

Operational Energy: ENERGY FOR THE WARFIGHTER

*Office of the Assistant Secretary of Defense for
Operational Energy Plans and Programs*

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30 July 2012*

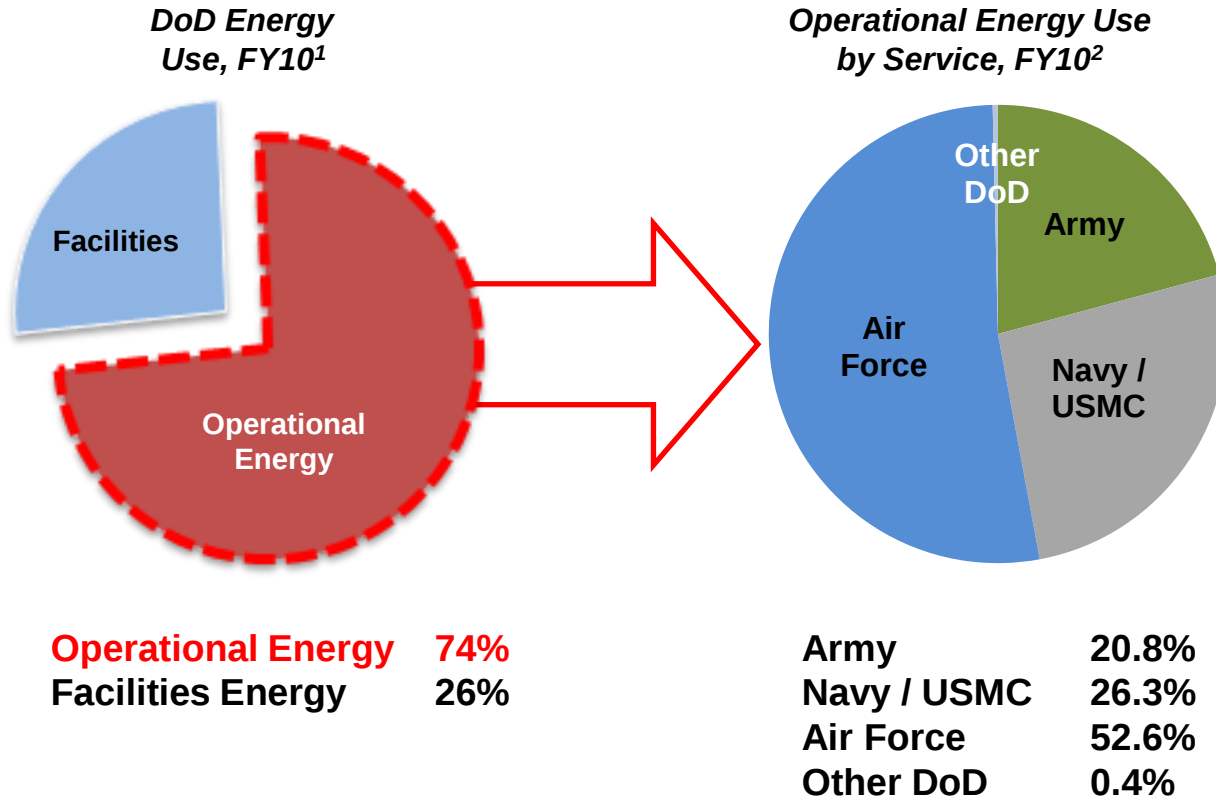


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Report Documentation Page			Form Approved OMB No. 0704-0188		
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 30 JUL 2012	2. REPORT TYPE		3. DATES COVERED 00-00-2012 to 00-00-2012		
4. TITLE AND SUBTITLE Operational Energy: Energy for the Warfighter			5a. CONTRACT NUMBER		
			5b. GRANT NUMBER		
			5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S)			5d. PROJECT NUMBER		
			5e. TASK NUMBER		
			5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Ofc of the Asst Secretary of Defense for Operational Energy Plans and Programs, ASD(OEPP), 3700 Defense Pentagon, Washington, DC, 20301-3700			8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)			10. SPONSOR/MONITOR'S ACRONYM(S)		
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)		
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES Presented at the 2nd Multifunctional Materials for Defense Workshop in conjunction with the 2012 Annual Grantees'/Contractors' Meeting for AFOSR Program on Mechanics of Multifunctional Materials & Microsystems Held 30 July - 3 August 2012 in Arlington, VA. Sponsored by AFRL, AFOSR, ARO, NRL, ONR, and ARL.					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 14	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			



Operational Energy at DoD



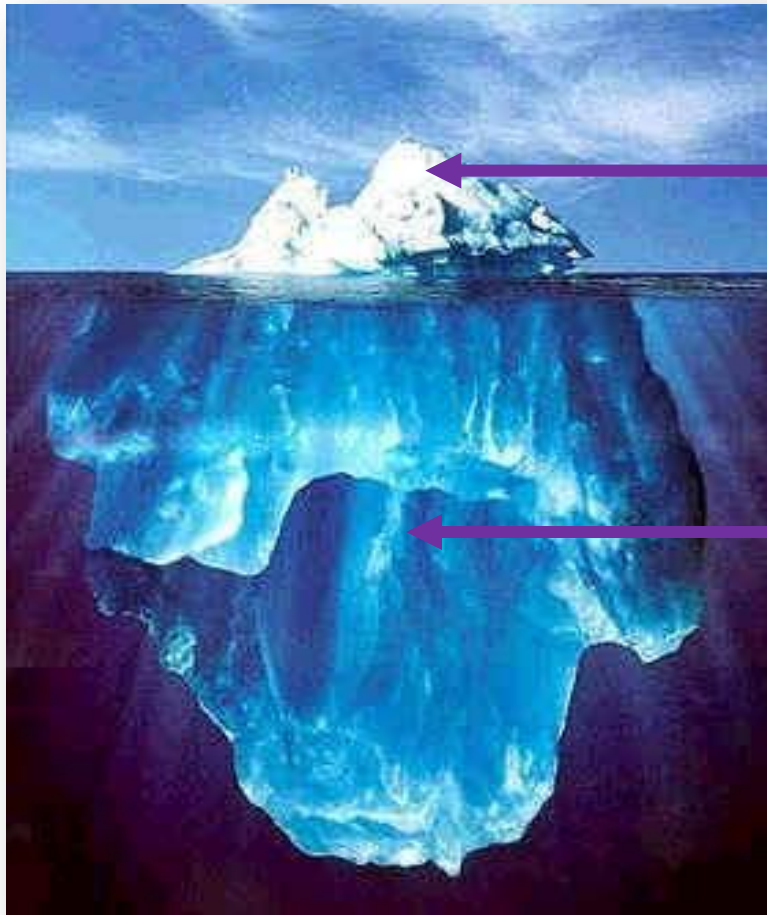
¹ FY2010 DoD Annual Energy Management Report, figures by site delivered BTUs

² DLA-Energy Fact Book FY2010, Total DoD Sales

Operational Energy – “The energy required for training, moving, and sustaining military forces and weapons platforms for military operations”



More Than Just the Cost of Fuel: Opportunity Costs of Energy



❑ Direct Financial Costs

- ~\$18B to purchase fuel in FY11



❑ Indirect Financial Costs

- Aerial refueling – AF, USMC tankers
- Refueling trucks and helicopters
- Underway replenishment – Navy oilers

❑ Operational Costs

- Casualties
- Force protection
- Time to deploy, employ
- Ability to disperse
- Risk of disruption
- Geopolitical access

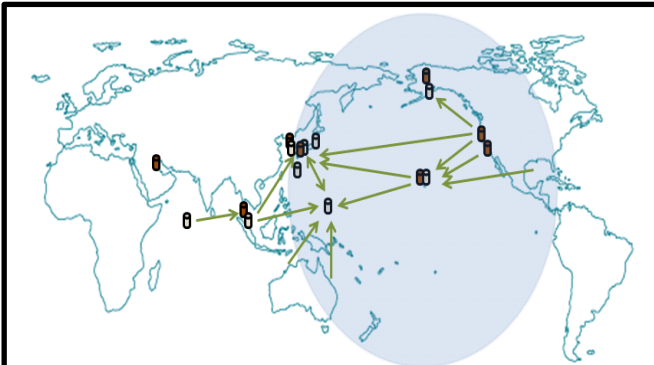
Emerging threats are increasing the risks of these indirect costs



Defense Energy Challenges



- ☐ Distributed, complex distribution networks
- ☐ Tactical fuel logistics in an irregular battlespace
- ☐ Inefficient equipment in theater adds to burden



- ☐ Energy choke points
- ☐ High and volatile prices
- ☐ A2/AD threats to energy affect power projection
- ☐ AirSea Battle



- ☐ New capabilities with growing energy needs
- ☐ Implications for sustainment
- ☐ Legacy equipment



Defense Energy Opportunities



- ☐ Centralized power generation
- ☐ Energy-efficient shelters, lighting, and heating/air conditioning
- ☐ Tactical Solar



- ☐ Hybrid electric drives
- ☐ Better hull and propeller coatings and stern flaps
- ☐ UUVs



- ☐ Improved routing and flight profiles
- ☐ Optimized cargo loading and center of gravity
- ☐ Engine wash / less drag



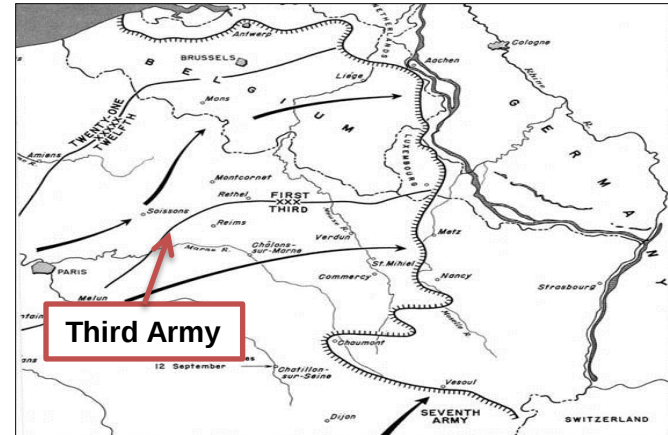
Case Study: Army in WWII

❑ Rapid advance of US 3rd Army meant limited fuel supplies

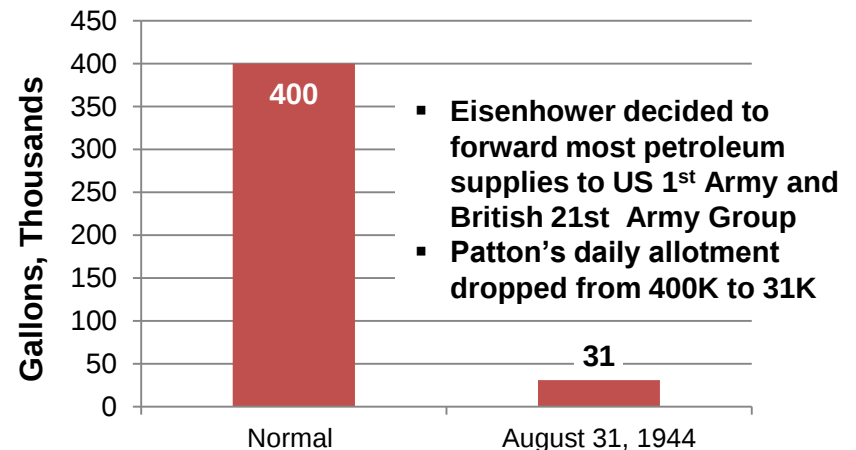
- Pre-invasion planning based on methodical advance with time to establish depots and bases
- Difficulties with pipelines and clearing channel ports meant almost all fuel had to come by truck from Normandy via Red Ball Express

❑ Fuel shortages forced operational level tradeoffs

- Eisenhower forced to choose between sustaining the breakout from Normandy or supporting failed push to Antwerp in Operation Market Garden



Fuel Supply to US 3rd Army

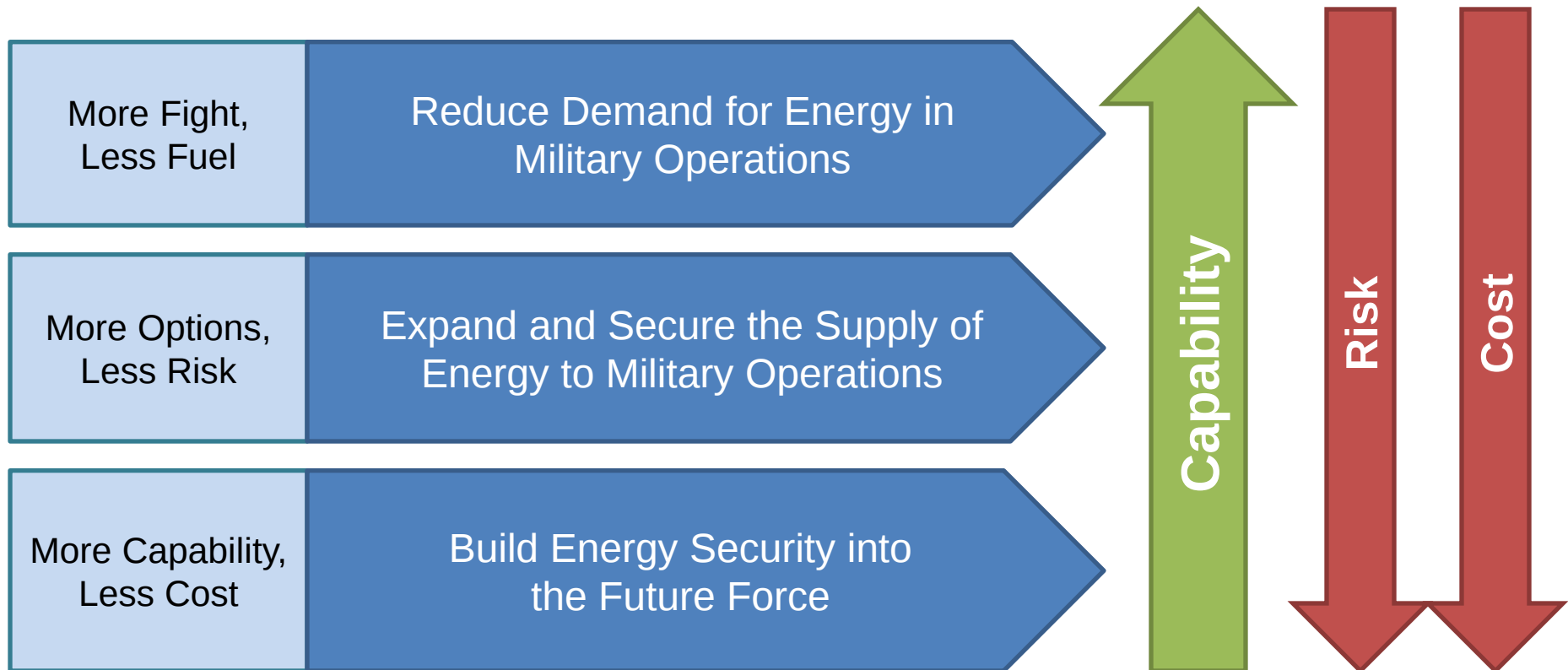


High fuel demand, geography, and the adversary challenged logistics assumptions – and forced operational tradeoffs



DoD Operational Energy Strategy

- ❑ **GOAL: U.S. armed forces will have the energy they require for 21st century military missions**



DoD Operational Energy Strategy outlines changes in energy demand, energy supply, and future capabilities



Implementing the Operational Energy Strategy

- ❑ Measure Operational Energy Consumption
- ❑ Improve Energy Performance and Efficiency
- ❑ **Promote Operational Energy Innovation**
- ❑ Improve Operational Energy Security at Fixed Installations
- ❑ Promote the Development of Alternative Fuels
- ❑ Incorporate Energy Security Considerations into Requirements and Acquisition
- ❑ Adapt Policy, Doctrine, Professional Military Education, and Combatant Command Activities

Operational Energy Strategy Implementation Plan includes near-, mid-, and long-term goals to achieve energy security for the warfighter



S&T Gap Assessment

- ☐ **ASD(R&E) to identify investment gaps in Department's science and technology (S&T) portfolio necessary to reduce demand, improve system efficiency, and expand supply alternatives**
- ☐ **Effort executed through Energy & Power and Air Platforms Communities of Interest (COIs), Service S&T Executive staff, Service Operational Energy offices, and OASD(OEPP)**
- ☐ **Results to Defense Operational Energy Board in Sep 2012**
- ☐ **Will help set agenda for future action**

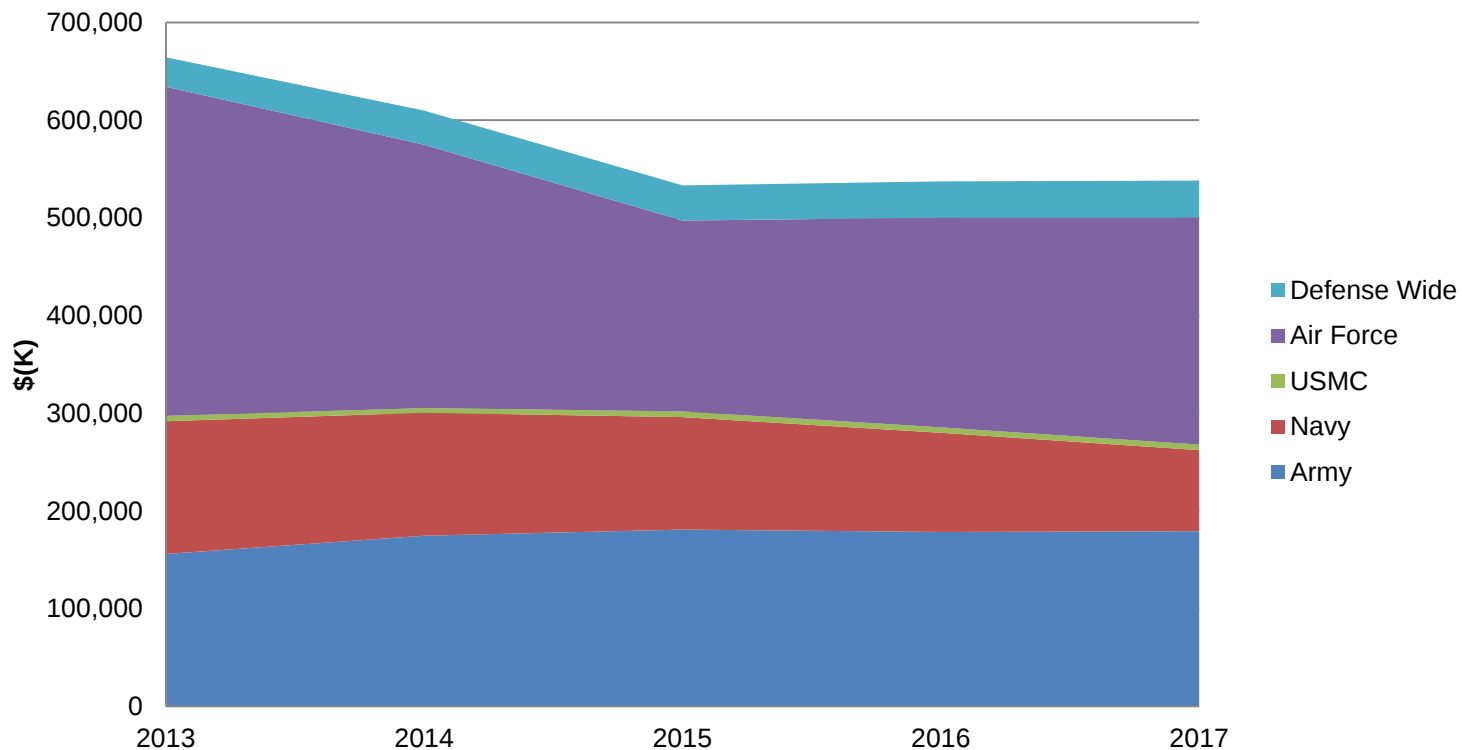




DoD S&T Investments

- Total S&T investment across FYDP: \$2.9B (32% of total OE investment)

S&T Funding for Operational Energy





Improving Energy Use at Contingency Bases

Solutions Must be Carefully Matched to the Operating Location

Largest Consumers of Fuel

Greatest Effort and Risk to Sustain

Main Logistics Hub – *Bagram*



- Centralized Power Projects
- LOGCAP Energy Services Initiative
- Design standards for temporary and semi-permanent facilities / infrastructure
- Base camp master planning

Tactical Edge – *PB Boldak*



- Energy efficient shelter systems
- Soldier power
- Alternative energy sources





Thoughts Re Multifunctional Materials

☐ **It's not just joules!**

- Understand energy burdens and risks in a military context
- Understand the hurdles in a military context

☐ **“Green” is nice but makes no sale. How does something make DoD fight better?**

☐ **Opportunities for Multifunctional Materials**

- Lightweighting
- Energy Harvesting
- Energy Efficiency
 - Improve systems
 - New ways of doing things?



What Does Success Look Like?

- ☐ Improving range, endurance, and availability of ground, air, and naval forces
- ☐ Lightening the logistics load
- ☐ Reduced vulnerability of energy supply lines and forces protecting them
- ☐ Refocusing combat forces from protection of supply lines and fuel to operational missions

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