USMC Acquisition Initiatives in Tactical Electric Power

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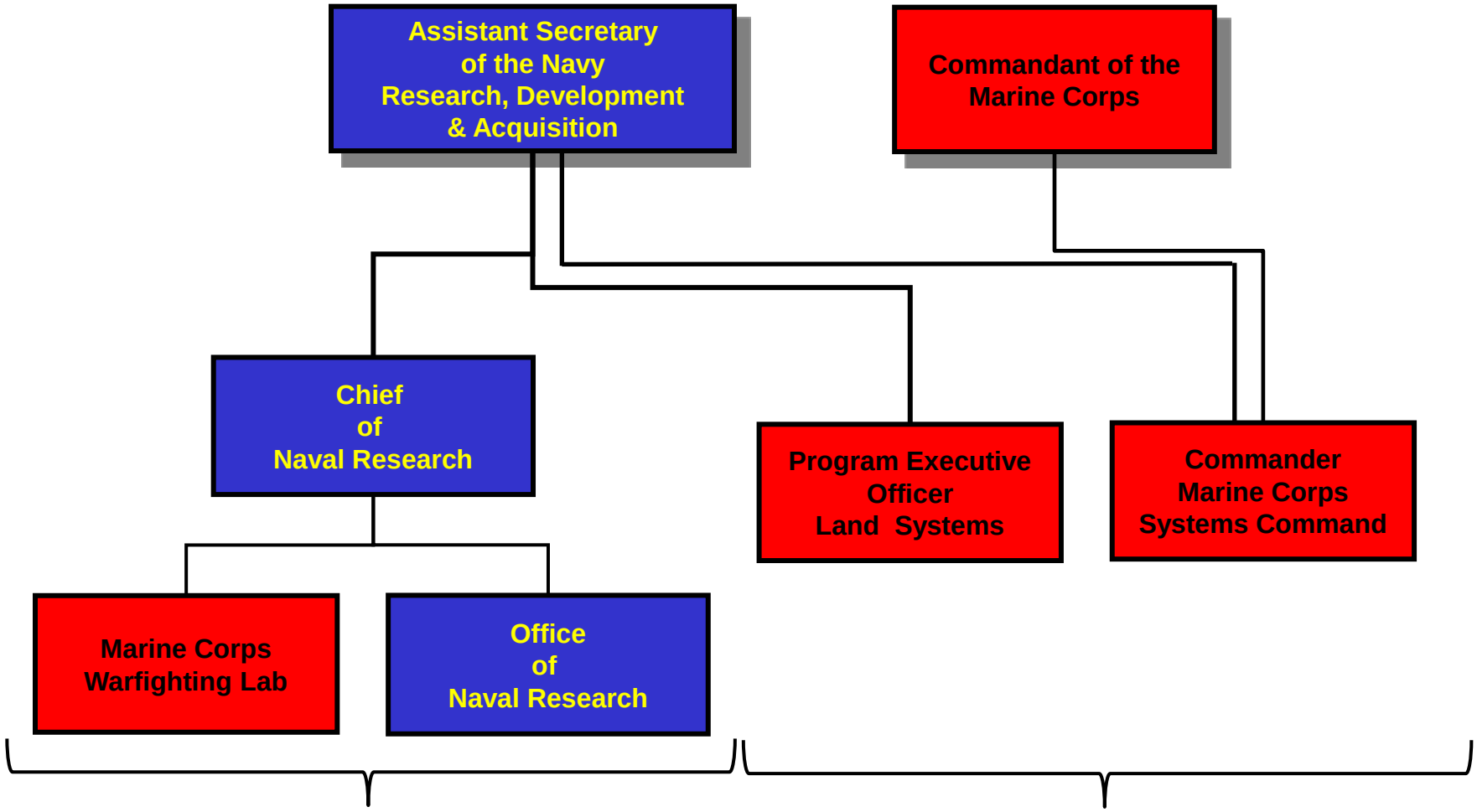
Program Manager - Expeditionary Power Systems
Marine Corps Systems Command

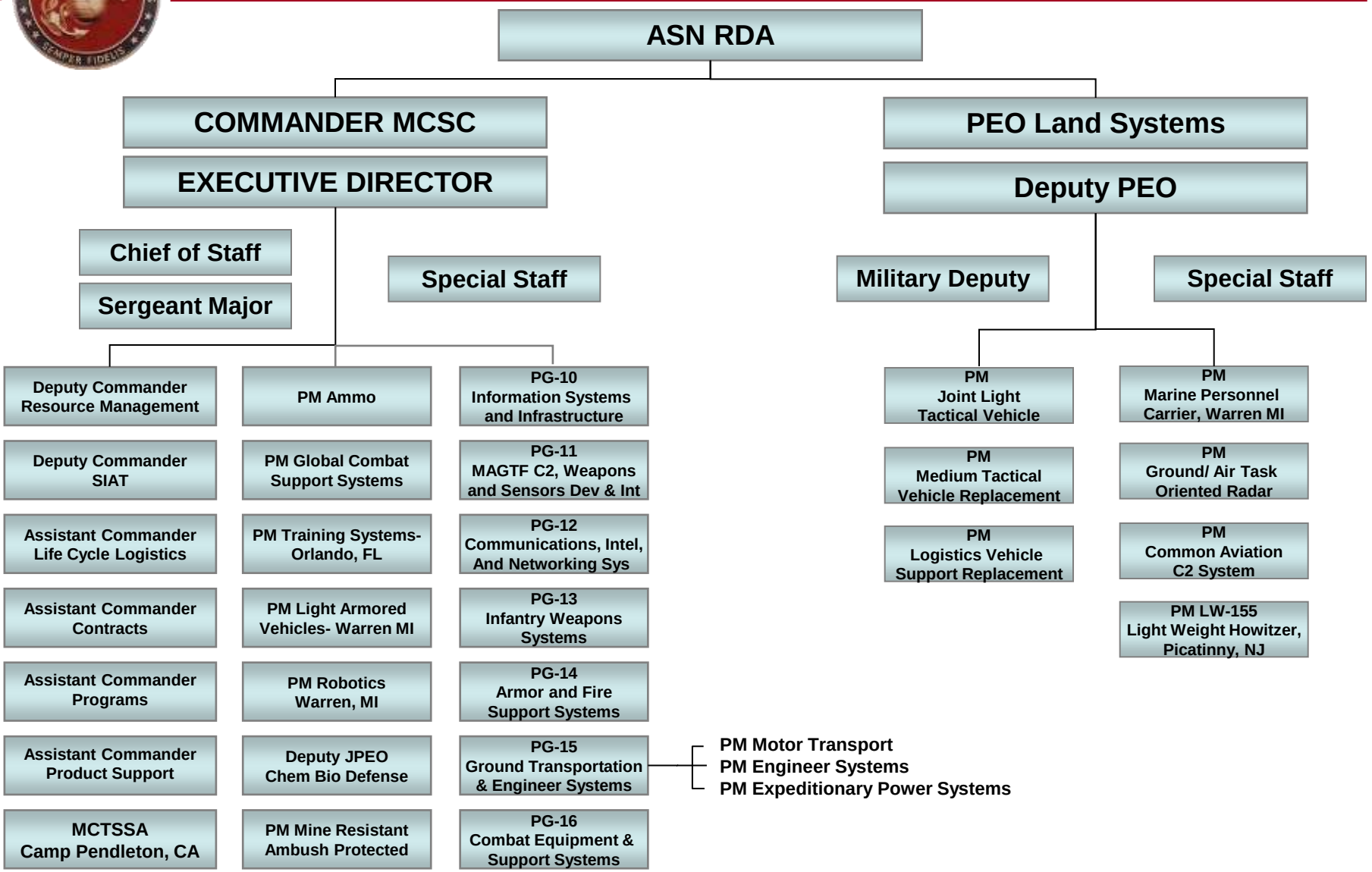
Discussion Topics

- **Organizations**
- **USMC Requirements**
- **New initiatives for USMC Power & Energy**
- **New acquisition policies and impacts**
- **Points of Contact**

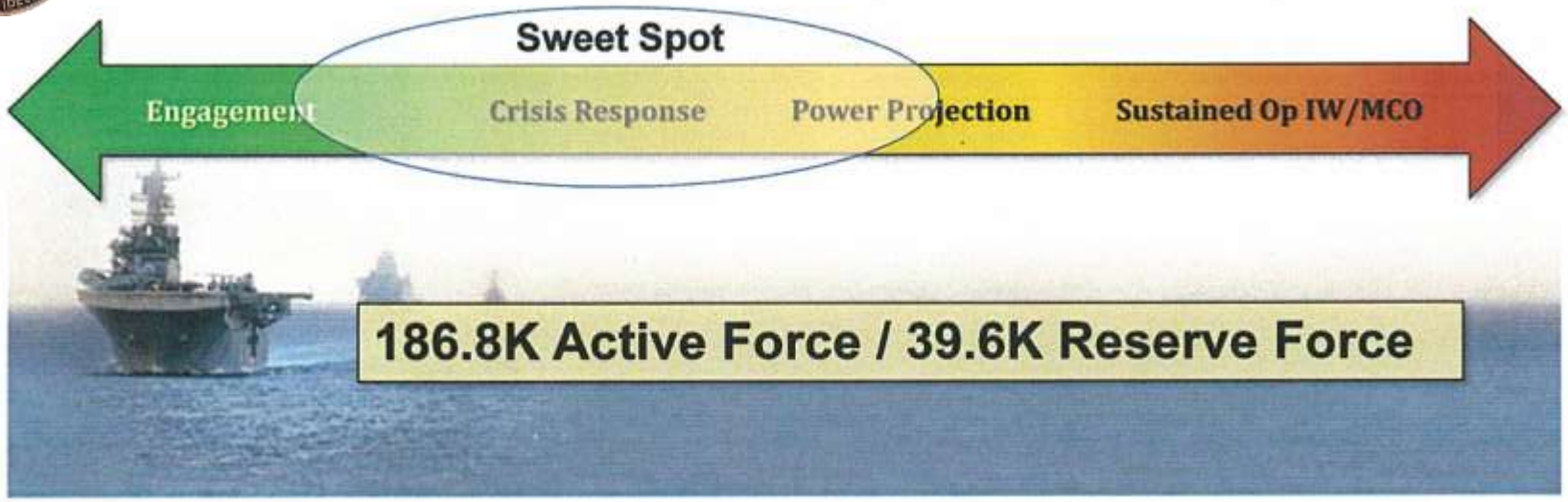
USMC Organizations in Power and Energy



USMC Acquisition Organizations



USMC Force Structure Review



- **7.5% reduction of force, but 9% reduction in logistics**
- **Larger than Special Operations Forces, but more expeditionary than conventional Army units**
- **Able to engage and respond quickly – often from the sea.**

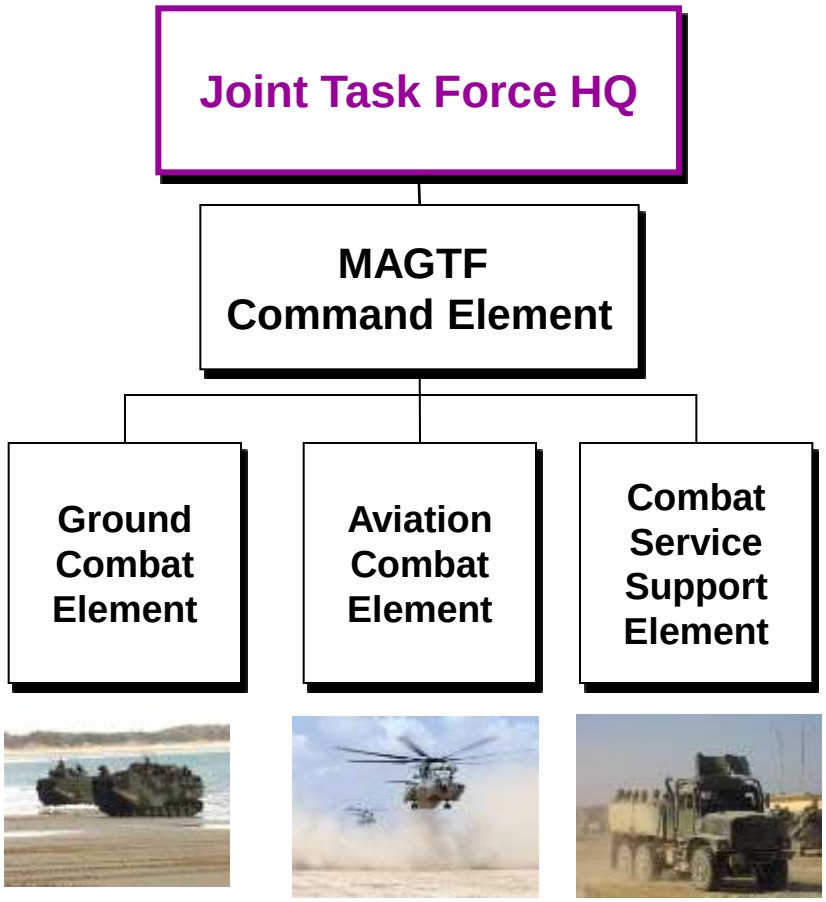
Strategically mobile, middleweight force

Optimized for rapid crisis response and forward-presence

Back to Amphibious / Expeditionary Roots

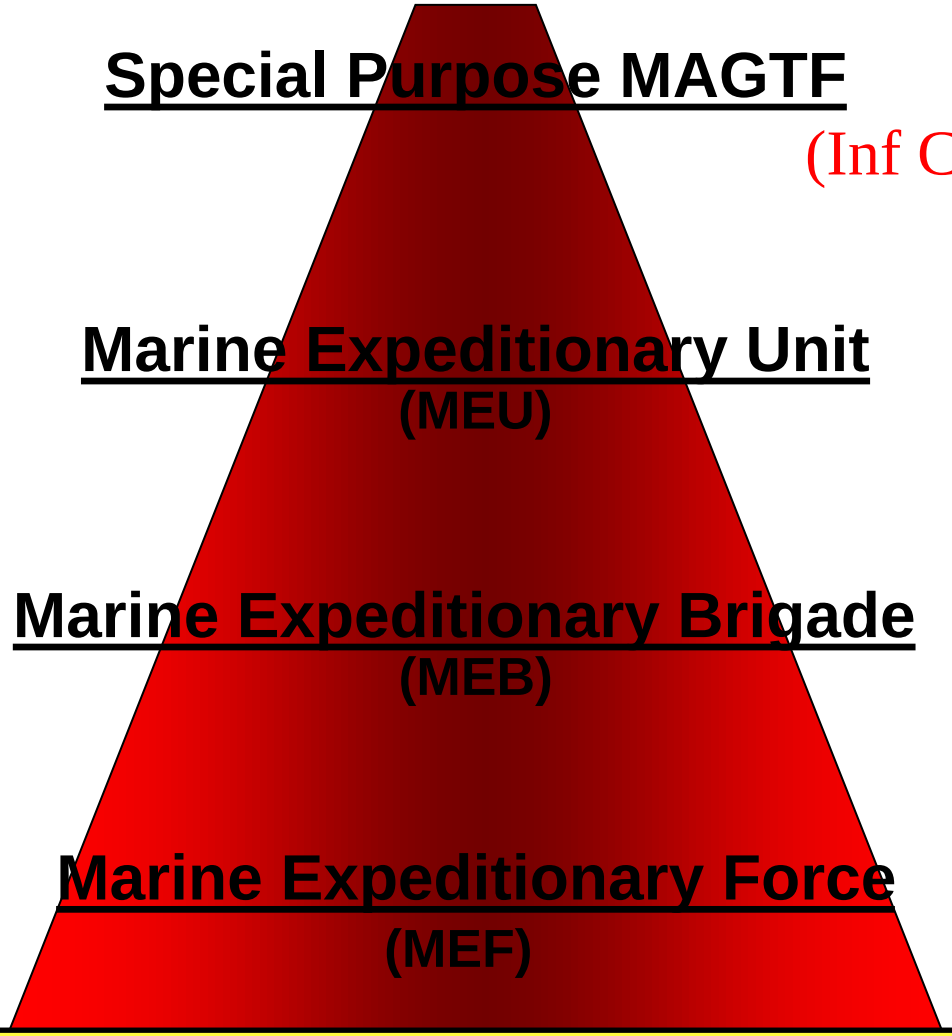
MARINE AIR-GROUND TASK FORCES

- USMC always works within the organizational framework and alignment to the Joint mission
- MAGTFs are self-contained
- MAGTFs bring their air, ground, and logistics support elements with them



USMC is, and will continue to be, inherently a Naval based force.

MAGTFs Come In Various Sizes



Special Purpose MAGTF

~ As required

(Inf Co ~ 72 hrs Sustainment)

Marine Expeditionary Unit

(MEU)

~ 1500 – 3K Marines

(15 days of supply)

Marine Expeditionary Brigade

(MEB)

~ 3 - 20K Marines

(30 days of supply)

Marine Expeditionary Force

(MEF)

~ 20 - 90K Marines

(120 days of supply)

Scalable, Tailorable Combined-Arms Teams

There is no "One Size Fits All" solution

Implications to Power & Energy

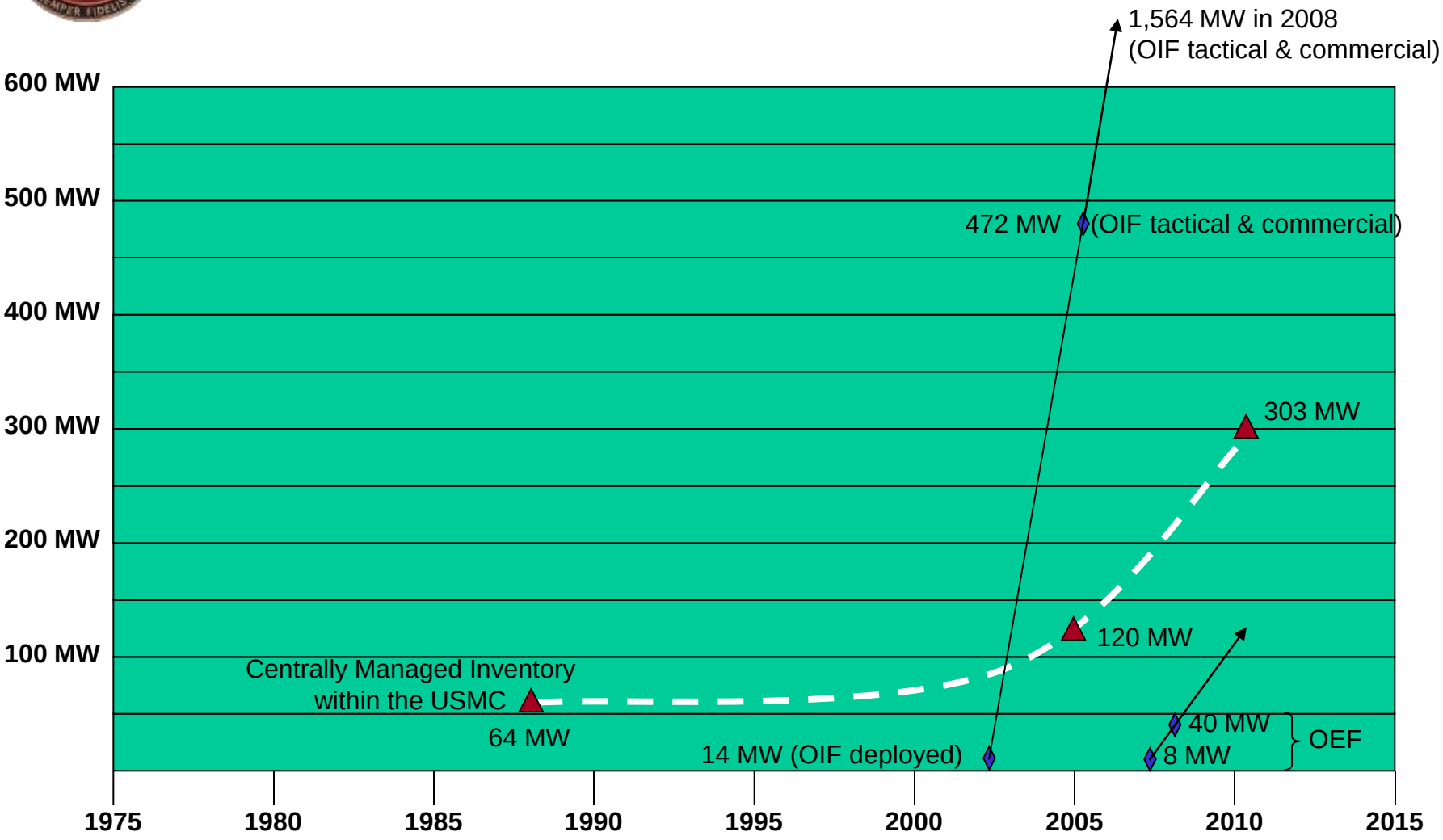
- **Space and Weight are at a premium due to lift restrictions**
  - Air
  - Sea
  - Land
- **Efficiency of energy use for deployed forces**
- **Unique transportation requirements**
  - All equipment must be capable of deploying via ship, air or tactical vehicle
  - High corrosion environment of surf transit and coastal storage
  - Electromagnetic interference from shipboard systems
  - Special restrictions for shipboard stowage / transport (Lithium Batteries)
  - Supply / resupply is from the Naval / Pre-Positioned Forces

Key Transportability Drivers

Individual Marine (carried):	**Assault Load < 75#, Existence < 150#**
Lifted by Marines / Loose Cargo:	**One person lift – 44 pounds**
Requiring Forklift / Material Handling:	**> 400 pounds**
HMMWV Trailer Towable:	**< 2700 pounds**
Medium Tactical Truck Carried:	**< 7 tons (off road), 10 tons (on road)**
Heavy Tactical Truck Carried:	**< 16 tons (on road)**
MV-22 Tilt-Rotor Lift:	**< 4 tons (internal)*, 7.5 tons (external)**
CH-53 Helicopter Lift:	**< 5 tons (internal)*, 14 tons (external)**

*** psi limitations on floor apply**

USMC Power Generation Capability



Vehicle Power Needs

Alternator Amperage Rating on HMMWV / MRAP at 28 VDC

MRAP Follow-on

OEF / OIF / Digitization / Networking

MRAP Cat I & II

Second Generation Vehicle Deliveries

RG-31 Upgrade

Initial Fielding – 60 Amps

COUGAR / JERRV

RG-31

Post Desert Storm – Start of Digitization

700
600
500
400
300
200
100
0

1980 1985 1990 1995 2000 2005 2010 2015 2020

What's Consuming Power

Counter IED - Electronic Warfare

Communications

Situational Awareness - ISR

Counter IED - Mine Rollers

Counter IED – Thermal / IR

Remote Operated Weapons

Situational Awareness - BFT

Situational Awareness
Drivers Vision Enhancement

Situational Awareness
Position Location/Reporting

Situational Awareness
Exterior Lighting

Individual Marine Power Requirements

AN / PVS-17
AA Battery

AN / PVS-14
AA Battery

AN / PAS-13D
AA Battery

AN / PEQ-16A
DI-123A Battery

Hand-held flashlight
AA Battery

MIOX Water Purifier
AA Battery

AN / PSC-13 D-DACT
Unique or AA Battery

DAGR
AA Battery

AN / PRC - 148 or 152
Unique Batteries

AN / PRC-153
Unique Battery

Quiet Pro Headset
Unique Battery

Squad Digital Camera
Unique Battery

AN / PRC-117F
BA-5590 / BA-5390 / BB-2590 Batteries

Rugged Laptop
Unique Battery

Secretary of the Navy Energy Goals

New Requirements for Acquisition Processes

- Mandatory evaluation factors used when awarding contracts for platforms, weapon systems, and buildings will include: Lifecycle energy costs, Fully-burdened cost of fuel, Contractor energy footprint

Sail the "Great Green Fleet"

- DON will demonstrate a Green Strike Group in local operations by 2012 and sail it by 2016

Reduce Petroleum Use in Non-Tactical Vehicles

- By 2015, DON will reduce petroleum use in the commercial fleet by 50%

Increase Alternative Energy Ashore

- By 2020, DON will produce at least 50 percent of shore-based energy requirements from alternative sources

Increase Alternative Energy Use Navy-wide

- By 2020, 50 percent of total DON energy consumption will come from alternative sources

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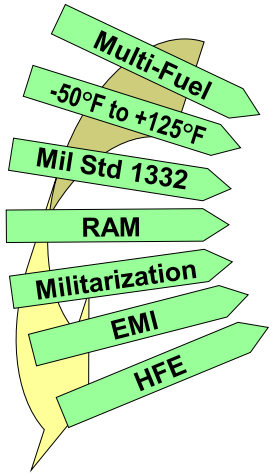
Military Vs. Commercial

Critical Military Features

- Diesel/JP-8 (DoD Policy)
- Environmental Extremes
- Excellent Power Quality
- High Reliability
- Ruggedized
- 24 Volt
- Battlefield Survivability
  - NBC
  - IR
  - Aural
  - EMP Hardening
- Rated Power at Altitude
- Paralleling / Syncing
- Aux Fuel ports



≠

Cost

Weight

≠

Mobile Electric Power

DOD Standard Generators

USMC Unique Generators

Tools / Customer Support

Integrated Trailer ECU - Generator

Power Distribution

Floodlight Sets

Environmental Control Equipment

Environmental Control Units

Special Customer ECUs

Field Refrigeration

Water Chilling / In-Field Ice Making (food service, mortuary affairs)

Tools / Customer Support

Advanced Power Sources

Radio Power Adaptors

Power Supplies

Renewable Energy

On-Board Power

Battery Management / Sustainment Systems

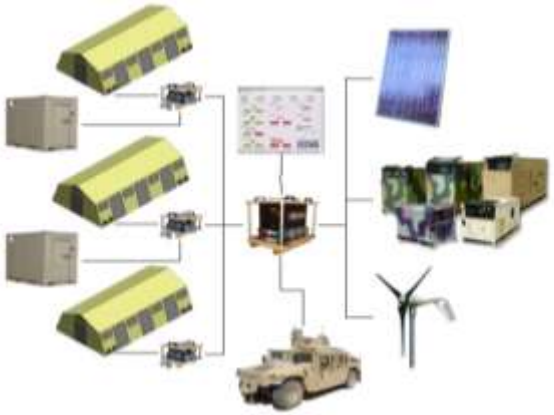
Science and Technology

Power Generation

Energy Storage

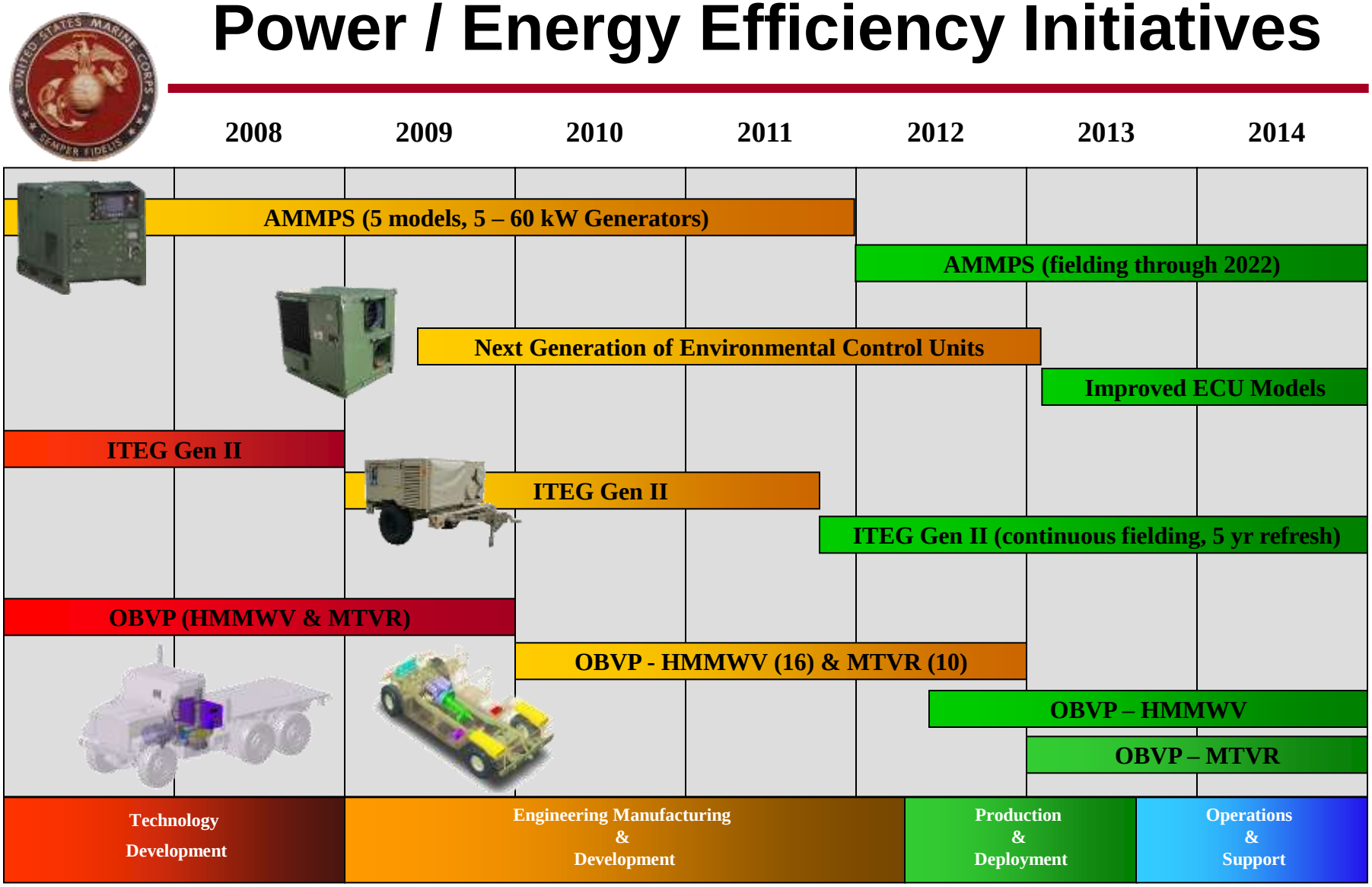
Environmental Control

Power Management / Micro Gridding



Experimentation, Modeling, and Tools

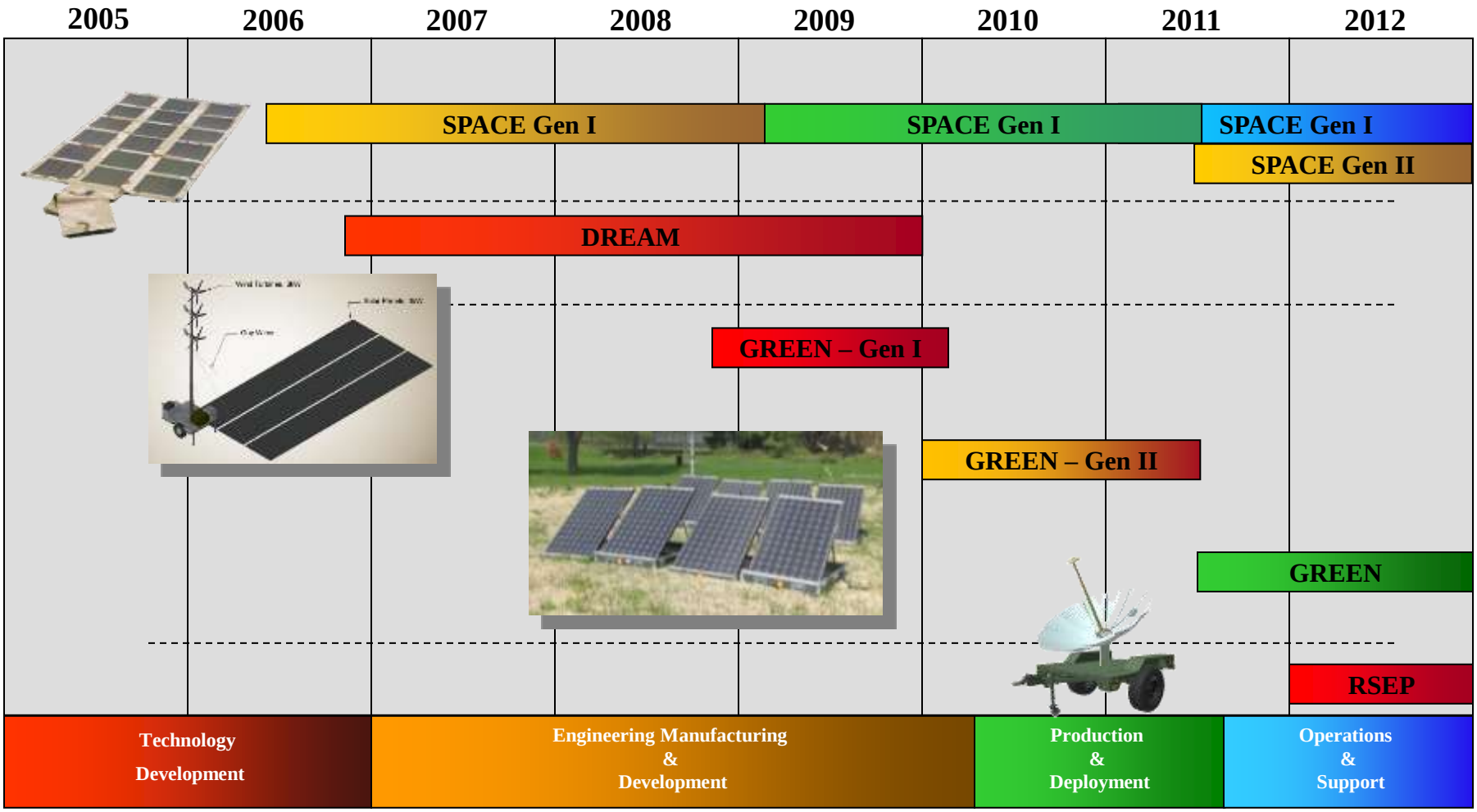
Power / Energy Efficiency Initiatives



AMMPS – Advanced Medium Mobile Power Sources
ECU – Environmental Control Unit

ITEG - Integrated Trailer – Environmental Control - Generator
OBVP – On-Board Vehicle Power Systems

USMC Renewable Energy Efforts



SPACE – Solar Power Adaptor for Communications Equipment (30 Watt continuous)
GREEN – Ground Renewable Expeditionary Energy Network (300 Watt continuous)

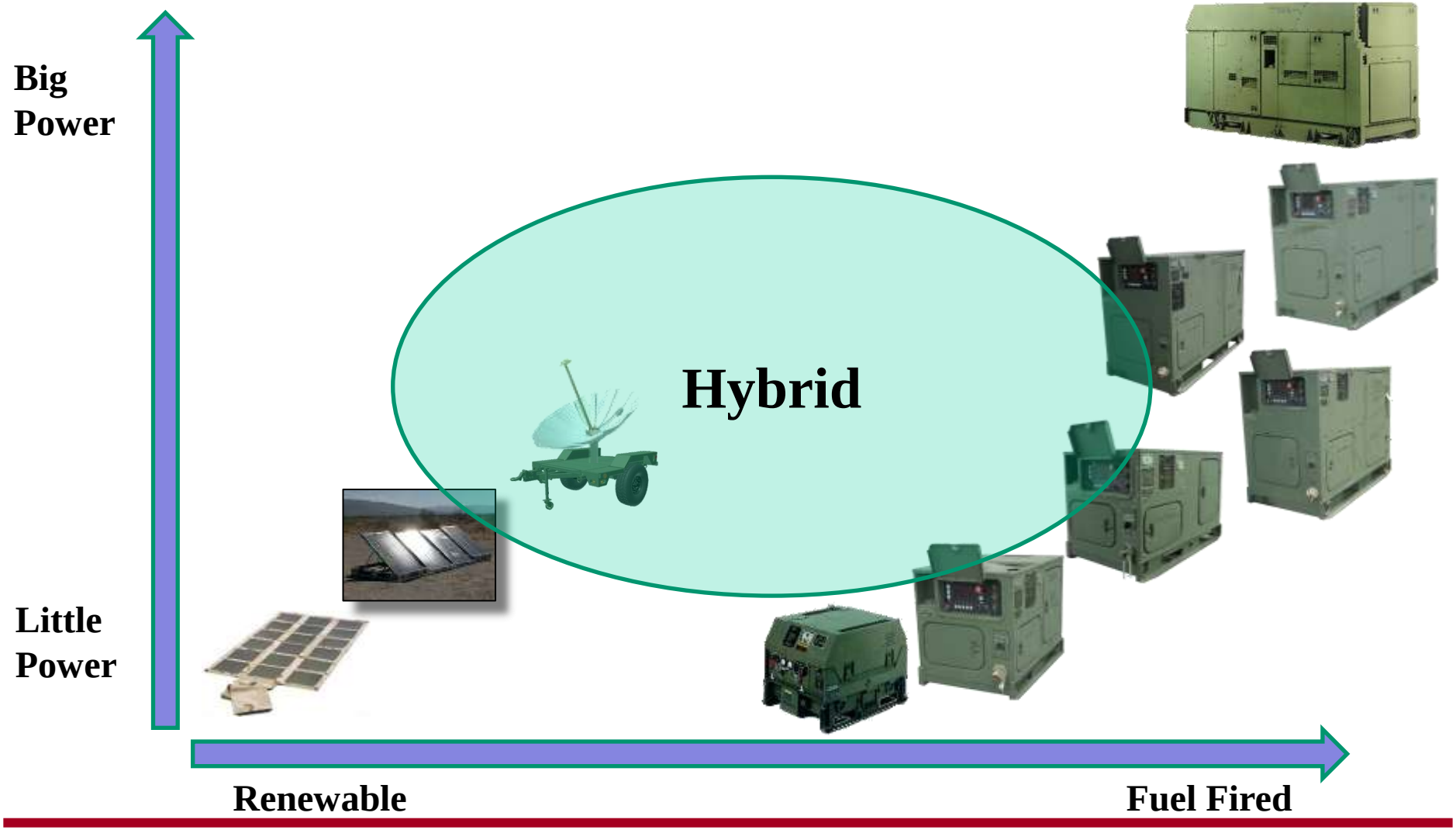
DREAM – Deployable Renewable Alternative Energy Module (1.5 kW continuous)
RSEP – Renewable Sustainable Expeditionary Power (3-5 kW continuous)

USMC Renewable Energy Efforts

USMC Calculations for Renewables

- Daily energy content (kw-hrs) is approximately 1/5 of the solar power collection capability
  - GREENS collects 1.6 kW solar power peak, system rated for 300W
  - Batteries rated for 60-70% energy capacity during 24 hr discharge cycle
  - More battery storage / less discharge will extend battery system life
- Currently cannot compete with fuel fired generators on dollars per kW-hours basis for purchase price (possibly life cycle cost)
- But on pound-for-pound resupply (fuel), renewables become competitive in 3-6 months
  - Better on low power side, worse on high power side
- Fully burdened cost of fuel is critical factor

Future Directions



2011 / 2012 Business Opportunities

- Rugged Power Supply with World Wide Power Input
- Improved AN/PRC-117F Radio Power Adaptor
- PRC-152 Stay-Alive Battery Adaptor
- GREENs RE-Buy
- Second Generation Man-Portable Solar Power Adaptor
- Renewable Sustainable Expeditionary Power (ONR)
- Intelligent Small Unit Power (NSWC-Carderock)
- Family of Energy Efficient Environmental Control Units
- MCWL EMO Limited Objective Exercise 2012
- Office of Naval Research – Broad Agency Announcement
- ~~Microgrid~~

Acquisition Policy Changes

DOD Influence:

- Target Affordability / Mandate Affordability as a requirement
- Shorter Program Timelines
- Fixed Price type contracts
- Competition at each program milestone
- Remove obstacles to competition (buy technical data / open systems)

Navy / USMC Influence:

- (N) Contractual Key Performance Parameter(s) for Energy Efficiency
- (N) Modified Source Selection Processes (Technical / Past Performance)
- (MC) Increase Fuel Efficiency
- (MC) Lighten the MAGTF / Equipment Oversight Board
- (MC) Limitations on Sole Source Contracting
- (MC) Use of bid-samples & testing to support source selection

Points of Contact

- PM_EPS@usmc.mil

- www.onr.navy.mil
- www.mcwl.usmc.mil
- www.marcorsyscom.usmc.mil/sites/pmeps

Backup Slides

Detailed Charts

of

Business Opportunities

Stay Alive Power Adaptor

NOTIONAL

Solicitation / Procurement

- Issuing Activity:
  - Marine Corps Systems Command (M67854)
- Planned Request for Proposal:
  - June 2011 (planned)

Technical Description

- Provide bulk charging and bulk-power adaptor to AN/PRC-152 radios
- Prevent loss of crypto-fill if main battery is discharged (long term storage, MPF)
- Integrated transit case and charger concept
- AC and DC power input
- Plan to use Statement of Objectives:
  - Will have a set # of Critical Requirements that must be met
  - Remaining requirements are *Desired / Value Added*
  - Vendor offered Value Added features also solicited

Environmental Control Units

Current articles

Solicitation / Procurement

- Issuing Activity:
  - Marine Corps Systems Command (M67854)
- Request for Information:
  - June 2010 & November 2010
- Request for Proposal:
  - September 2011 (planned)

Technical Description

- Next family of systems to support:
  - Rigid wall shelters - 9K and 18K BTU/hr
  - Soft wall shelters - 80K to 100K BTU/hr
  - Special applications - 400 Hz models
  - Highly Mobile Applications - DC powered
- Key feature: Energy Efficiency
- Solicitation plans to use:
  - Performance Specification
    - Required attributes
    - Desired attributes
    - Interface Specification
  - Statement of Work
    - Deliverable products & services
    - Data items

Family of USMC Power Supplies

Current
Ruggedized Power Supply (RPS)

Current
Benchtop Power Supply (BPS)

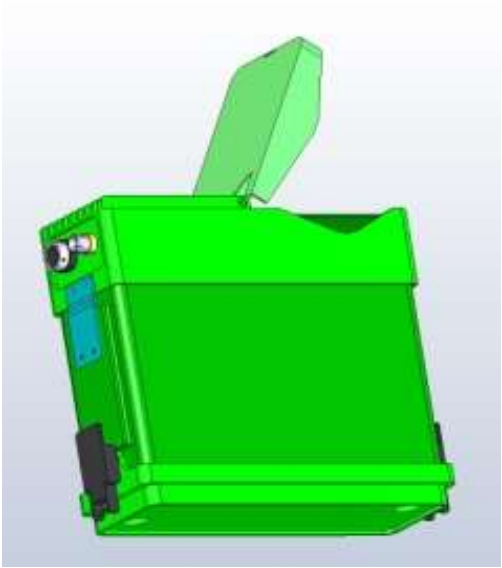
Solicitation / Procurement

- Issuing Activity:
  - Marine Corps Systems Command (M67854)
- Request for Information:
  - RPS: Summer 2010
- Request for Proposal:
  - BPS: Completed
  - RPS: July 2011

Technical Description

- Benchtop Power Supply (BPS):
  - 0-40 Volts DC Out
  - 25 Amps Out
  - 120 VAC, 60 Hz In (required)
  - 90-240 VAC, 50-400 Hz in (desired)
  - Performance Specification based
  - GSA competition
  - Bid Samples required with proposal
  - No R&D, right to Production
- Ruggedized Power Supply (RPS):
  - 0-30 Volts DC Out
  - 60 Amps Out
  - 90-240 VAC, 50-400 Hz In required
  - Performance Specification based
  - Open Competition
  - Defense Acquisition Challenge funded
    - R&D phase
    - Production options

AN/PRC-117F Radio Power Adaptor



NOTIONAL

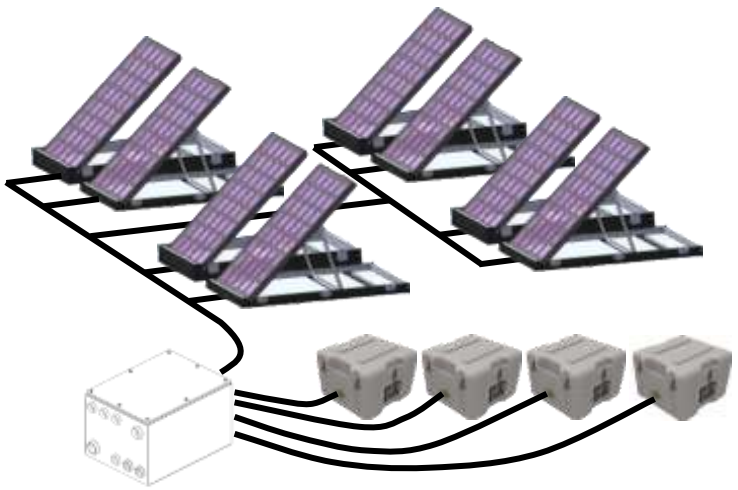
Solicitation / Procurement

- Issuing Activity:
  - Marine Corps Systems Command (M67854)
- Request for Proposal:
  - September 2011 (planned)

Technical Description

- Radio Power Adaptor to allow the 24Volt AN/PRC-117F Tactical Radio to operate from multiple input power sources:
- Input: 120VAC, 60 Hz (required)
- Input: Worldwide power (desired)
- Form Factor: Attach securely to radio
- Military battery for UPS function
  - BA-5590, BA-5390, BB-2590
- Export up to 5 amps at 24VDC
- 5-year contract, up to 5000 units purchased

Ground Renewable Expeditionary Energy Network



Solicitation / Procurement

- Issuing Activity:
  - Marine Corps Systems Command (M67854)
- Draft Solicitation:
  - April 2011
- Request for Proposal:
  - Summer 2011 (planned)

Technical Description

- Follow-On procurement of additional systems (following original performance specification)
- Will work with separately procured Integrated Solar Panel / Case Assembly
- DC Output power with distribution kit
- Key Performance parameters:
  - 300 watts continuous over 24 hour day
  - 1000 watt peak power
  - Lithium Ion Battery (backup Lead Acid)
  - Hybrid generator integration
- Up to 500 articles to be purchased

Man-Portable Solar Power Adaptor II

Current System

Solicitation / Procurement

- Issuing Activity:
  - Marine Corps Systems Command (M67854)
- Request for Information:
  - Summer 2011
- Request for Proposal:
  - Early 2012

Technical Description

- Current Solar Power Adaptor for Communications Equipment (SPACES) highly successful in deployment to OEF
- Next generation system will be required
- Future capability set (notional) to include:
  - < 10# weight (less battery, case)
  - Multiple folding panels
  - BB-2590/U battery charger
  - AA battery charger
  - USB power port
  - AN/PRC-152, -153, -117F adaptors
  - DC-AC inverter
  - AC charging plug, DC NATO plug
  - Hard case for full suite
  - Soft case for deployed sub-set
  - Backward compatible with SPACES

Experimental Forward Operating Base (ExFOB)

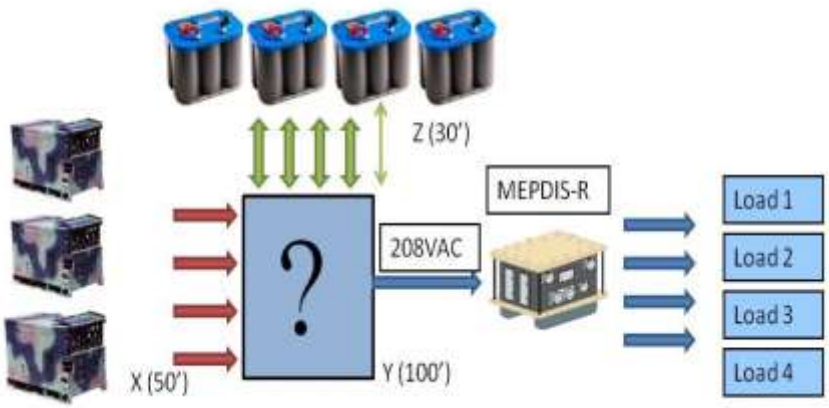
Solicitation / Procurement

- Sources Sought Notice:
  - M00264-11-I-0209
  - Issued: 14 March 2011
  - Responses due: 29 April 2011

Technical Description

- Previous USMC ExFOBs conducted:
  - Quantico VA – Winter 2010
    - Power Generation
    - Efficient Shelters
    - Expeditionary Water
  - 29 Palms CA – August 2010
    - Efficient Shelters
    - Alternate Power Generation
    - Alternate Cooling sources
- Next ExFOB
  - 29 Palms CA – August 2011
- Technology Focus Areas:
  - Tactical Vehicle Fuel Efficiency
  - Concentrated Solar Harvesting
- Vendor funded participation
- Government will instrument & measure

Intelligent Small Unit Power



NOTIONAL

Solicitation / Procurement

- Issuing Activity:
  - Naval Surface Warfare Center (N00167)
- Request for Information:
  - TBD
- Request for Proposal:
  - TBD (2011)

Technical Description

- Collaborative effort between:
  - OSD (DDR&E)
  - Office of Naval Research
  - Marine Corps Systems Command
  - Naval Surface Warfare Center (Carderock Division)
- Rapidly develop / demonstrate a capability for electric power generation and tactical gridding at the small unit level
- Less than 50 kW electric power continuous
- Existing components in military inventory
- 1 year effort to hardware demonstration

Renewable Sustainable Expeditionary Power

NOTIONAL

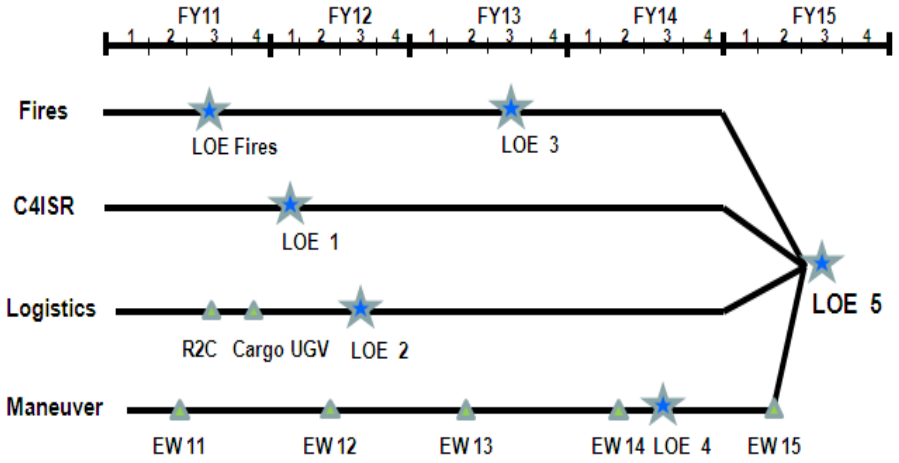
Solicitation / Procurement

- Issuing Activity:
  - Office of Naval Research
- Broad Agency Announcement Release:
  - 15 December 2010
- White Papers Due:
  - 8 April 2011

Technical Description

- Announcement: ONRBAA11-002
- Seeking highly deployable, renewable-based, 3 kW power systems with ability to transition at TRL 6
- Shall employ sustainable energy strategies, energy storage, and liquid fuels, in a hybrid concept to generate power and achieve 40% savings over existing, comparable size DoD power systems.
- Focus Areas:
  - Fuel consumption
  - Noise levels
  - Cost of ownership
  - Maintainability
  - Deployability

MCWL EMO LOE #2 Experiment



Solicitation / Procurement

- Issuing Activity:
  - Marine Corps Warfighting Lab (M67854)
- Source Sought Announcement Released:
  - 6 December 2010

Technical Description

- Marine Corps Warfighting Lab
- Enhanced Maneuver Operations
- Limited Objective Experiment
- Experiment will execute in 2012
- Seeking electrical power solutions for foot mobile units
- Title: “Foot Mobile Charger”
- Announcement: M67854-11-R-9011

ONR Broad Agency Announcement

Office of Naval Research

Solicitation / Procurement

- Issuing Activity:
  - Office of Naval Research
- Initial Issue
  - 24 September 2010 (check for updates)
- Open Through:
  - 30 September 2011

Technical Description

- ONR Announcement # 11-001
- 2011 Long-Range Broad Agency Announcement for Navy and Marine Corps Science and Technology
- http://www.onr.navy.mil/en/Contracts-Grants/Funding-Opportunities/Broad-Agency-Announcements.aspx
- Science & Technology Objectives in the Logistics Thrust Area:
  - Energy scavenging
  - Operational Self Sufficiency
  - Ad-hoc "microgrid" power distribution
  - Simple generator refit kits