



• August 15-18, 2010 • Dallas, Texas •
• Dallas Convention Center •



Department of Defense and Renewable Energy

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August 16, 2010

Agenda

- ❖ DoD Energy Profile
- ❖ Energy Mandates
- ❖ DoD Renewable Energy Initiatives
- ❖ Renewable Energy – Army
- ❖ Renewable Energy – Air Force
- ❖ Renewable Energy – Navy



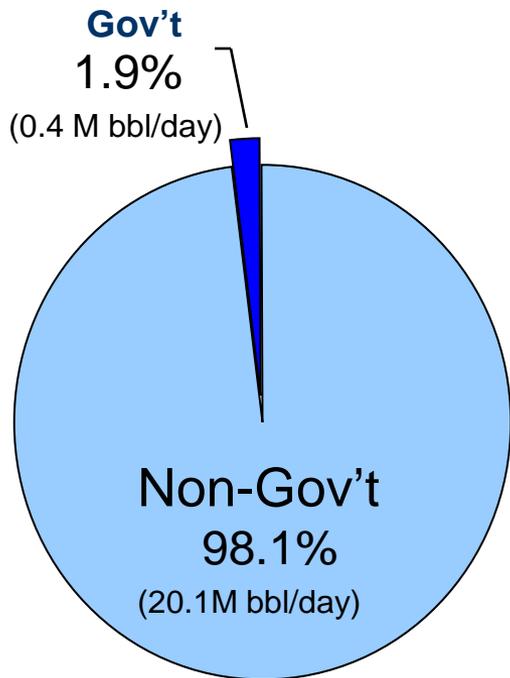


Energy Mandates

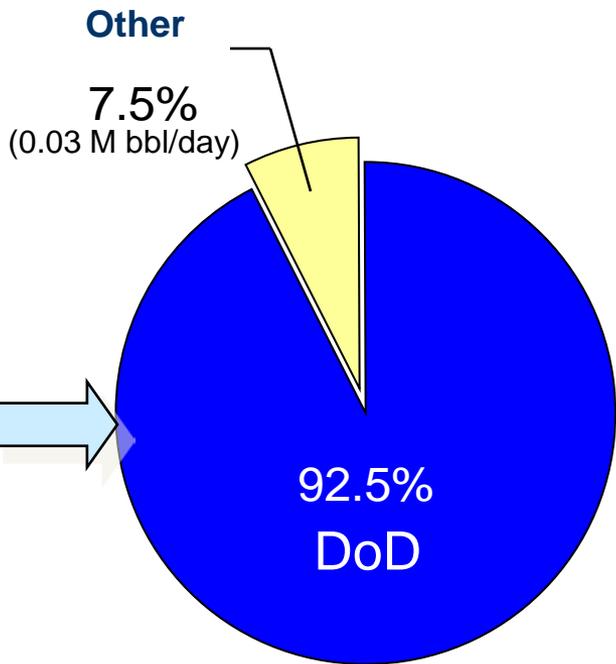
Legislative/ Executive Directives	Provisions / Goals
E.O. 13423	<ul style="list-style-type: none"> • <i>Improve energy efficiency through reduction of facility energy intensity by 3% annually and 30% by end of FY2015. FY2003 baseline.</i> • <i>Consume ≥ 50% of renewable energy from <u>new</u> renewable sources.</i> • <i>Reduce the fleet's total consumption of petroleum by 2% annually through the end of FY15. FY2005 Baseline.</i>
E.O 13514	<ul style="list-style-type: none"> • <i>Established an agency-wide GHG emissions percentage reduction target (Scope 1 & Scope 2) by FY20. FY08 baseline.</i> • <i>Reduce water consumption 26% by 2020. FY10 baseline.</i> • <i>Reduce the use of fossil fuels.</i> • <i>Implement high performance sustainable Federal building standards.</i>
Energy Independence Act of 2007	<ul style="list-style-type: none"> • <i>Reduce total energy use in federal buildings by 30% by 2015. FY03 baseline.</i> • <i>Beginning in FY10, each Federal agency shall reduce petroleum consumption and increase alternative fuel consumption.</i>
National Defense Authorization Act 2010	<ul style="list-style-type: none"> • <i>Produce or procure 25% of the total energy from renewable energy sources beginning in 2025.</i> • <i>Explore expeditionary use of solar and wind to provide electricity.</i>

U.S. Petroleum Consumption

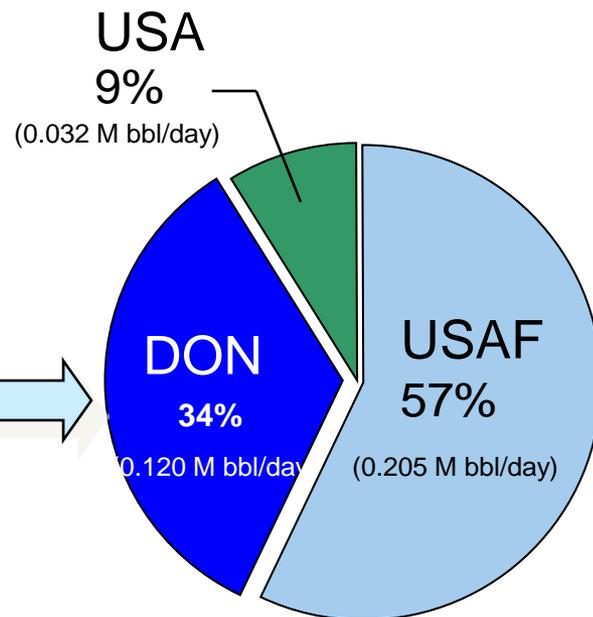
United States



Government



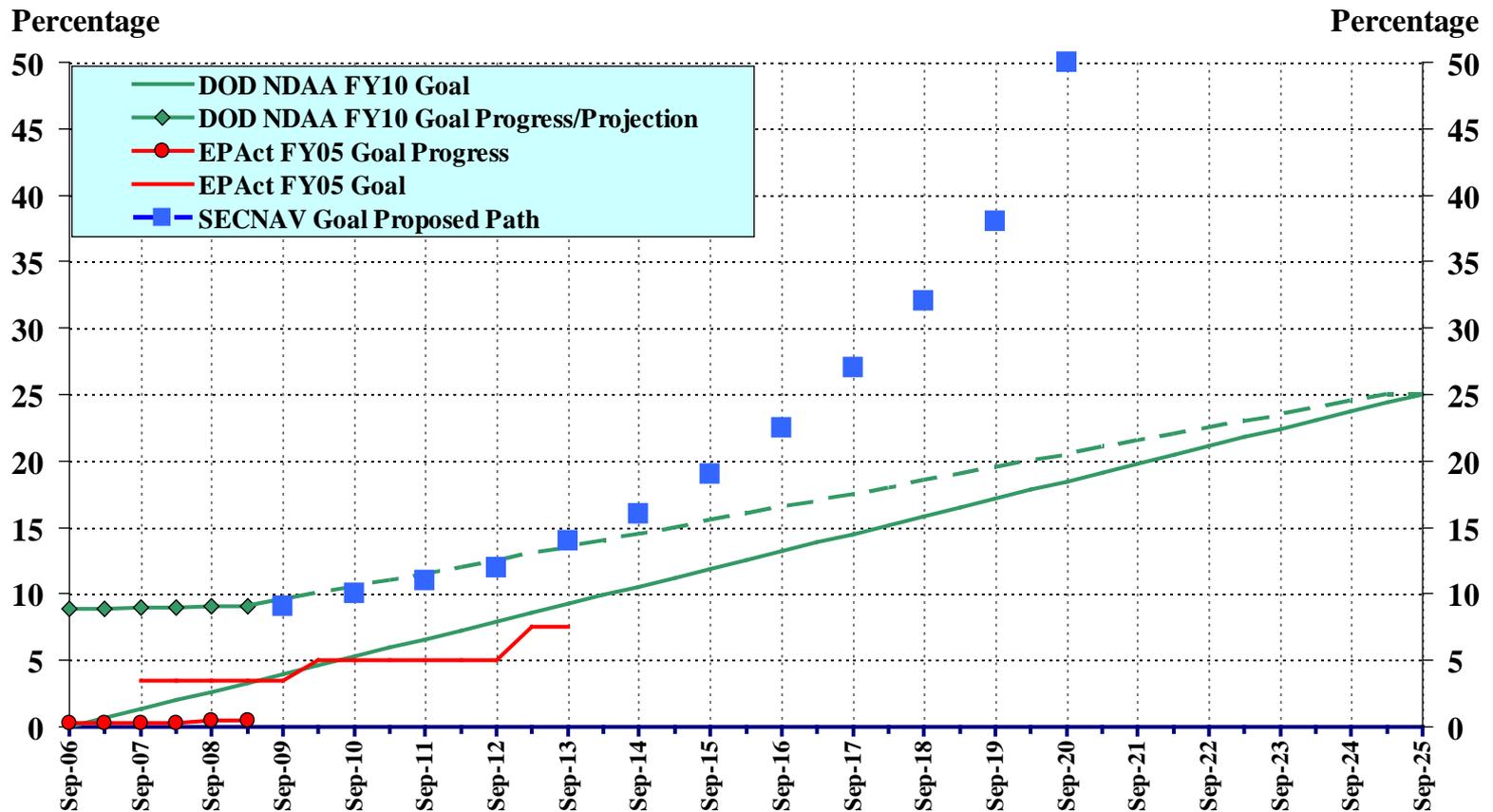
DoD



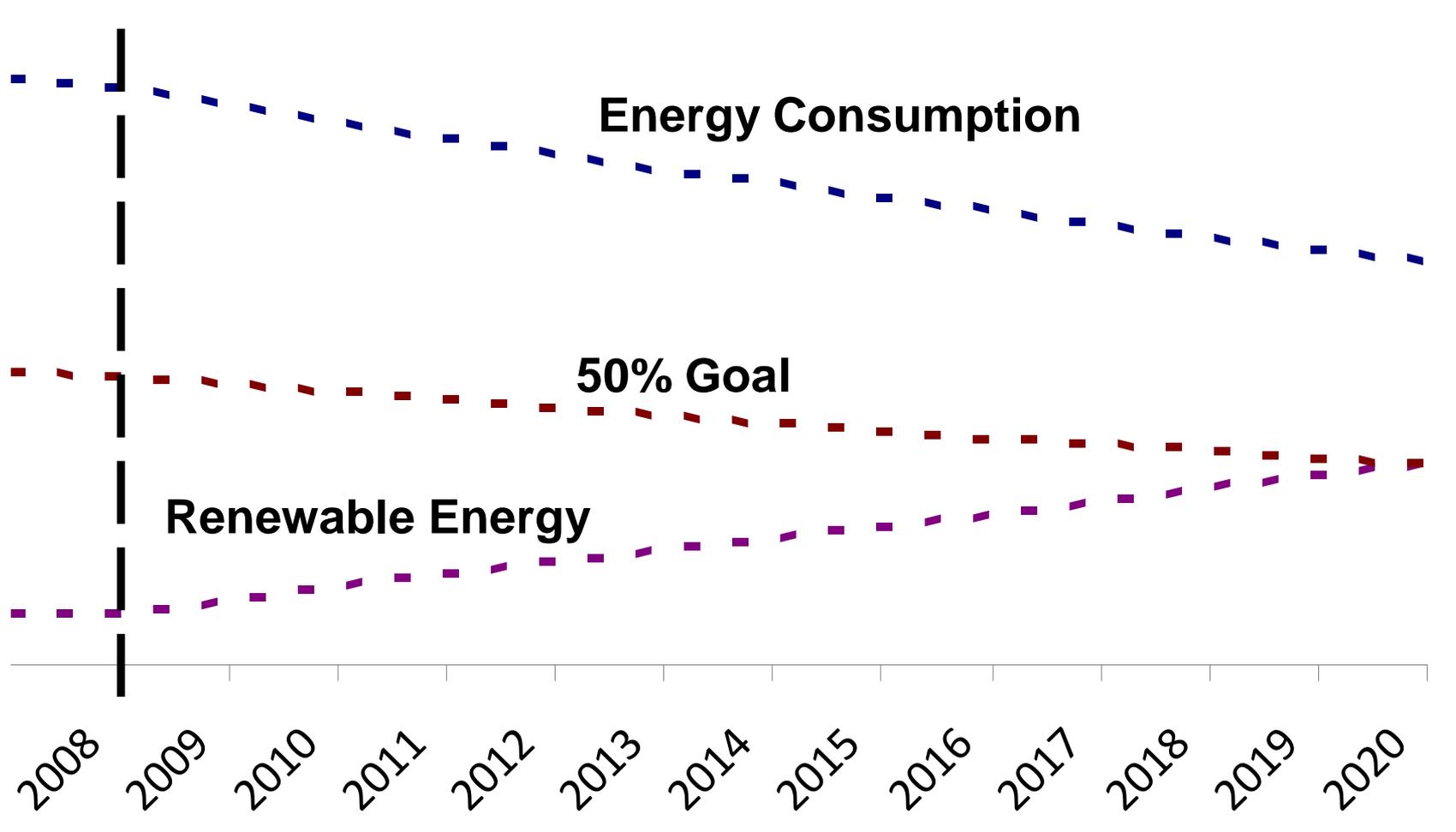
*DoD is the largest individual consumer...
but not a market maker*

Federal Mandate Progress – Renewable Energy

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



Energy Efficiency & Renewable Energy



Renewable Energy - Army

Army Initiatives

RENEWABLE ENERGY PROJECTS CURRENTLY INSTALLED AT ARMY LOCATIONS*

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

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

Army Initiatives

FY 09-11 ARMY ECIP RENEWABLE ENERGY PROJECTS

	COST (\$000)	Savings (\$000)	Solar	Geothermal	Wind	Hydropower
2009	20,571	3,258	9	3		
2010	30,700	2,463	7	2		
2011	26,304	12,820	9	3	1	1
Total	77,575	18,541	25	8	1	1

Sea Girt Photo-voltaic 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 than 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



Ft. Knox Ground Source Heat Pumps

FORT KNOX - GEO THERMAL SYSTEM

- 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 – 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

Alternative Energy Ashore Projects

Solar

- **Currently, 4-5 MW in over 20 locations**
- MGAGCC Twenty-Nine Palms – 1.1 MW
- Naval Base Coronado – >1.0 MW
- NAVFAC Pearl Harbor – 309 kW
- **60 MW of PV currently being added with solar MAC (ARRA funds)**



Wind

- **Roughly 6 MW currently online**
- NAVSTA Guantanamo Bay – 3.8MW (diesel hybrid)
- MCLB Barstow – 1.5 MW
- San Clemente Island – 675 kW
- **RFI for VA Capes to be released in July 2010**
- **22 Anemometer studies underway**



Geothermal

- **270 MW at NAWS China Lake**
- Four power plants
- Feeds California grid
- DoD Lead Agency for Technology Transfer and Development
- **Projects under development: 20-30 MW potential apiece: NAF El Centro, MCAGCC 29 Palms, MCAS Yuma**

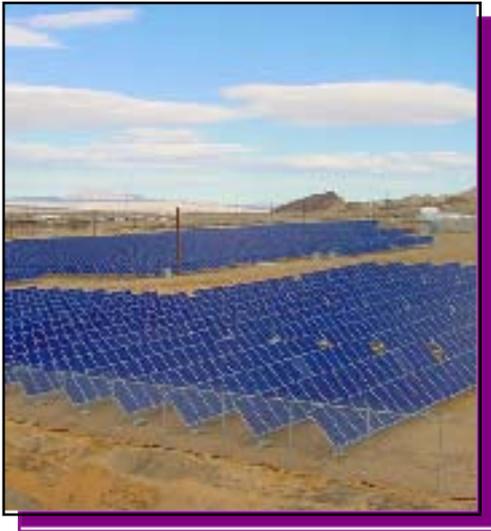


Ocean

- 3rd Generation Wave Power Buoy pilot, MCB Kaneohe Bay, Hawaii
- Exploring hydro-kinetic at Puget Sound – 2012
- Ocean Thermal Energy Conversion (OTEC) in Hawaii, currently in design phase, 2017 pilot



Photovoltaic – Car Ports 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

Photovoltaic – Solar Roof

Naval Base Coronado

*51 KW – Navy's first Building
Integrated photovoltaic (BIPV)
roof covers 10% of peak
demand*



Naval Station Pearl Harbor

**309 KW – PV array on
Building 54, Ford Island**

Wind

San Clemente Island

- 675 KW →
- Studying feasibility of adding 4th turbine



San Nicolas Island

- 250 KW Planned

Naval Station Guantanamo Bay, Cuba

**3.8 MW Wind
Diesel Hybrid** →

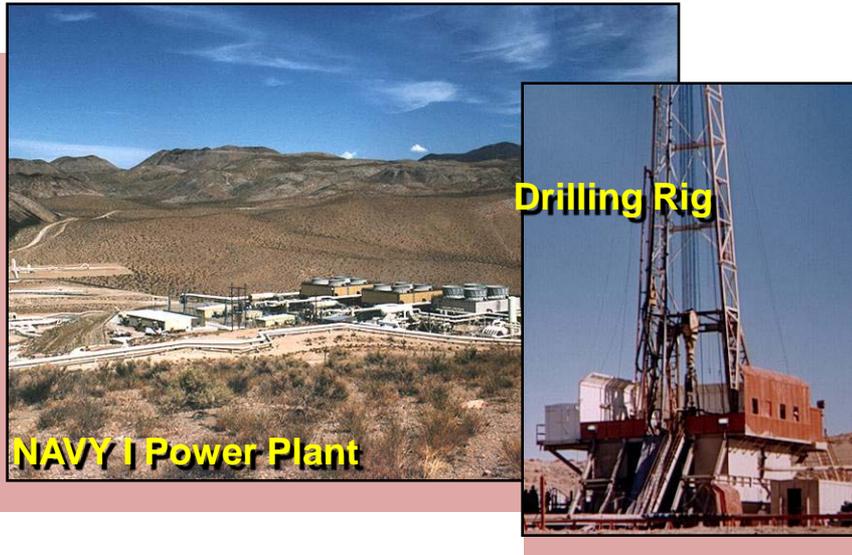


↑
**Marine Corps
Logistics Base
Barstow, CA
1.5 MW- March 2009**

Offshore Wind Development in VA

- Minerals Management Service (MMS) Task Force held a pre-Request For Interest (RFI) meeting on Tuesday, April 27
- Discussed the MMS lease blocks where DoD (with DON as the lead) has given concurrence to move forward with the RFI in those areas
- RFI for Virginia Capes (VACAPES) area will be released in July 2010

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

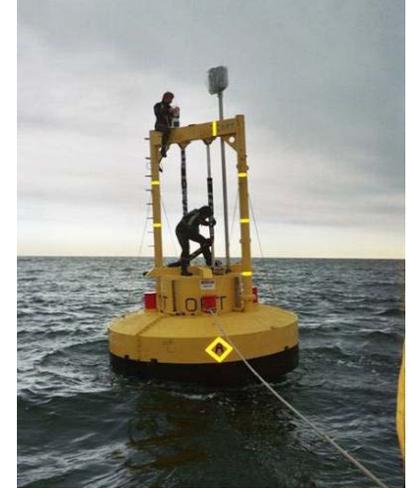
- World Class Geothermal Resource
- First power from Coso Field in 1987
- Enough power to supply electricity to 180,000 homes
- DOD Lead Agency for Technology Transfer and development
- Awarded NAS Fallon NV
 - Plant Sized at 30 MW
- Assisting Army at Hawthorne, NV
- Exploring NAF El Centro, MCAGCC Twenty-Nine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

Ocean Energy

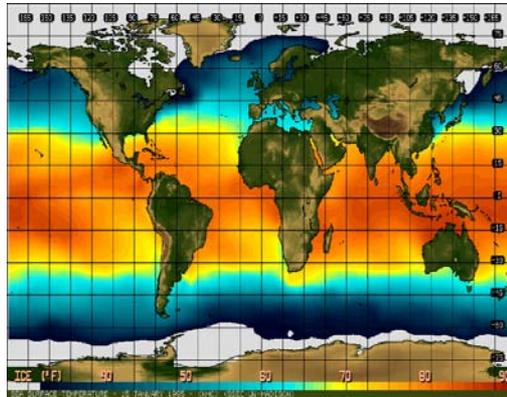
Conduct site assessment, prepare design, obtain permitting for kinetic hydropower installation in Puget Sound area



Develop and test 3rd generation wave energy MCB Hawaii test site



Ocean Thermal Energy Conversion (OTEC) is ideal for island locations. Can get power and water.

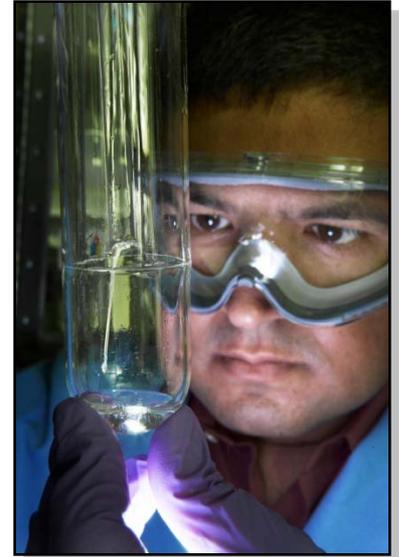


Evaluate future feasibility of H₂ and/or synthetic fuel production afloat



Biofuels

- Test and Certification Requirements –
Develops testing protocols for alternative fuels
- Aircraft and Ship Demonstrations –
Tests fuels produced from renewable sources
 - F-18 “Green Hornet” initiative (camelina plant derived)
 - “Green Ship” initiative (algae derived)
- Non-Tactical Alternative Fuel Vehicles –
Increases utilization of non-petroleum fuel for base vehicles and support equipment
- Alternative Fuel Testing –
Enhances characterization and test simulation to determine fuel chemistry differences and evaluate potential operational impacts



Questions ?

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