

2009 AUSA Annual Meeting & Exposition

Energy & Environment for an Expeditionary Army

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6 October 2009



America's Army: The Strength of the Nation



BLUF

- To improve our energy security posture, IMCOM is committed to:
 - Modernizing energy & utility infrastructure to improve reliability
 - Incorporating system redundancy for mission assurance
 - Developing renewable energy supplies to reduce dependence on fossil fuel
 - Maintaining disaster recovery preparedness



America's Army: The Strength of the Nation

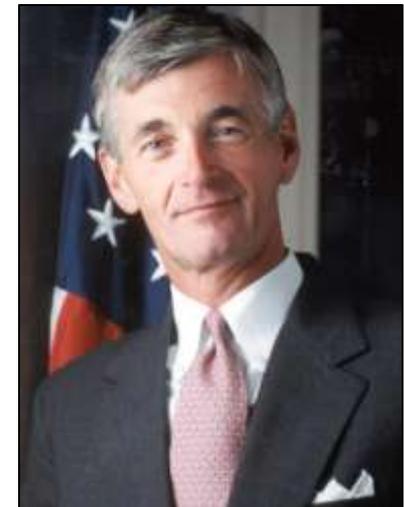
Our Mission: To provide the Army with the installation capabilities and services to support expeditionary operations in a time of persistent conflict, and to provide a quality of life for Soldiers & Families commensurate with their service.

“Competition for water, resources, food is going to increase the international friction. Estimates are that energy supplies are not going to equal demand even if you count in what people are trying to do in the interim to increase it or look for alternative sources. Climate change [and] natural disasters create friction, create tensions and population movements and pandemics.”

***GEN George W Casey U.S. Army
Chief of Staff***

“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
of the U. S. Army***





Assured access to reliable, affordable, & stable energy supplies remains a significant challenge for the Army



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

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

1. Reduce energy consumption
2. Increase energy efficiency across facilities
3. Increase use of renewable/alternative energy
4. Assure access to sufficient energy supplies
5. Reduce adverse impacts on the environment

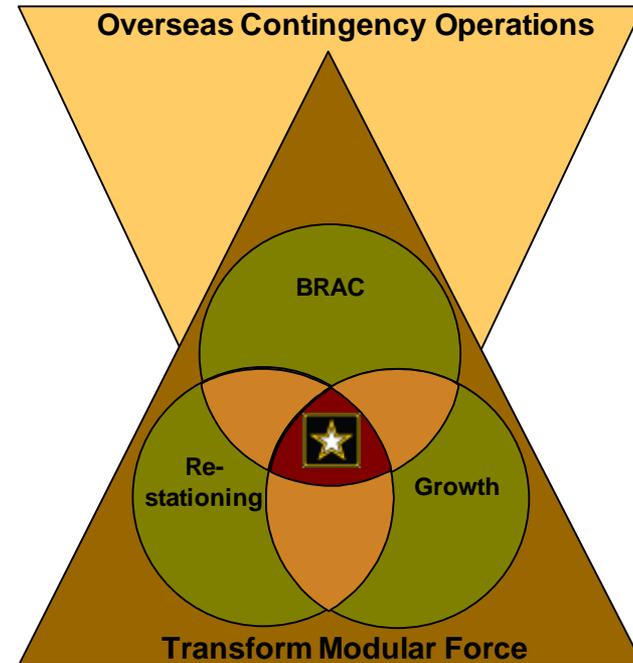
Army Energy Security Implementation Strategy & Plan



Energy Management: Challenges

Army continues its largest organizational change since WW II

- Transform to a Brigade-centric, Modular Force
- Re-station one-third of the force
- Grow the force
 - 547,400 Active Component
 - 358,200 National Guard
 - 206,000 Army Reserve
- Complete BRAC on time



- MILCON strategy supporting these changes
 - Comply with BRAC law
 - Complete Global Defense Posture Realignment
 - Grow the Army
 - Sync QOL facilities investments
 - Improve existing infrastructure

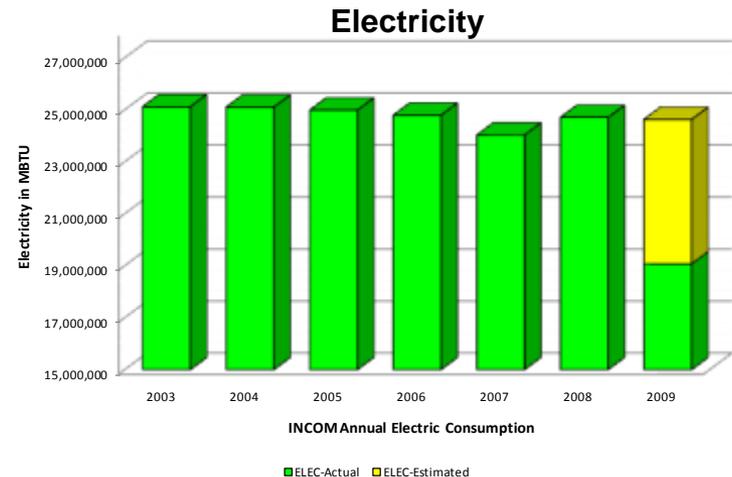
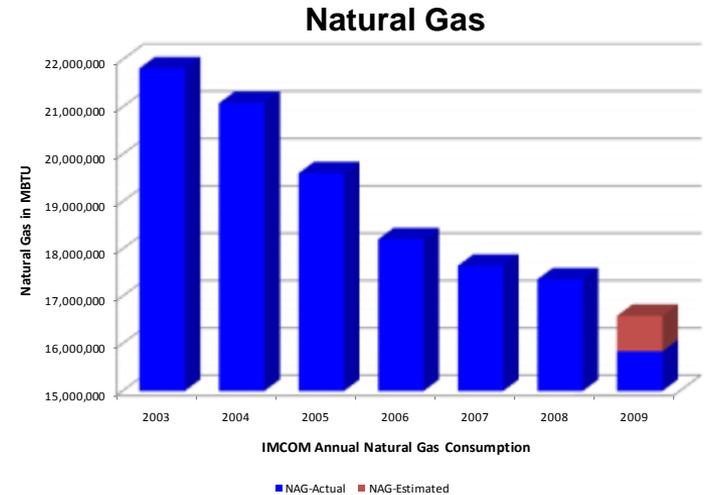




Energy Management: Challenges

Current metric of performance measurement is energy per square foot

- Managing energy reduction for fixed installations responsible for housing an Expeditionary Army
- IMCOM has made significant progress in reducing natural gas consumption while electric remains a challenge
- Challenges:
 - BRAC construction
 - Grow the Army
 - Large energy consuming activities not included in real property





America's Army: The Strength of the Nation

Energy Management: Challenges

Large energy consuming facilities are not included in real property but count against reduction goals

Fort Bliss
Large Area Maintenance Tent



Growing trend of deploying these types of facilities across the enterprise

Fort Hood Simulators



Fort Leonard Wood Tent





Energy Management: The Enterprise Approach

To address the Energy Management challenge, IMCOM Centrally Funds Enterprise Programs

Centrally funded programs provide standard set of services

Programs driven by federal legislation, Executive Orders & DA Policy

Programs provide technical assistance to energy managers

Program deliverables identify energy savings projects & costs

Programs are available for CONUS & OCONUS installations

- ▶ Energy Engineering Analysis Program
- ▶ Energy Awareness & Conservation Assessments
- ▶ Natural Gas Risk Management Program
- ▶ Resource Efficiency Managers
- ▶ Energy Savings Performance Contract (ESPC) Support
- ▶ Utility Energy Services Contract (UESC) Support
- ▶ Energy & Water Master Plans
- ▶ Commercial Utilities Program
- ▶ Metering Program
- ▶ Renewable Energy Assessments



Renewable Energy: The Enterprise Approach

- **IMCOM has taken the following actions:**
 - **Partnered with DOE to conduct detailed analyses of the potential for electricity generation at selected U.S. Army installations.**
 - **Completed 13 assessments, 6 scheduled for FY10**
 - **Identified economically feasible opportunities for generation of electricity from renewable supply that is significant enough to warrant connection to the grid and/or to contribute in a meaningful way to the aggressive renewable energy goals of the Army and the Department of Defense.**

Renewable Energy Potential

Wind	Solar	GSHP	WTE	Biomass
Bliss	Irwin	Riley	Bliss	Bragg
Hood	Hawaii	Leavenworth	Aberdeen	Hood
Carson	Hood	Carson	Leonard Wood	Benning
Wainwright	Huachuca	Hood		Stewart
	Bliss	Knox		Wainwright
	White Sands	Lewis		



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Renewable Energy: The Enterprise Approach

Existing renewable projects completed to date

Ft. Drum Solar Wall



Ft. Huachuca Photovoltaic Roof



Ft. Knox GSHP



Ft. Jackson Fuel Cells



Ft. Carson Solar Array



Ft. Stewart Biomass Plant





Renewable Energy: The Enterprise Approach

Future Renewable Projects – Fort Irwin

- **Strategically located in sunny southern California with over 1,000 square miles of land**
 - **Good potential for large scale renewable project**
 - **Identified as one of 5 SecArmy energy initiatives**
- **The U.S. Army Corps of Engineers, Baltimore District, Enhanced Use Leasing (EUL) program**
 - **Prepared solicitation to test market viability for large scale EUL**
 - **Good industry response to solicitation**
- **Corps selected Irwin Energy Security Partners LLC to develop, construct and manage the largest solar power project proposed to date within the Department of Defense**
- **Solar energy EUL will entail a flexible, phased, multi-technology approach to delivering up to 500 megawatts (MW) of power generation**
- **Improves Fort Irwin's overall energy security posture**

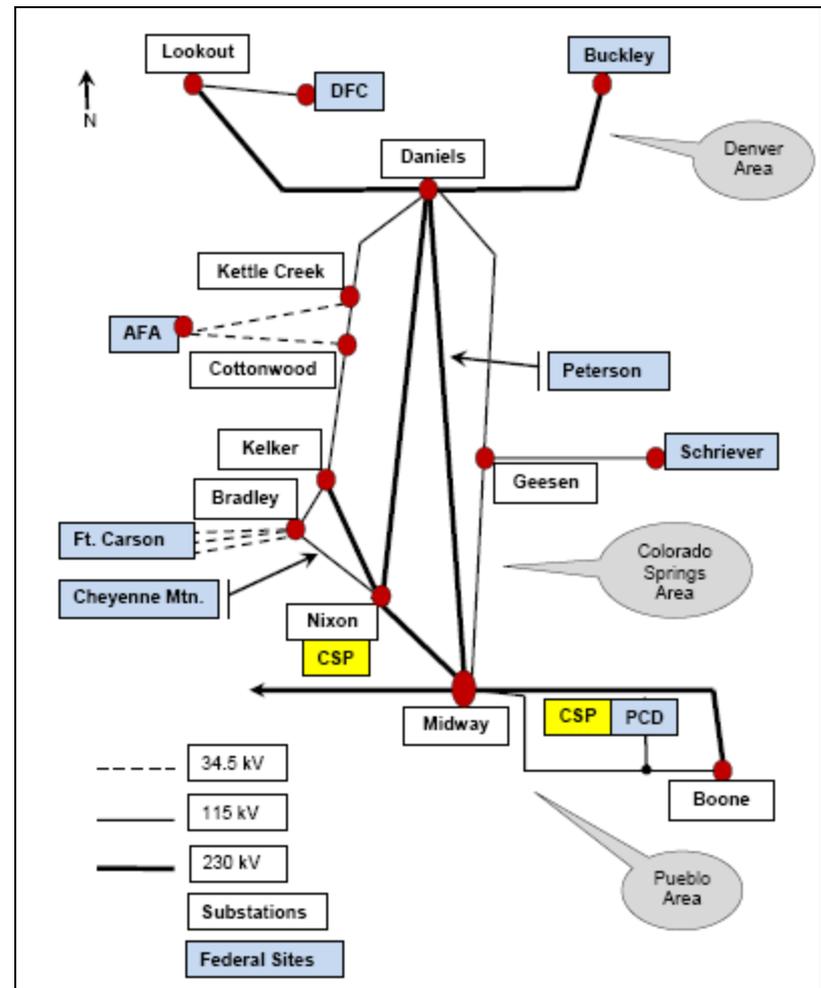


ACCIONA's Nevada Solar One

Renewable Energy: The Enterprise Approach

Future Renewable Projects – Fort Carson & Pueblo Chem Depot

- Facilities needed to provide power from a potential 200 MW Concentrated Solar Power (CSP) Plant
- Plant located near Pueblo or Colorado Springs, CO supplying eight (8) federal sites along the Rocky Mountain Front Range.
- The Front Range Renewable Energy Consortium (FRREC) is an interested group of public, private and government organizations leading the CSP project.
- The CSP plant is targeted to be located at either the US Army Pueblo Chemical Depot (PCD) or Colorado Springs Utilities (CSU) Nixon Power Plant with power transfers to the nearest points of distribution that can serve the following federal sites:
 - Air Force Academy (AFA)
 - Buckley Air Force Base
 - Cheyenne Mountain
 - Denver Federal Center (DFC)
 - Fort Carson
 - Peterson Air Force Base
 - Schriever Air Force Base
 - Pueblo Chemical Depot





Utilities Privatization

Leveraging UP to improve Army Energy Security Posture

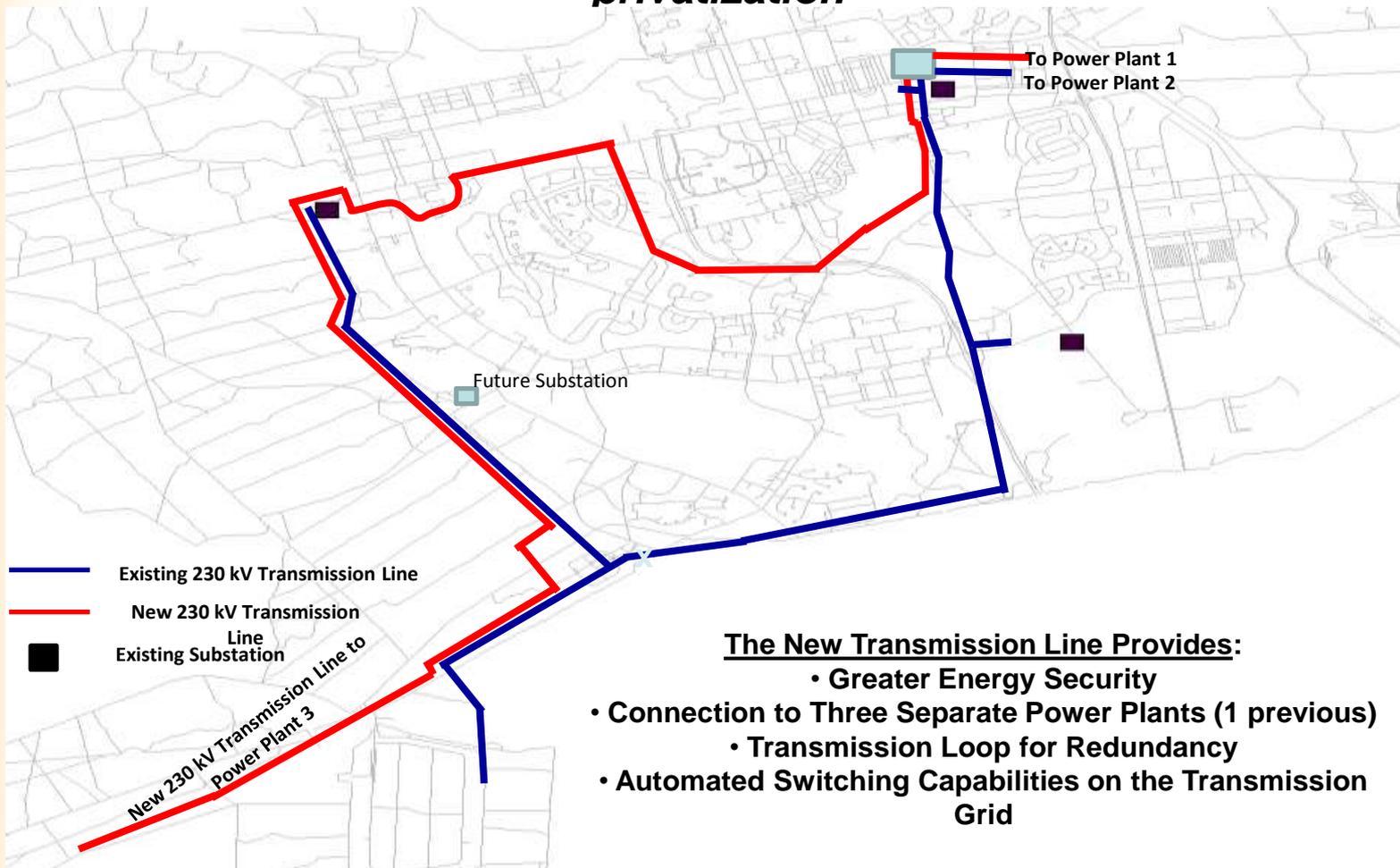
- **Utilities Privatization (UP) is an investment strategy to recapitalize the Army's utilities infrastructure (electric, natural gas, water and wastewater) and bring systems up to current industry standards**
- **A utility services contract (up to 50 years) is awarded to the UP Provider (contractor) to provide the utility service including operation, maintenance, and system upgrades.**
- **Systems are privatized only where the upgrades are economical**
- **Systems are exempted if the costs are unfavorable for the Army or for security reasons**
- **The Army has privatized 142 utility systems**
- **Leveraging the process to improve energy security**



Utilities Privatization: Energy Security Success Stories

Fort Bragg, NC

Utility system redundancy connection developed through utilities privatization



The New Transmission Line Provides:

- Greater Energy Security
- Connection to Three Separate Power Plants (1 previous)
 - Transmission Loop for Redundancy
- Automated Switching Capabilities on the Transmission Grid



Utilities Privatization: Energy Security Success Stories

Fort Bliss, Texas

- On-going massive construction of new facilities now and over the next four years which will increase water and electricity requirements
- Addition of 20 new ranges adding power requirements
- New weapon systems with high wattage plug-in requirements
- Fort Bliss is the largest MOB/DEMOB location for training in the US with prolonged hot season requiring A/C cooling of training tents
- Post-wide migration to air conditioning. Old building envelopes and existing infrastructure not up to current standards.

2nd substation constructed at Biggs Airfield east of main cantonment area to meet the requirement generated by massive construction and additional SF at a cost of \$60 Million with a current capacity of 90 MW





Utilities Privatization: Energy Security Success Stories

Fort Greely, Alaska



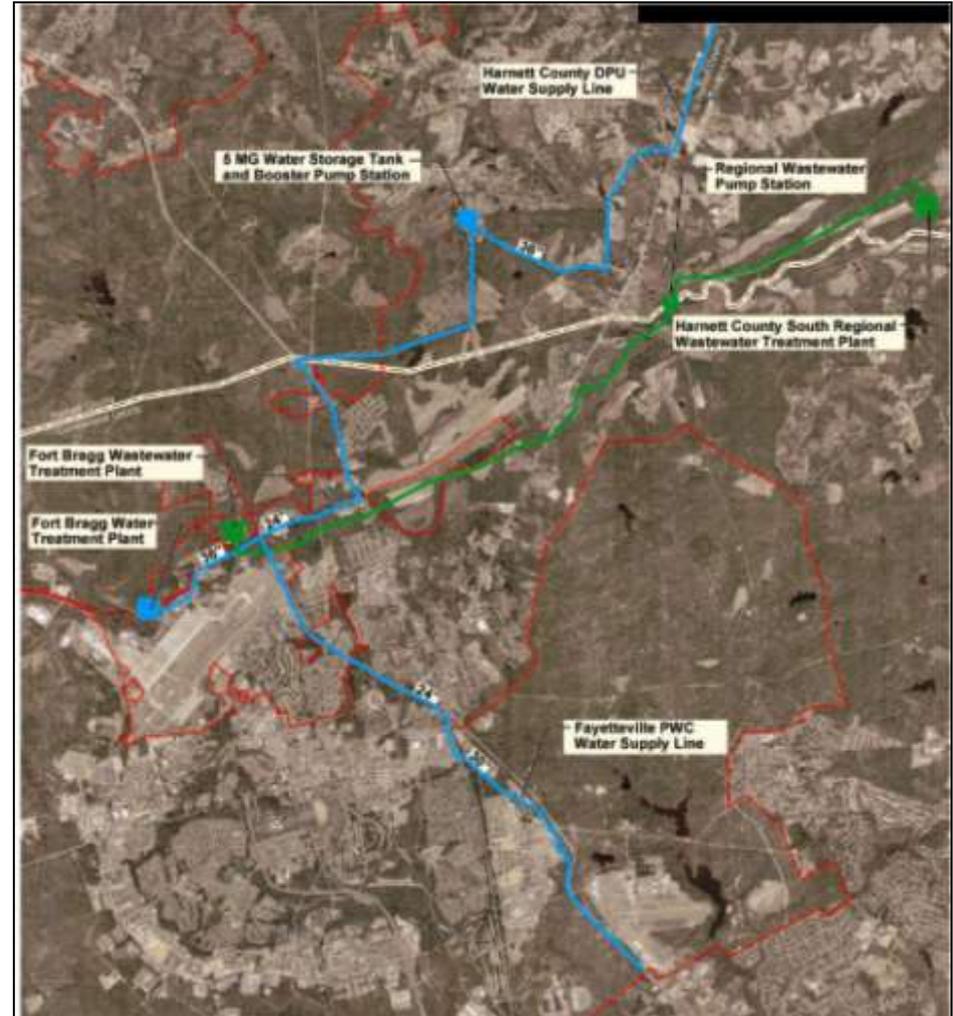
- **Increase reliability through new 138 KV Transmission Line and Substation**
 - New substation is energized to provide 20 MW capability vice having 5.5MW capacity produced by old diesel generators
 - Replaced a 50-year old transformer and 50-year old switchgear which will reduce maintenance and power outages
- **Reduced reliance on fossil fuel**



Utilities Privatization: Energy Security Success Stories

Fort Bragg, NC

- Historically, water has been fed from the Ft Bragg Water Treatment Plant and was highly vulnerable to drought conditions in the low stream flow of the Lower Little River
- Utility privatization of water services installed distribution lines from Fayetteville Public Water Commission and Harnett County
- Provided redundancy of 8 Million gallons a day (MGD) from each utility to handle current annual average of 6 MGD and provided for future growth and demand
- Reduced need to use on base ponds for backup, which improved wildlife habitat





Energy Disaster Recovery: The Enterprise Approach

Unintended Consequences

- **Natural disasters are a regular occurrence across the nation**
 - Fire, flood, ice, wind
- **Collateral damage includes interruption of power supply to the garrison**
- **Impact on operations could be significant**
 - Outages range from few hours to several days
- **To mitigate impact of future natural disasters on garrisons, IMCOM is developing an enterprise program to assess site-specific risks based on mission criticality, risk & duration of outage, & cost effectiveness of risk mitigation options**

Fort Huachuca, Arizona



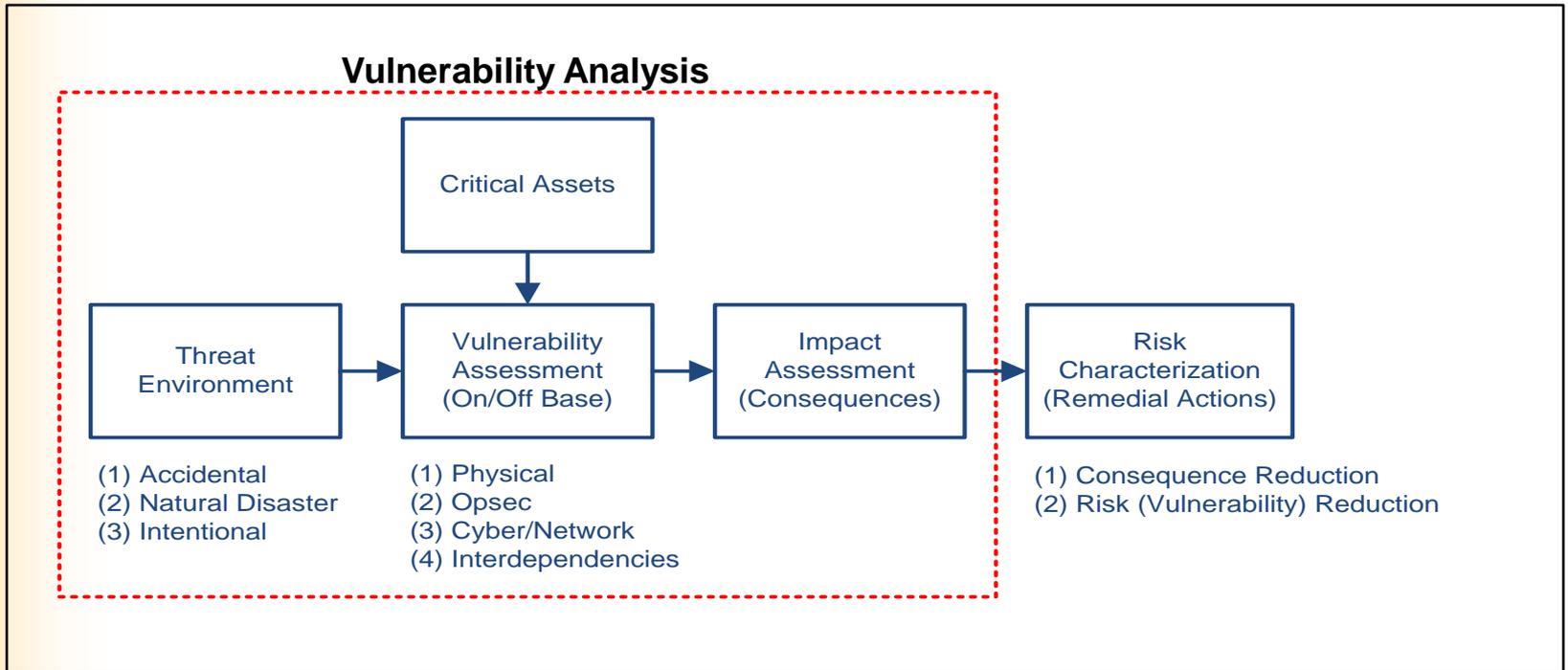
Fort Carson, Colorado





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IMCOM Energy Security Assessment Process: The Enterprise Approach



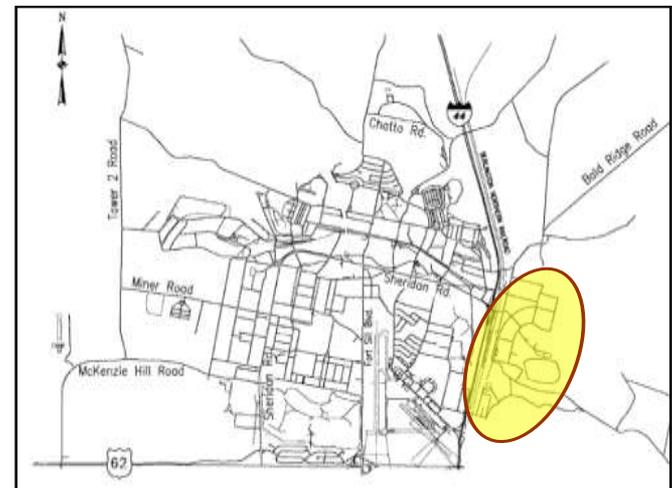
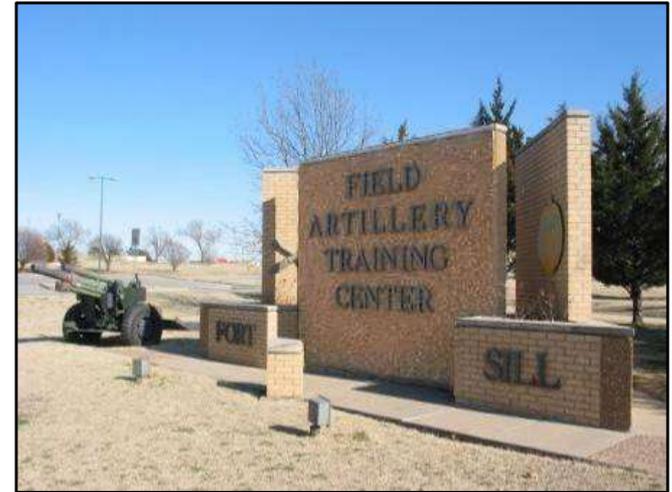
Energy security means preventing the loss of power (surety), ensuring resilience in energy systems (survivability), accessing renewable energy on installations (supply), providing adequate power for critical missions (sufficiency), and promoting support for the Army's mission, its community, and the environment (sustainability).



Addressing the Future: The Enterprise Approach

Microgrid field scale demonstration Fort Sill, OK

- Development of hardware, software, and controls to perform field scale micro-grid implementation at a subset of buildings at the Field Artillery Training Center at Fort Sill, OK
- Demonstration of capabilities, operator training, and documentation of results
- Provide secure and high reliability energy and environmental performance in an islanded mode for a minimum of 30 days
- Increased energy security from multiple generation sources
- Electric demand peak-shaving capability
- Reduced carbon footprint
- Enabling technology for integration of existing and future renewable energy sources





Addressing the Future: The Enterprise Approach

Fort Hood, Texas

- National Defense Center for Energy & Environment (NDCEE) supporting the DoD to build cost-effective, energy-efficient buildings with sustainable design
- NDCEE proposes to demonstrate & compare the effectiveness of on-site renewable energy systems for power generation at Fort Hood
- NDCEE & Fort Hood to ensure system will meet expectations and be compatible with electricity distribution system

Carport with PV Panels



Vertical Axis Wind Turbine



Notional Photos

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Energy Security: The Enterprise Approach

Energy must be readily available to support Army missions to fixed installations

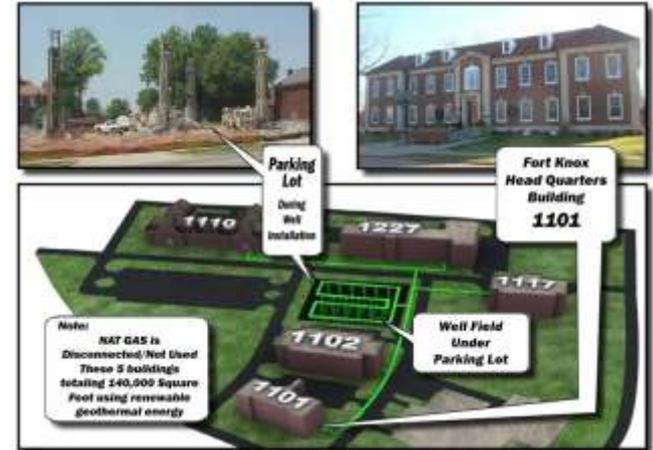
Fort Carson Solar (2MW)



Fort Leavenworth Electric Car



Fort Knox Ground Source Heat Pumps



IMCOM is committed to improving our energy security posture by reducing Army energy consumption, increasing energy efficiency in our facilities, and promoting the use of new sources of renewable energy supplies, and disaster recovery