

# Army Power and Energy



#### Army Energy and Sustainability Program

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## Mr. Richard Kidd

Deputy Assistant Secretary of the Army (Energy and Sustainability)



#### AMERICA'S ARMY: U.S.ARMY THE STRENGTH OF THE NATION

## Framing the Energy Security Challenge



#### **Key Questions**

- Why is this issue important to America?
- Why is this issue important to America's Armed Forces?
- Why is it important to Army leaders?
- What is our military establishment doing to deal with the challenges we face today and tomorrow?
- What is our Army doing to ensure adequate supplies of energy, now and into the future?
- How has our Army "framed" this problem?
- How do we plan to measure our progress in solving this problem?

**Army Energy in Perspective** 

- The Army manages both Installation & Operational Energy requirements
- The Army is largest facility energy consumer in the Federal Government \$1.25B (FY12)

Fort Carson Photovoltaic Array

*EXTERNAL VIEW: "Pay attention: When the U.S. Army desegregated, the country really desegregated; when the Army goes green, the country could really go green."* – Thomas Friedman, 2009

WHITE HOUSE VIEW: "Now, there are costs associated with this transition. And there are some who believe that we can't afford to pay those costs right now. I say we can't afford not to change how we produce and use energy – because in the long-term costs to our economy, our national security and our environment are far greater. "– President Obama, June 2010

*"Operational Energy equates exactly to operational capability" -* General John Allen, Commander United States Forces – Afghanistan, December 2011

*"Improving our energy security directly translates to improving our national security." -* General Martin Dempsey, Chairman of the Joint Chiefs of Staff, October 2011

• The Army spent \$3.6B on liquid fuel purchases in FY12







# **Strategic Context**

Energy Security is defined as "having assured access to reliable supplies of energy and the ability to protect and deliver sufficient energy to meet mission essential requirements."\*

- The Army has historically undervalued energy and energy security
- Treating energy as a "free good" (unintentionally) creates vulnerabilities and risks in terms of:
  - Cost: Waste, commodity price escalation, and volatility
  - Operational Constraints: Vulnerable Lines of Communication, casualties tied to supply and resupply functions, diverted combat power
  - Organizational Reputation: Failure to meet Presidential, Congressional, and Defense mandates on schedule
  - Others?
    \*FY 2012, NATIONAL DEFENSE AUTHORIZATION ACT (NDAA)





#### AMERICA'S ARMY:

#### THE STRENGTH OF THE NATION

### A Multi-Disciplinary Approach

**Tactical** 

Vehicles

**Non Tactical** 





Net Zero Installations Contingency Basing Smart & Green Energy Mini Grid Power Plants Adv. Mobile Medium Power Sources Insulated Tents/Spray Foam Renewable Energy Program Plan ARNG Energy Lab (Schools) LED & Electroluminescent Lighting Shower Water Reuse System Expeditionary Water Packaging Water From Air System System Integration Lab - Ft Devens Solar, Wind, Geothermal Power

Rucksack Enhanced Portable Power Expeditionary Energy Soldier Power Manager Nett Warrior

**Soldier** 

OSD Operational Energy Strategy

Senior Energy & Sustainability Council

Energy Initiatives Task Force

Army Energy Security Initiatives

Net Zero Strategy

Tactical Fuels Manager Defense Smart-Charging Micro Grids Vehicle-to-Grid (Fort Carson, CO) Alternative Fuels Low Speed Electric Vehicles Hybrid Electric Vehicles Hybrid Truck Users Forum (TARDEC) Hydrogen Fuel Cell Vehicles Improved Turbine Engine Program

> Operational Energy Installation Energy



### **Advantages in Operational Edge**

### **Enabled by Energy**





#### AMERICA'S ARMY: THE STRENGTH OF THE NATION

## **Enhancing Mission Effectiveness**



### **Operational Energy**

- The Army spent \$3.6 Billion on fuel in FY12.
- 70-80% of resupply weight in theater consists of fuel and water.
- 18% of US casualties in OIF and OEF are related to ground resupply.
- 40% of fuel goes to produce electricity we have the technology and know how to save between 30-60% of this amount
- Reducing fuel and water demand will reduce logistical burdens, save lives, and expand capability. To achieve this the Army has:
  - Deployed 36 mini-grids, saving 50 million gallons annually;
  - Accelerated fielding of new generator (AAMPS), 21% more efficient and designed to be networked;
  - Deployed "hybrid" energy systems with solar panels, battery storage, and power management systems;
  - Established a robust and structure test and evaluations system, integrated with training as well as doctrine development
  - Working to drive behavior change across all levels of the Army
- Results can be measured in terms of dollars saved and capability
- Tactical Energy Security Investments are Expanding CHOICE



### Where We Are Today



- **SOLDIER -** Integrate smart energy initiatives to enhance Soldier's effectiveness.
  - Soldier Worn Integrated Power Enhanced System: Reduces energy weight for three-day patrol by 30% (from 14 to 9.8 lbs for team leader)
  - **Capability Set 13**: In FY-12/13, five brigades were equipped with modernized energy efficient equipment



- **BASING** Integration of fuel, water, and waste (F/W/W) disposal system efficiencies are being tested worldwide.
  - Base Camp Integration Laboratory at Fort Devens: Improved F/W/W disposal efficiency
  - Smart and Green Energy: Maximizes engineering specifications; present savings from 30% to 60%
  - Kuwait Energy Efficiency Project: Improves shelter & microgrids, reduces consumption, expected cost return in year 1
  - Shower Water Reuse System: Expected to reduce water consumption by 75%.



- **WHEELED VEHICLES** Technology to enable Soldiers to recharge batteries, reduce reliance on mobile Power generation, and extend operational reach.
  - Abrams Auxiliary Power Unit: At tactical idle consumes 17 gallons per hour (83% efficiency gain)
  - Bradley Transmission Upgrade: Will generate an overall fuel savings of 3%



- **AIRCRAFT** Provides movement to positions of advantage to defeat the threat effectively.
  - Improved Turbine Engine Program (ITEP): Replacement engine for Blackhawk/Apache
    - 35% reduction in production and maintenance costs
    - 65% increased horsepower to weight
    - 20% longer engine life



#### AMERICA'S ARMY:

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## **Enhancing Mission Effectiveness**



Through technology and policies we are reducing our energy footprint. We will provide flexibility and resiliency by developing alternatives and adaptable capabilities

# **Installation Energy**

- The Army is largest facility energy consumer in the Federal Government \$1.25B (FY12).
- Since FY03 the Army has reduced its energy intensity by 16.8% while total population on its installations has increased 20%.
- Established Net Zero Initiative to demonstrate integrated design principals that will ensure the Army of tomorrow has the same access to energy, water, land and natural resources as the Army of today.
- Formed the Energy Initiatives Task Force to develop large scale renewable energy projects that will help strengthen energy security while supporting the Army's energy goals.
- Army has most robust ESPC program in entire Federal government.
  - Secured more than \$1.5B in ESPC and UESC investment at more than 72 installations.
  - Cost avoidance of \$148 million.
  - Energy savings of more 7.986 trillion British Thermal Units (BTU).
  - Army efforts over the past year have reduced process times on these contracts to less than 14 months.
- The Army is actively managing its non-tactical vehicle fleet to reduce size and improve efficiency, resulted in a 28.5% fuel use reduction since FY05.



### **Army Facilities Energy Outlook**





#### **Renewable Energy Development**

#### EITF - Moving the Army to 1 Giga-Watt of Renewable Energy by 2025

