Department of Defense Renewable Energy Initiatives

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Energy Mandates

Legislative / Executive Directives	Provisions / Goals
E.O. 13423	*•Improve energy efficiency through reduction of facility energy intensity by 3% annually and 30% by the end of FY 2015 on a FY2003 baseline* *•Consume ≥ 50% of renewable energy from new renewable sources.* *•Reduce the fleet's total consumption of petroleum by 2% annually through the end of FY15 on FY2005 baseline*
E.O. 13514	*•Established an agency-wide GHG emissions percentage reduction target (Scope 1 & Scope 2) by FY20 on a FY08 baseline.* *•Reduce water consumption 26% by 2020 on a FY10 baseline.* *•Reduce the use of fossil fuels* *•Implement high performance sustainable federal building standards*
Energy Independence Act of 2007	*•Reduce total energy use in federal buildings by 30% by 2015 on a FY03 baseline.* *•Beginning in FY10, each Federal agency shall reduce petroleum consumption and increase alternative fuel consumption.*
National Defense Authorization Act 2010	*•Produce or procure 25% of the total energy from renewable energy sources beginning in 2025.* *•Explore expeditionary use of solar and wind to provide electricity.*

RENEWABLE ENERGY EFFORTS - ARMY

Army Initiatives

RENEWABLE ENERGY PROJECTS CURRENTLY INSTALLED AT ARMY LOCATIONS*

SOLAR	66
GEOTHERMAL	26
WIND	10
HYDROPOWER	1
WASTE TO ENERGY	5
ENERGY CERTIFICATES	4

*As Reported To OACSIM FY 2009 via AWERS and Data Call

Sea Girt Photovoltaic Project 230 kW

- Two open panel Photovoltaic Carport solar power projects for the New Jersey National Guard.
  - –Joint Forces Headquarters at Fort Dix, N.J.,
  - –National Training Facility at Sea Girt, N.J.
- Energy generated will power two buildings, less then 200 feet away from the parking lots.
- The Fort Dix project will generate 240 KW and Sea Girt approx. 230 KW.

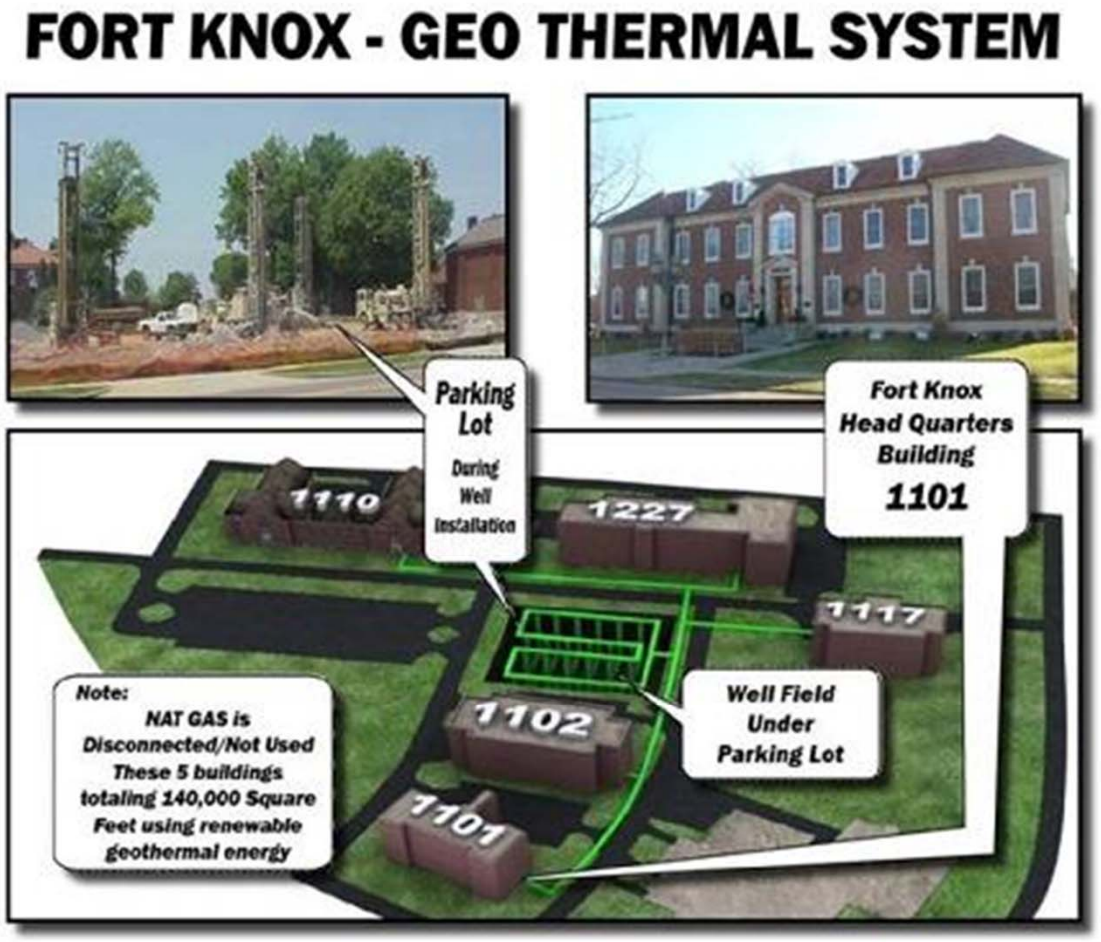
- Provide Fort Dix building 40 percent of its summer energy needs and the Sea Girt building with 80 percent.
- Total savings about $116,000 electric and earn about $350,000 from the SREC Program (Solar Renewable Energy Credits).

Fort Irwin Solar Project - Concept

- Allows for utility scale on-site generation that is economically feasible
- Produces 500+ MW of solar power at five identified sites using an Enhanced Use Lease (EUL)
- Provides energy security in the form of 24/7 power in the event of grid failure
- Contributes to achieving Congressional renewable energy mandates and energy security
- Facilitates State of California renewable portfolio standard goals
- Key Partners and Stakeholders:
  - Clark Energy Group / Acciona Solar Power
  - State of California
  - Southern California Edison
  - San Bernadino County
  - Los Angeles Department of Water and Power
- Estimated $ 1 billion for full development plan of 1.3 GW

Fort Knox Ground Source Heat Pumps

- Fort Knox has more than 7,000 tons of heating/cooling capacity provided by ground source heat pumps.
- It is used in more than 130 buildings with a total of more than 4,000,000 sq. ft.



Camp Williams Wind Turbine

- First wind turbine at Camp Williams began operation in January 2000.
- First wind power site in Utah.
- Together the two turbines produce close to one megawatt of power.

Biomass Generation and Cogeneration Plants Under Consideration

Ft. Carson - Cogeneration

Ft. Drum - Wood Chip Fired Generation Plant

Ft. AP Hill - Waste to fuel

Ft. Benning - Waste to fuel

Ft. Lewis - Waste to fuel

Ft. Stewart - Waste to fuel

RENEWABLE ENERGY EFFORTS- AIR FORCE

Air Force – Biomass and Wind

- Ascension Island, Wind, 2.7 MW, operational
- FE Warren, Wind, 1.3 MW, operational
- Hill, Landfill Gas, 2.3 MW, operational
- FE Warren, Wind, 2 MW, Congressional demo, under construct
- Dyess, Waste to Energy, 5.5 MW, in dev
- Tin City, Alaska, 250KW, Wind, ECIP, under construct
- Davis Monthan, Waste to Energy, 8 MW, in dev
- Cape Cod MMR, 1.5 MW, under construct
- Laughlin, Wind, 6kW, O&M funds, operational
- Kirtland, Wind, 30 MW, joint project with Sandia Labs, in dev
- Vandenberg, Wind, 48 MW, in dev

Air Force - Solar

- Hickam, Hot Water, 1176 sf, operational
- Lackland, Hot Water, 736 sf, operational
- Mildenhall, Hot Water, 3014 sf, operational
- Moron, Hot Water, 136 sf, operational
- Nellis AFB, 14.2MW), Photovoltaic (PV); operational
- Goodfellow , 1.5 MW, PV , in dev, on base
- Buckley ,1 MW PV, ECIP, in dev
- Luke, PV roof, 375 KW, ESPC, operational
- March, PV, 460 kW, ECIP, operational
- Fresno, PV, 660 kW, ECIP, operational
- Lackland, PV, 150 kW, ESPC, in dev
- Los Angeles, 145 kW Solar Powered Commissary (operational)

Air Force - Geothermal

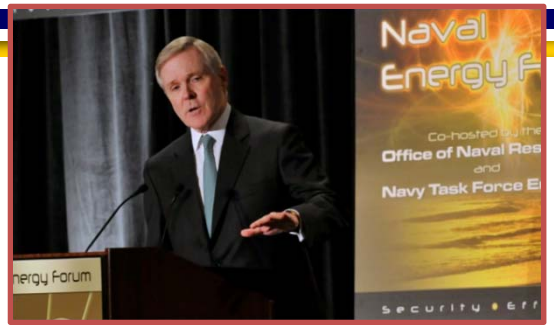
- Charleston, GSHP, 4255 tons, ESPC, operational
- Little Rock, GSHP, 2727 tons, operational
- Langley, WSHP, UESC, 1200 tons, operational
- Offutt, GSHP, 1379 tons, operational
- Tyndall, GSHP, 246 tons, operational
- Minot, GSHP, 126 tons, ESPC, operational
- Whiteman, GSHP, 212 tons, ESPC, awarded

Air Force – Other Initiatives

- Fed Gov't # 1 Green Power Purchaser (off base, various locations) – 426.2 M kWh in FY08
- Low Speed Vehicles: 6,401 in USAF Inventory
- Mt Home/Nellis (Geothermal); Alaskan LLR sites (wind)
- 7 Mobile & Fixed facility Fuel Cell Projects (Var Locs)
- Hickam, AFB, New Hydrogen Generation Plant, operational
- Selfridge ANGB, MI: FT Fuels for Support Equipment
- Hurlburt Field, Plasma Arc, Net-Zero Waste Disposal (awarded)

RENEWABLE ENERGY - NAVY

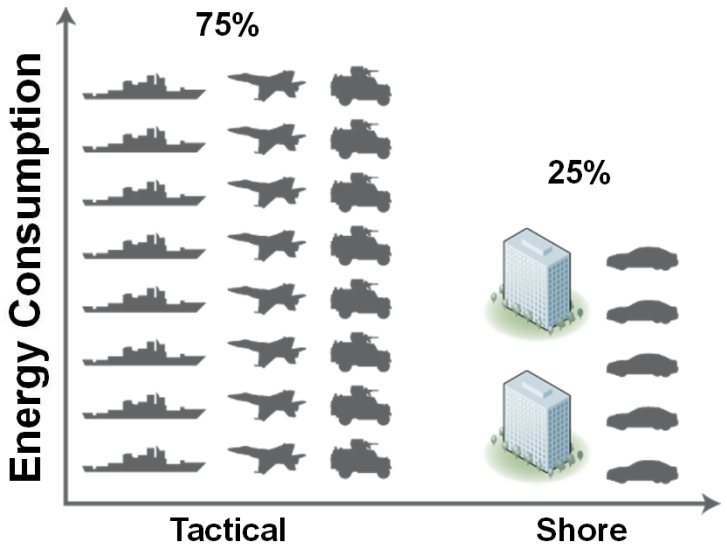
Our Energy Goals



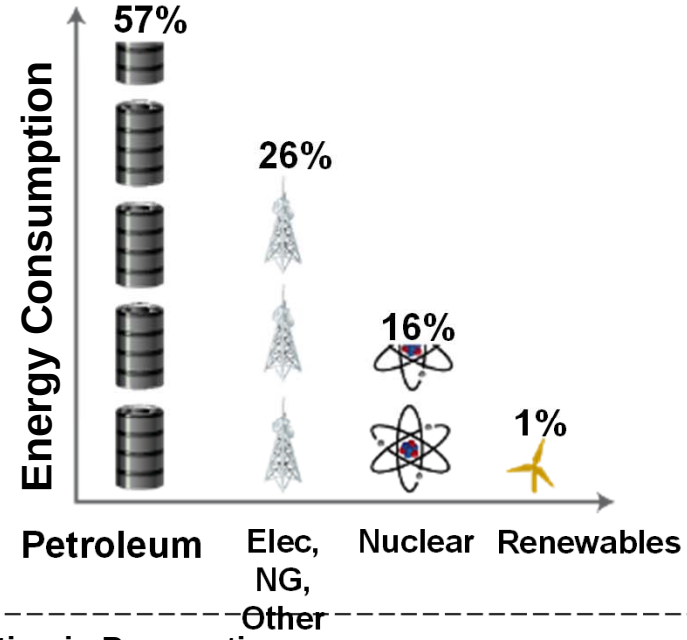
Increase Alternative Energy Department-wide	**By 2020, 50% of total Department energy consumption will come from alternative sources**
Increase Alternative Energy Sources Ashore	**By 2020, at least 50% of shore-based energy requirements will be met by alternative sources; 50% of Department installations will be net-zero**
Reduce Non-tactical Petroleum Use	**By 2015, Department will reduce petroleum use in vehicles by 50%**
Sail the "Great Green Fleet"	**Department will demonstrate a Green Strike Group in local operations by 2012 and sail it by 2016**
Energy Efficient Acquisitions	**Evaluation of energy factors will be mandatory when awarding contracts for systems and buildings**

Naval Energy Profile

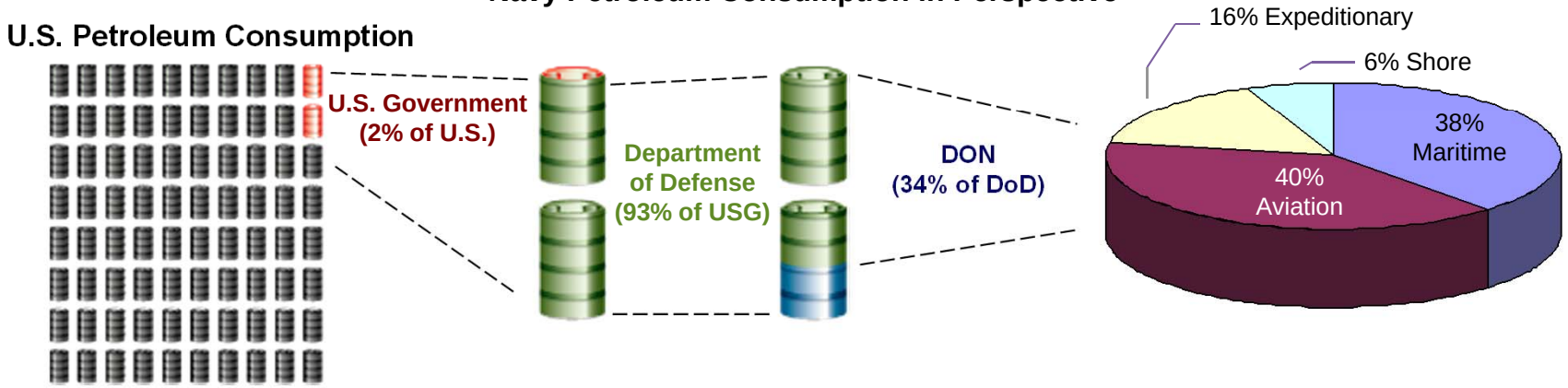
Overall Energy Consumption



Overall Energy Sources

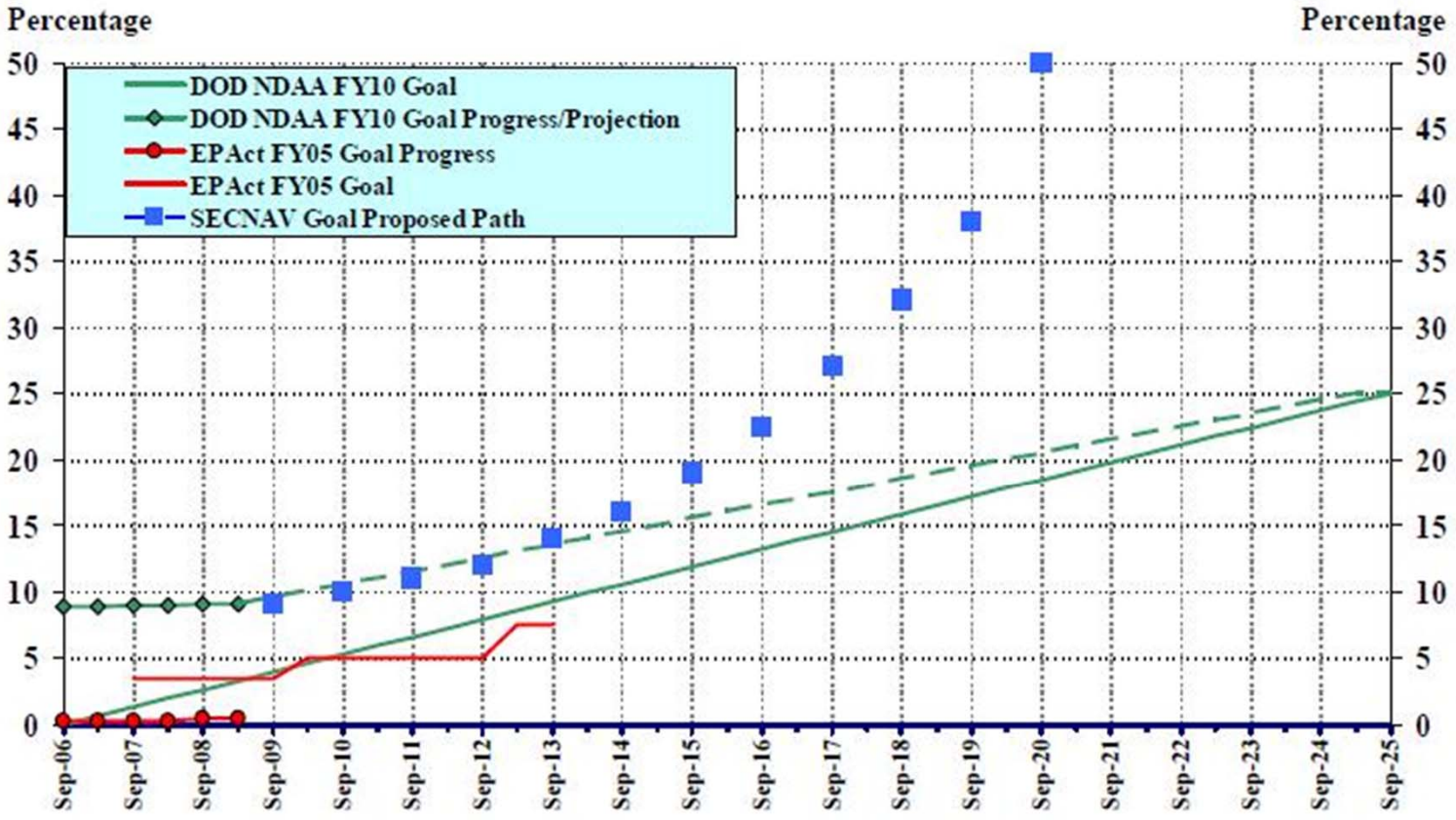


Navy Petroleum Consumption in Perspective

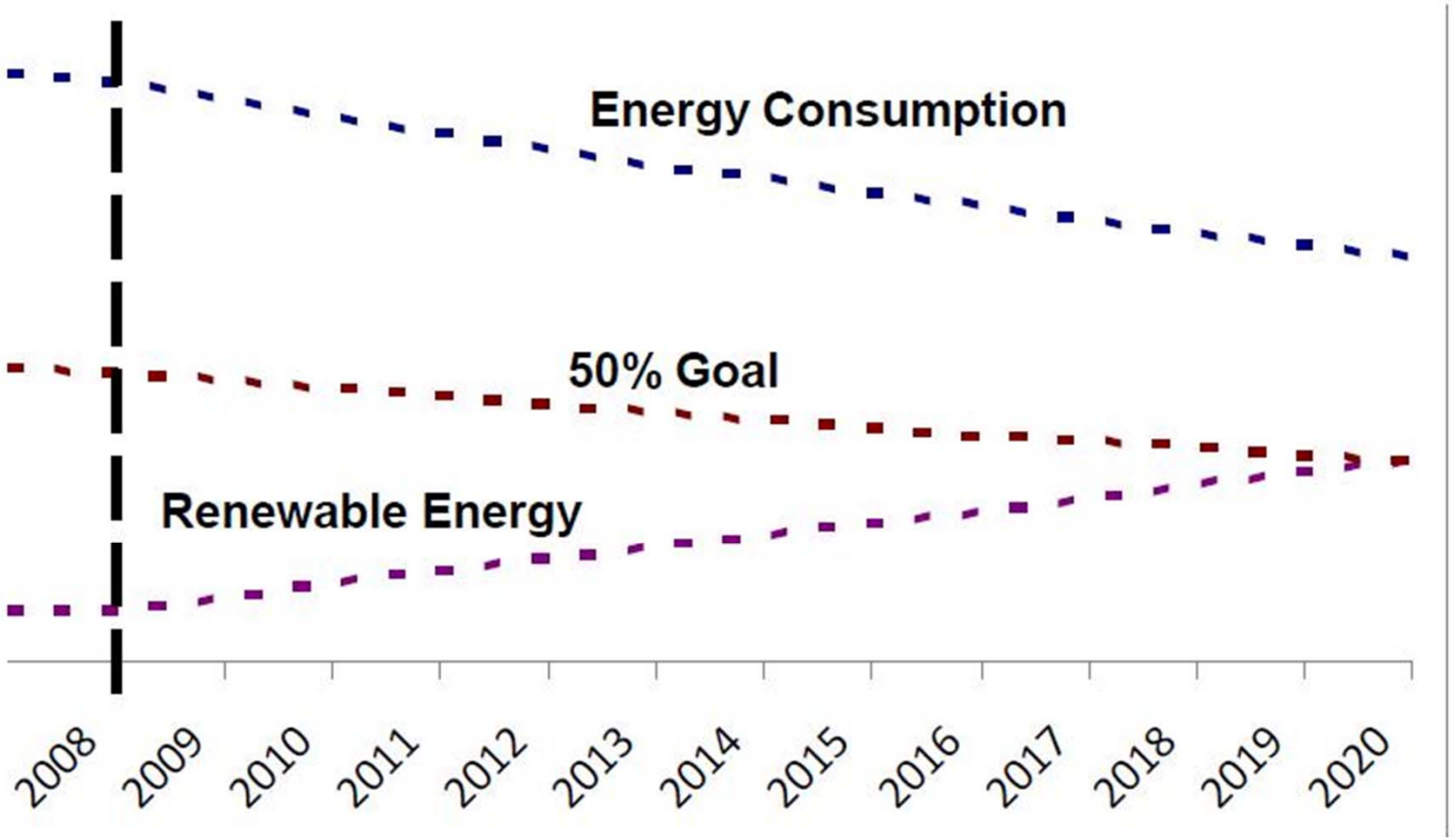


Federal Mandate Progress – Renewable Energy

By 2012, each agency shall consume 5% renewable energy and by 2013, 7.5%, relative to total electric energy (EPAct 2005); by 2025, each agency shall produce or consume 25% renewable energy of total energy (NDAA 2007/10)



Energy Efficiency & Renewable Energy



Photovoltaic – Carports and Fixed Arrays

1.1 MW at Twenty-Nine Palms, CA

Naval Bases Coronado and San Diego

Close to 2 MW of PV installed to date, and the number is going up every day

Wind

San Clemente Island
- *675 KW*
- *Studying feasibility of adding 4th turbine*

San Nicolas Island
- *250 KW Planned*

Marine Corps
Logistics Base
Barstow, CA
1.5 MW- March 2009

Naval Station Guantanamo Bay, Cuba
3.8 MW Wind
Diesel Hybrid

22 Anemometer studies underway

Geothermal

COSO Facilities

- Four power plants – 2 Navy & 2 BLM
- Nine turbine-generator sets
- 270 MW Max net output
- Two transmission lines
- 166 wells
- >200,000 lineal feet of pipe

- World Class Geothermal Resource
- First power from Coso Field in 1987
- Enough power to supply electricity to 180,000 homes
- DOD Lead Agency for Technology Transfer and development
- Awarded NAS Fallon NV
  - Plant Sized at 30 MW
- Assisting Army at Hawthorne, NV
- Exploring NAF El Centro, MCAGCC Twenty-Nine Palms, MCAS Yuma

Biomass (LFG)

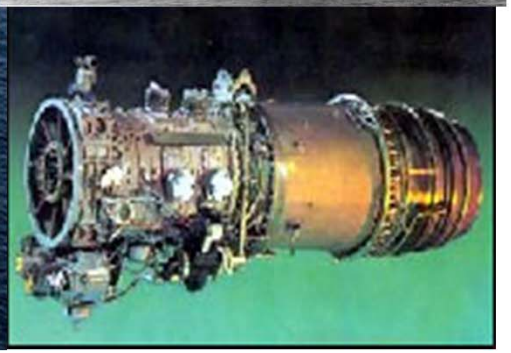
Biomass (LFG)

Biomass (WTE)

Portsmouth, VA
Provides power for Navy's largest shipyard and sells excess to the grid

Aviation Biofuels Progress

Surface Platforms Progress



Technology – Expeditionary & Shore

Efficient Platforms
Example: LCAC, Amphibious Ships

Efficient Power Generation & Use
Example: On-Board Vehicle Power, ECU

Alternative Power Sources
Example: GREENS (Solar-Powered Battery)

Renewable and Sustainability

- *New Construction / Major Renovations LEED Silver or Equivalent*
- *Integrated Technology Strategy: Watch-Partner-Lead*

Energy Efficiency First

- *Recapitalize Existing Infrastructure with More Energy Efficient Systems*
- *Annual Energy Audits – Building Level Assessments of Opportunities*
- *Energy Security*

Navy Culture and Behavior

- *Increased Transparency at Individual, Command, and Function Levels*
- *Technology Enabled (Advanced Meters; SmartGrid Pilot)*
- *Link to Operations*

Technological solutions in development will enhance capability

Thank You !!

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