>
<thead>
<tr>
<th>Metric</th>
<th>Metric Statement</th>
<th>Metric Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4a</td>
<td>Develop methodologies to identify and implement energy reduction opportunities as identified by annual energy audits (conduct 25% of facilities per year) (Complete/Not complete)</td>
<td>Complete by end of FY13 OPR- ACSIM</td>
</tr>
</tbody>
</table>

## ESG 5: Reduced Adverse Impacts on the Environment

**Objective 5.1** Reduce greenhouse gas emissions by reducing the use of fossil fuel

<table>
<thead>
<tr>
<th>Metric</th>
<th>Metric Statement</th>
<th>Metric Targets</th>
</tr>
</thead>
</table>
| 5.1a   | % reduction in greenhouse gas emission at installations from 2003 baseline as reported through a standard protocol | 7.5% reduction from 2003 baseline by the end of FY13  
25% reduction from 2003 baseline by the end of FY25  
50% reduction from 2003 baseline by the end of FY30  
OPRs – ASA(I&E) and LHCs |
## Energy Conservation Investment Program (ECIP) - $32M

<table>
<thead>
<tr>
<th>Installation</th>
<th>State</th>
<th>Project Title</th>
<th>Prog Amt</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fort Lee</td>
<td>VA</td>
<td>High Efficiency Lighting (Phase III)</td>
<td>$1,114</td>
<td>Awarded 8/24/2009</td>
</tr>
<tr>
<td>Fort Drum</td>
<td>NY</td>
<td>Install Solar Walls, Energy Improvements</td>
<td>$1,600</td>
<td>Awarded 9/25/2009</td>
</tr>
<tr>
<td>Fort Bragg</td>
<td>NC</td>
<td>EMCS</td>
<td>$1,041</td>
<td>Awarded 9/28/2009</td>
</tr>
<tr>
<td>Fort Lee</td>
<td>VA</td>
<td>EMCS Upgrade (Phase II)</td>
<td>$2,883</td>
<td>Awarded 9/28/2009</td>
</tr>
<tr>
<td>Fort Knox</td>
<td>KY</td>
<td>Barracks GSHP, Ph 5</td>
<td>$4,850</td>
<td>Awarded 9/30/2009</td>
</tr>
<tr>
<td>Fort Knox</td>
<td>KY</td>
<td>Barracks GSHP, Ph 6</td>
<td>$3,303</td>
<td>Awarded 9/30/2009</td>
</tr>
<tr>
<td>Fort Wainwright</td>
<td>AK</td>
<td>Facility Energy Improvements</td>
<td>$1,950</td>
<td>Awarded 11/3/2009</td>
</tr>
<tr>
<td>White Sands MR</td>
<td>NM</td>
<td>Install Direct Digital Controls</td>
<td>$668</td>
<td>Awarded 11/30/2009</td>
</tr>
<tr>
<td>Fort Hood</td>
<td>TX</td>
<td>Install 8,000 Motion Sensors</td>
<td>$1,450</td>
<td>Awarded 11/30/2009</td>
</tr>
<tr>
<td>Iowa AAP</td>
<td>IA</td>
<td>GSHP &amp; PV for Bldg 100-101</td>
<td>$590</td>
<td>Awarded 3/31/2010</td>
</tr>
<tr>
<td>Fort Sill</td>
<td>OK</td>
<td>Solar Water Preheater</td>
<td>$810</td>
<td>Awarded 4/15/2010</td>
</tr>
<tr>
<td>Fort Campbell</td>
<td>KY</td>
<td>Replace A/C with GSHP, Efficient Boilers</td>
<td>$1,015</td>
<td>Awarded 4/16/2010</td>
</tr>
<tr>
<td>Hawthorne AD</td>
<td>NV</td>
<td>Geothermal Test Wells, Phase 2</td>
<td>$3,000</td>
<td>Awarded 5/7/2010</td>
</tr>
<tr>
<td>Planning &amp; Design Funds</td>
<td></td>
<td></td>
<td>$2,194</td>
<td></td>
</tr>
<tr>
<td><strong>Army Total</strong></td>
<td></td>
<td></td>
<td><strong>$32,233</strong></td>
<td></td>
</tr>
</tbody>
</table>
Annex 46 Applications and Support to the Army Energy Strategy

• IMCOM Energy Engineering Analysis Program (EEAP)
• IMCOM Barracks Improvement and Upgrade Program
• EPACT 2005 30% energy use reduction in new construction under MILCON Transformation Program
• EISA 2007 60-80% energy use reduction in new construction analysis
• IMCOM Energy and Water Conservation Design Guide (for Sustainment, Restoration and Modernization (SRM) and MILCON Projects)
• Support to Installations
• Showcase studies and training
• Six Annual International Advanced Energy Technologies Workshops
Objectives:
• Identify and eliminate critical energy inefficiencies at Army installations
• Develop and successfully implement energy projects
• Provide cost effective best fit energy and mission solutions
• Stream-line fielding of promising energy efficient technologies
• Develop a Strategic Army-wide partnership to use multiple centralized and local Army assets and third-party financing to reach Army energy goals
Support to $500M IMCOM Barracks Improvement and Upgrade Program

Funded by IMCOM with objectives to identify typical issues and provide advice on energy conservation measures to be included with major renovation and repair projects.

Humidity/Mold – One of the Major Problems

Ft Stewart spends at least $1 Million annually for mold cleanup
Ft Stewart VOLAR Barracks Upgrade 2007-2008: Improved air tightness + Dedicated Outdoor Air System with three different types of humidity control systems

Ft Polk – VOLAR Barracks Renovation 2009-2010: Better Insulation, Improved air tightness (0.1 cfm/ft²), DOAS, enclosed stairways with a vestibule, covered atrium with increased usable space, etc.
Energy Efficient Technologies - MILCON Transformation Support EPAct 2005 30% Reduction

- Funded by ACSIM
- Partnership with HQUSACE, Corps District COSs, NREL, ASHRAE, and ERDC
- Product is specific Army MT RFP guidance for compliance with EPAct 2005 30% reduction for: UEPH, TEMF, BHQ, Training Barracks, DFAC, CDC, COF, Reserve Centers
- ERDC is conducting training for USACE Districts funded by HQ USACE
Energy Efficient Technologies – Advanced Guides to meet long- and short-term EISA 2007 Requirements (60-80% energy reduction study)

- Funded by HQUSACE
- Partnership between USACE COSs, NREL, ASHRAE, and ERDC
- Product - guidance on how to reach 60-80% energy use reduction for UEPH, TEMF, BHQ, DFAC and COF with the corresponding first cost and LCCA analysis
- Results of this study will be incorporated in the Design-Build process under MILCON Transformation Program
MEMORANDUM FOR SEE DISTRIBUTION


1. References:
   b. Email, HQ IMCOM, Mr. Donald LaRocque, 21 October 2006, Subject: FY10 Annual Project Prioritization System Update and Energy Guidance.

2. Effective immediately, garrisons will implement the criteria contained in the IMCOM Energy and Water Conservation Design Guide for Sustainment, Restoration and Modernization (SRM) and MILCON Projects. This guide will be used when designing all Sustainment, Restoration and Modernization (SRM) Projects, and designing MILCON projects. The new guide supersedes and replaces the design criteria that were distributed with referenced NETCALL and Email. The guide can be found on the web at: http://www.wbdg.org/references/pa_dod_energy.php.

3. All new construction and major repair projects are required to comply with the specific goals defined in EPACT 2005, EISA 2007, EO 13423, and EO13514. To achieve compliance, Garrison staff will find detailed guidance and examples in the Guide to assist them during project design.

4. The mandatory use of the Guide is an important step in our efforts to improve our energy and water consumption reduction efforts in existing buildings and new construction.

5. HQ IMCOM POC for this action is Mr. Ismael Melendez, Public Works Division, (210) 424-8221, e-mail ismael.melendez@us.army.mil. Technical criteria POC is Dr. Alexander Zhivov, Construction Engineering Research Laboratory, (217) 373-4519, alexander.m.zhivov@erdc.usace.army.mil.

DONALD G. LAROCQUE
Chief, Public Works Division

http://www.wbdg.org/references/pa_dod_energy.php
Energy and Water Conservation Design Guide Table of Contents

• Executive Summary
• Current DOD Policies and Directives on Energy Conservation
• Design Guides for Military Buildings to Meet EPACT 2005 Energy Reduction Requirements
• Prescriptive Technology Solution Sets
  • Training Barracks Prescriptive Technology Solution Sets
  • TEMF Prescriptive Technology Solution Sets
  • BHQ Prescriptive Technology Solution Sets
  • COF Prescriptive Technology Solution Sets
  • CDC Prescriptive Technology Solution Sets
  • DFAC Prescriptive Technology Solution Sets
  • ARC Prescriptive Technology Solution Sets

Surety Supply Sufficiency Survivability Sustainability
Energy and Water Conservation Design Guide Table of Contents Cont’

- Building Envelope
- Building Air Tightness and Air Barrier Continuity Requirements
- Air Leakage Test Protocol for Measuring Air Leakage in Buildings
- Achieving Energy Efficiency and Improving Indoor Air Quality in Army Maintenance Facilities (TEMF)
- Energy Design Guides for Army Barracks
- Improving Energy Performance of Army Dining Facilities
- Requirements for Building Thermal Conditions
- Advanced Lighting Systems
- Requirements for Lighting Levels
- Heating and Cooling Generation and Distribution Systems
- HVAC Control Systems
- Air Barrier Continuity: A Quick Guide to Sealing Air Leakage Pathways in Buildings
• Developed to streamline Energy Engineering Analysis Program
• Tested and implemented at the following Army installations:
  - USA:
    Non-industrial (~ 40 sites): Ft Stewart, Ft Polk, Ft Belvoir, Ft Rucker, Ft Drum, Ft Carson, Ft Bragg, Ft Campbell, Ft Hamilton, Ft Myer, West Point Academy, etc.

Industrial: RIA, TYAD, CCAD, SIAD, Aberdeen PG, Dugway PG, Natick, etc.

- Europe and Asia:
  6 installations in Germany and Italy; 3 in BENELUX; 2 in South Korea, 4 in Japan
Analysis of Air-tightness impact on energy and mold resulted in establishing of US Army Air Leakage Requirements and Testing Protocol

More than 100 Army buildings built and retrofitted to meet or exceed new Army requirement of 0.25 cfm/ft² at 75 Pa
Dissemination of New Technologies and Retrofit Concepts across DOD through Demonstration and Case Studies

- Definition Of Energy Performance Contract
- Motivations For Using EPCs for Government Facilities
- Most Common Energy Conservation Measures (ECMs)
- Implementation Process
- EPC Best Practices
- Continuous Program Improvement
- Conclusions

16 Case-Studies
Training Workshop and Level I Energy Assessment at USMA, West Point, USA, September 18-28, 2007
45 experts from the USA, Finland, Germany and Sweden

Ft Lee, USA
September 17-22, 2009
66 experts from the USA, Finland, Germany, Canada, Korea and Sweden

Surety Supply Sufficiency Survivability Sustainability
Conclusion

Our Strategy Depends on Partnerships!

- The *Army is answering and leading* the call to the nation to face one of the great challenges of our time: confronting our dependence on foreign oil, addressing the moral, economic, and environmental challenge of global climate change, and building a clean energy future that benefits all Americans.

- *Leveraging the inter-agency and international collaboration* to lead in the transformation of the ways we produce and use energy for the sake of our environment, our economy, and our security.

- Continue to *lead by example in using public and private cooperation* to meet our nation’s security needs.