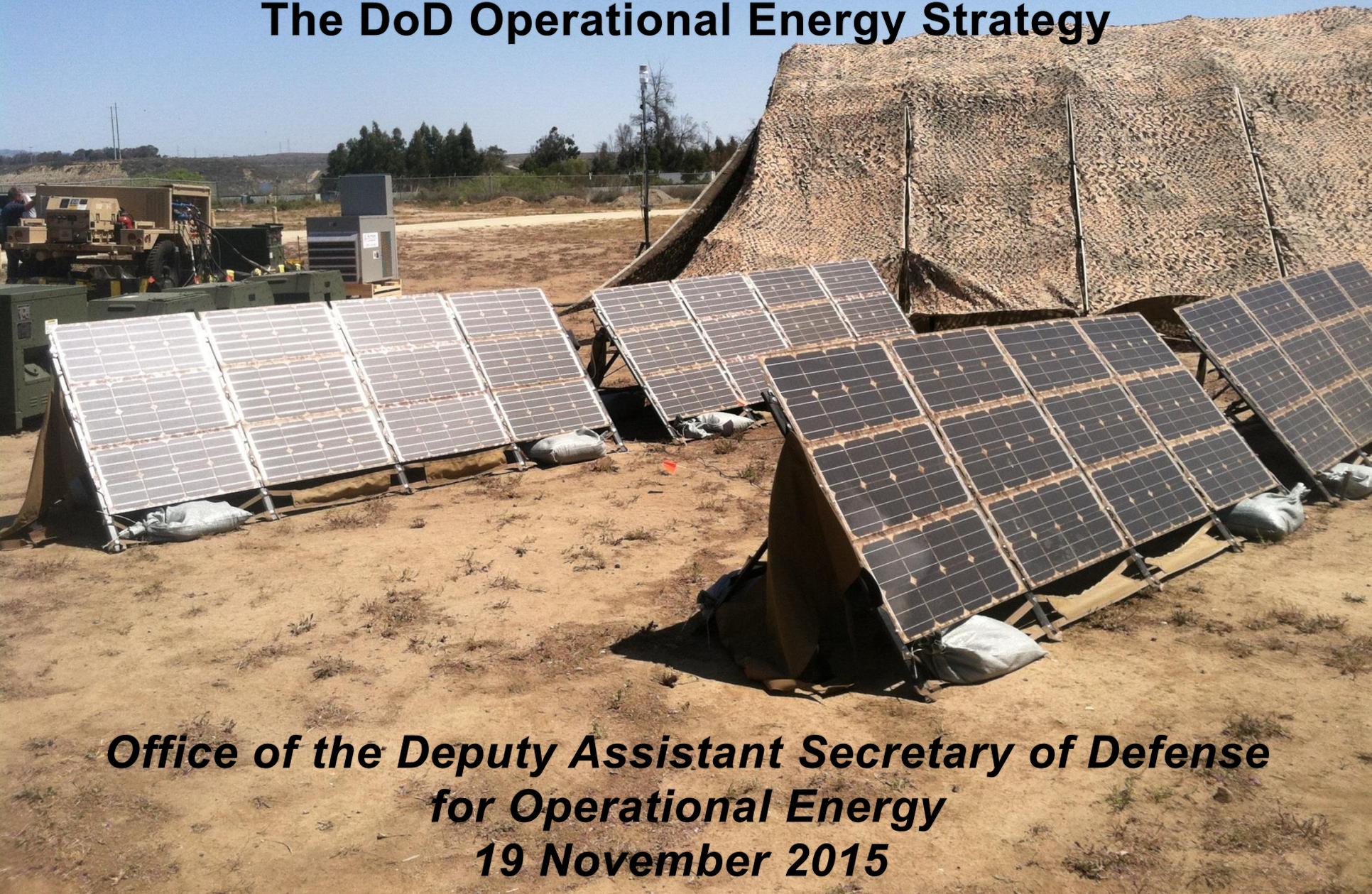


ENERGY FOR THE WARFIGHTER:

The DoD Operational Energy Strategy

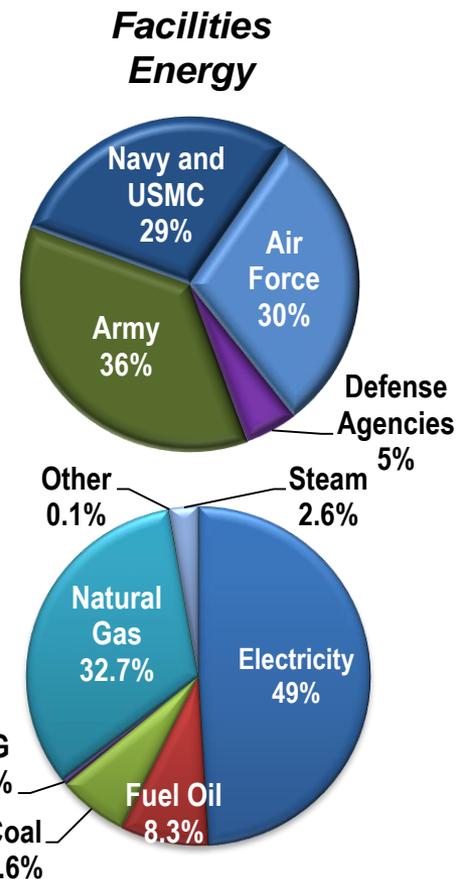
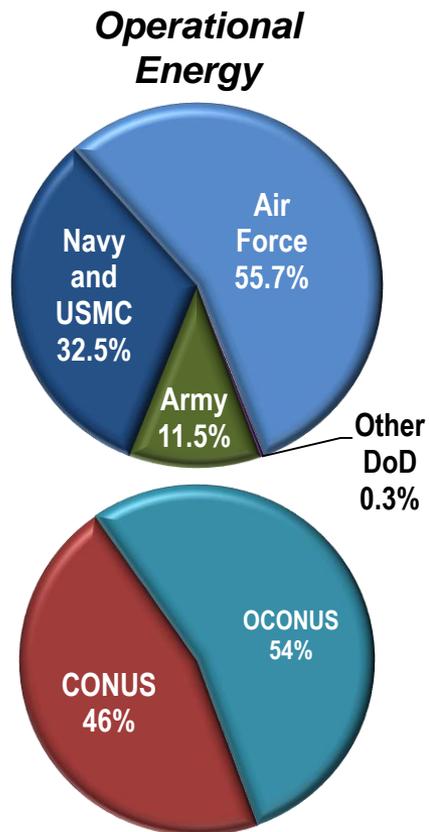
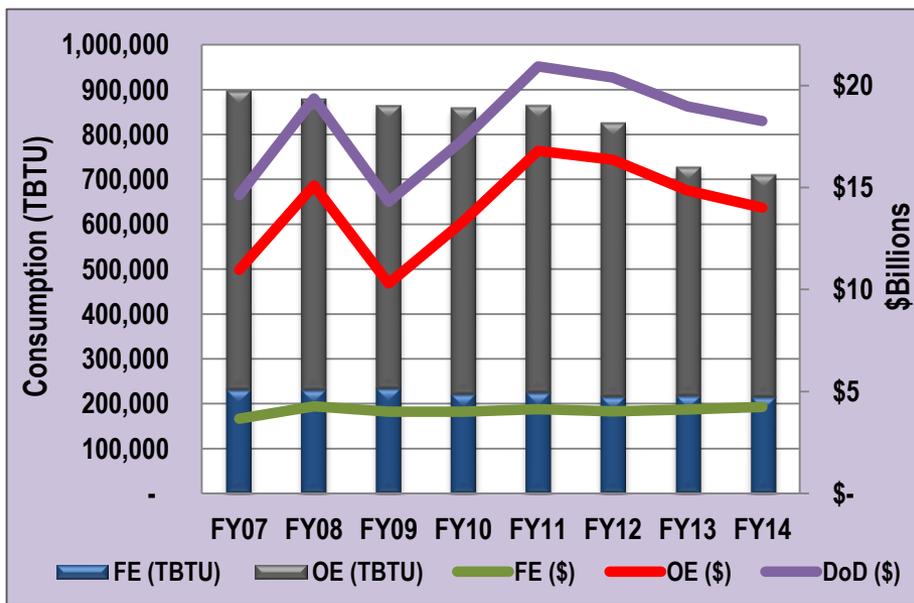


***Office of the Deputy Assistant Secretary of Defense
for Operational Energy
19 November 2015***

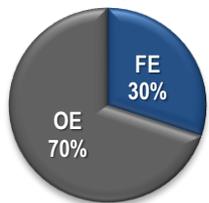


DoD Energy Profile

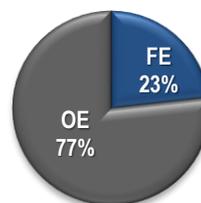
DoD Energy Use and Cost, FY07-14



Consumption



Costs



Sources: Annual Energy Management Report, DLA

Operational Energy: Energy required for training, moving, and sustaining military forces and weapons platforms for military operations

Facilities Energy: Energy to sustain activities at permanent military installations, including non-tactical vehicles



Risks to Operational Energy

Anti-Access/Area Denial Threats



Distance/Geography



Distributed Operations



Irregular Adversaries



Peer Competitors

Adaptations to demand, supply, and the future force designed to mitigate these risks and increase capability



Implications for Defense Capabilities

More Capability, More Energy



C-141



F-16



P-3



M2 Bradley



FFG-7



C-17



JSF



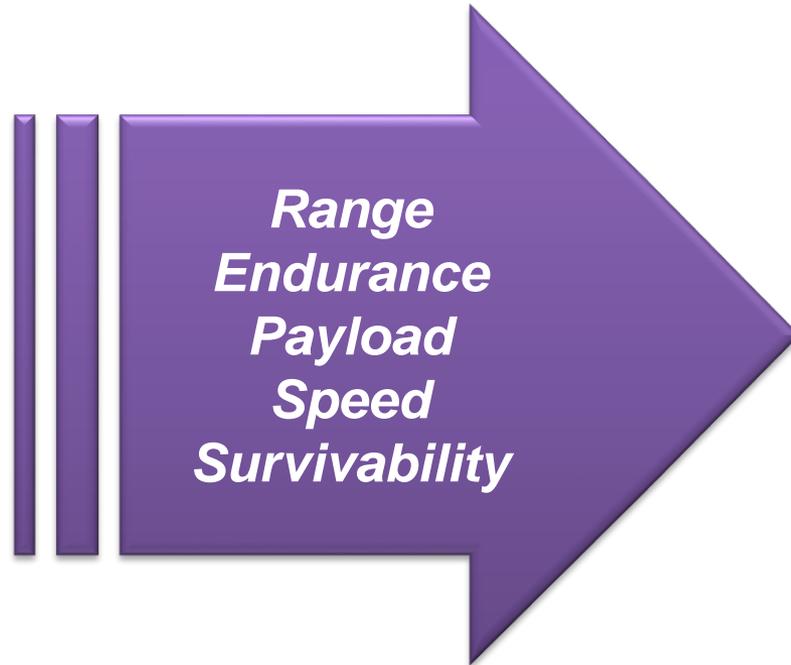
P-8



GCV



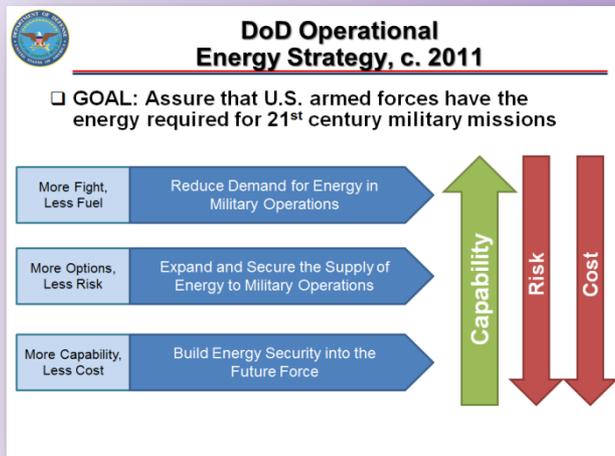
LCS



While enabling capability, increasing energy requirements also bring risk



Evolving the Strategy



Objectives

Reduce demand
Diversify supply
Adapt the future force

Priority

Support current operations
in CENTCOM

- Increase warfighter capability
- Identify and reduce logistics risks to mission
- Improve current mission effectiveness

Shift to Pacific

Operations in A2/AD

Improve Resilience



Current Initiatives: Aircraft, Vehicles, Ships, and Bases

AIR

M1 Auxiliary Power Unit



APU extends range by reducing sustainment requirements

LAND

AMMPS



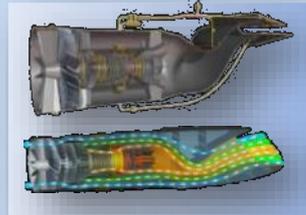
New gen-sets use 21% less fuel and 95% more reliable than predecessors

SEA

Energy Dashboard



Dashboards provide actionable information to commanders



Adaptive and Efficient Engines

Advanced engines can reduce consumption by 25% and increase range by 30%

Shades and Liners



New shelters better withstand power outages and up to 75% more power efficient than tents

Operating Procedures



Improved cargo loading and routing contributed to the Air Force transporting 9.5% more cargo per gallon of fuel than three years ago

Improved Turbine Engine Program



Increased lift/range in hotter conditions and at higher altitude, with reduced fuel consumption and maintenance

Hybrid Electric Drive



Electric Drive on DDG-51 will enable 2.5 additional days on station per year





Current Initiatives: Diversifying Supply and Adapting the Future Force

❑ Alternative Fuels

- Established department-wide policy
- Certify & qualify equipment
- Support development of biorefineries

❑ Tactical Solar

- Develop foldable solar blankets & universal battery chargers
- Improve dismounted power to increase endurance & agility

❑ Logistics Risk Reduction

- Identify & mitigate operational energy and logistics risks in OPLANs
- Improve energy supportability of Concept of Operations

❑ Adapt the Future Force

- Explore risks & opportunities through wargames, M&S
- Include energy performance parameters in requirements & acquisition of future systems
- Improve combat effectiveness & supportability through innovation





Operational Energy: Lessons Learned

- ❑ **Earlier is better: Energy-informed force development and planning**
 - Platforms, plans, and people

- ❑ **Long-term versus short-term**
 - Take advantage of turnover and short operational life to rapidly field improved equipment
 - Balance short-term with R&D, CONOPs, and changes in requirements process

- ❑ **Understanding risk is paramount**
 - Baseline of operational gaps and requirements
 - Risk does not always equal volume of fuel or supplies
 - End to end DoD energy supply chain

- ❑ **Portfolio of initiatives needed**
 - More than demand reduction
 - Consider DOTMLPF – concepts of operation, log capacity, TTPs, et al
 - Behavior change



Energy in Warfare is Not New



OPERATIONAL ENERGY IN HISTORY

NORTHERN DISTRIBUTION NETWORK

2011: Stretching almost 1,000 miles, the Northern Distribution Network delivered almost 250,000 tons of supplies to support operations in Afghanistan



NAPOLEON

1812: Hampered by the weather and long vulnerable supply lines, Napoleon's invasion of Russia ended in disaster.

END OF SAIL

1814: The USS Fulton was the first U.S. Navy warship to be propelled by steam instead of wind to increase speed and capability.



RED BALL EXPRESS

1944: The Red Ball Express, a convoy of trucks, used 300,000 gallons of fuel a day to deliver 400,000 gallons for the Third Army's drive across France.



RAPID UPGRADES

1943: A new engine and drop tanks allowed upgraded P-51 Mustangs to escort bombers all the way to Berlin.



COAL TO OIL

1910's: Led by Winston Churchill, the Royal Navy switched from locally sourced coal to foreign oil to improve speed and range.

MID-AIR REFUELING

1929: The Army Air Corps "Question Mark" set an airplane endurance record of more than 150 hours thanks to 42 mid-air refuelings.

