USMC Expeditionary Energy

Joint Committee On Tactical Shelters (JOCOTAS)
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**7th Bi-Annual DOD JOCOTAS Meeting with Rigid & Soft Wall Shelter Industry & Indoor & Outdoor Exhibition, 1-3 Nov 2011, Panama City Beach, FL**

**Approved for public release; distribution unlimited**
Distributed Operations
“Enabled By Technology Advances”

- 250% Increase in Radios
- 300% Increase in IT/Computers
- 200% Increase in # of Vehicles
- 75% Increase in Vehicle WGT
- 30% Decrease in MPG
  - MTVR – 4.3 MPG
  - HMMWV – 8.0 MPG
  - MRAP – 4.0 MPG

Increased Risk and Dependence

24 Mar 10 – 30 Jun 10
299 Fuel/Water Convoys (98 Days)
6 Marines WIA hauling Fuel/Water
1 Marine WIA per 50 Fuel/Water Convoys

We can’t afford to continue business as usual.
Lighten the Load, Don’t Give up Lethality

Batteries Alone:
380% Weight Increase
2,400% Cost Increase

Vietnam

Today

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Today’s Deployed MAGTF

Small Improvements in Energy Efficiency…Big Impact!

- **0.5% Improvement ~0.5M gals/yr.**
  - 95 Fuel Trucks or $3.6M

- **5% Improvement ~4.7M gals/yr.**
  - 949 Fuel Trucks or $36M

- **15% Improvement ~14M gals/yr.**
  - 2,847 Fuel Trucks or $109M

- **25% Improvement ~24M gals/yr.**
  - 4,745 Fuel Trucks or $182M

1 Gallon JP-8

- **25%**
- **30%**
- **45%**

- **$7.68 / Gallon**
- **260,000 Gallons / Day**
- **52 Fuel Trucks / Day**
- **or**
- **18,980 Fuel Trucks / Year**
- **$729M / Year**

USMC Consumes ~ 5M Bbls per year
Energy cost have risen over 300% since 2000
$10 increase per Bbl = $1.2B cost to DoD
Oil has increased $20+ since Oct 2010
Projected to increase to $125/Bbl by 2025 (EIA 2010)
Expeditionary Energy Goals
“A Starting Point”

- 25% Doctrine, Training, Organization, and Leadership = Behavior Change “Expeditionary Ethos”
- 10-15% Increased Efficiency of Ground Vehicles and Equipment
- 5-10% Renewable / Alternative Energy
- 10% Increased Efficiency in Aviation
- ~50% Reduction by 2025

Starting Baseline
OEF 2010
(Will be adjusted as we gain greater insights into actual use across the MAGTF)

Creating a more Capable MAGTF, Today and Tomorrow
Increasing Effectiveness
Reducing Risk

- Lethal: "More Tooth less Tail"
- Austere: "Reduce Footprint"
- Fast: "Lighten Load"

Efficiency
Renewables
Ethos

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More Efficient, Alternative Fuel-Capable Aircraft & Renewable-Powered UASs

Minimized Aviation Resupply Missions

Self-Sufficient FARP – Water & Energy
Alternative Fuel

Self-Sufficient COP/PB - Renewable Energy Powered
COC & Life Support, Locally Sourced Water
Renewable Energy, Water Purification

Precision Air Delivery

Dispersed Maneuver Force

Improved, Fuel Efficient Vehicles
Operating on Alternative Fuels

Dismounted Ops – Reduced Battery & Water Load & Resupply
Renewable Energy, Water Purification

Plan for Energy, Water, & Waste Efficiency

Self-Sufficient Bn FOB – Renewable Energy
Powered COC & Life Support,
Locally Sourced Water
Minimum Footprint Ashore

Joint or Coalition Force, Interoperable Energy, Water & Waste Capabilities

Afloat CZ & Logistics Support

Common Operational Energy Picture
Monitor, Analyze, Manage

Fuel, Battery, & Water Resupply Convoys Minimized
Strategic Framework to Create a More Capable MAGTF

Mission
By 2025 we will deploy Marine Expeditionary Forces that can maneuver from the sea and sustain C4I and life support systems in place; the only liquid fuel needed will be for mobility systems which will be more energy efficient than systems are today.

E2W2 CBA/ICD

Three Pillars Required to Accomplish the Mission

Energy Strategy and Supporting Requirements Documents Written in Parallel to Achieve CMC’s Priority; …to “Implement New Capabilities…”
“Expeditionary Energy, Water, and Waste ICD Gaps”
ExFOB Update
ExFOB Team

- ExFOB executed Aug (West Coast)
  - Additional ExFOB 30 Apr – 4 May (East Coast)
- Operational Planning Team – Weekly
- Executive Board Meets Quarterly
- MROC Brief Annually
- E²O administrative oversight, scheduling, and budgeting

Informs Requirements / Mitigates Investment Risks / Builds Confidence in New Technology
ExFOB To Date

Dec-09
RFI 95 Technologies

Mar-10
ExFOB 16 Technologies Quantico, VA

Apr-Jul 10
Eval/Train 8 (-2) Technologies

Oct-10
Deployed 6 Technologies

Jul-11
Accelerated 4 Technologies

1st ExFOB

Apr-10
RFI 28 Technologies

Aug-11
ExFOB 15 Technologies 29 Palms, CA

May-Jul 11
 Eval/Train 3 Technologies

Aug-11
Deployed 3 Technologies

TBD
Accelerated TBD Technologies

2nd ExFOB

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1st ExFOB Deployment
Accelerating Technologies to OEF

**Cost & Savings:**

- **Cost**: $25M
- **Projected Savings**
  - Est. $40.9M / Year
  - Est. 9M lbs / Year
  - Est. 450 MV-22 Sorties
  - Est. 180 Fuel Trucks

**Fielding 10 Sets Each:**

- 75 x Shelter Liners for BASE-X 305
- 75 x LED Lights
- 96 x Solar Portable Alternative Communications Energy System (SPACES)
- 20 x Ground Renewable Expeditionary Energy Network System (GREENS)

**Operational Impact:**

- Reduced fuel and battery requirements, reduced load
- Improved quality of life with efficient shelters
- Quiet, easy to maintain systems

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2nd ExFOB Deployment  
PB Boldak

**Hybrid Power System**  
- Greater Than 80% Fuel Savings  
- Break Even Weight approx. 3 Months  
- Break Even Fuel Cost approx. 1 Year  
- Concerns: Complexity / Weight

**Direct Current Air Conditioner**  
- Great Than 70% Fuel Savings  
- Break Even Cost Immediately  
- Concerns: Durability / Heating

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Non-Material Solutions Update

• Common Skills Program “Expeditionary Ethos”
  – Under review at TECOM

• Camp Commandant Pilot Training Program
  – MCES In-Work

• Doctrine Review
  – Ongoing

• NPS New Energy Curricula
  – 3 Students
The Marine Corps Expeditionary Energy Office (E²O) will analyze, develop, and direct the Marine Corps’ energy strategy in order to optimize expeditionary capabilities across all Warfighting functions.

Col Bob “Brutus” Charette
Director, Expeditionary Energy Office