

# ***PACOM ENERGY INITIATIVES (U)***



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## *Overview*

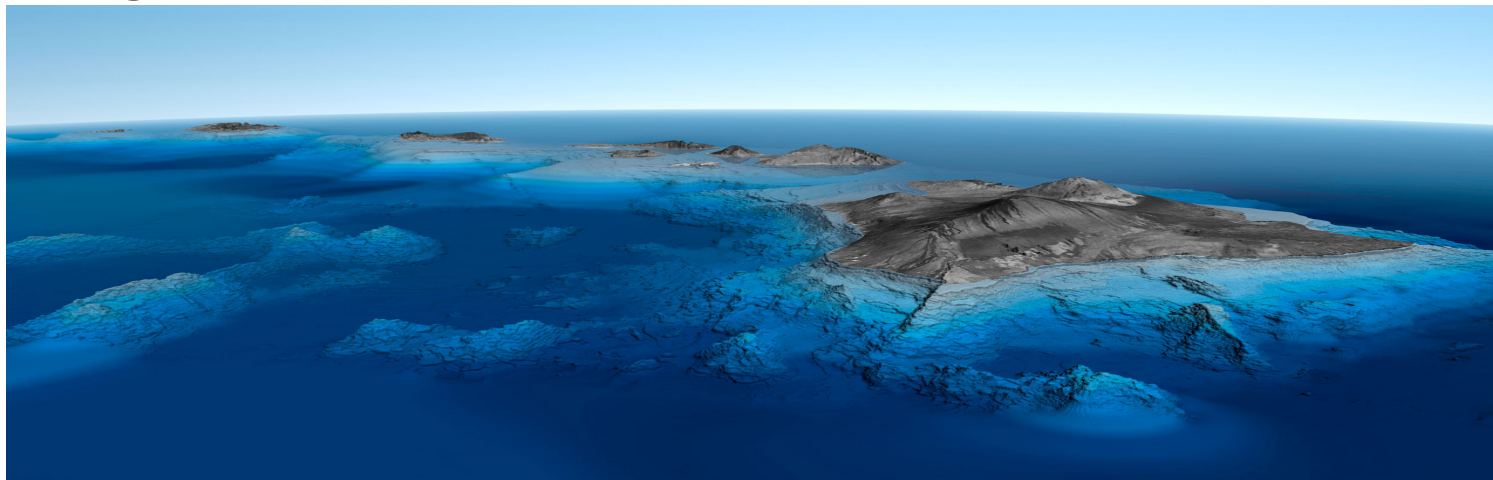
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- **Strategies – In Two Phases**
- **Funded Energy Projects**
- **Unfunded Energy Projects**
- **FEMP Proposal**
- **Energy Experimentation**
- **Questions**



## **PACOM Energy Strategy X 2**

- **Energy Partnership Strategy with the State of Hawaii**
  - **Target completion date is Summer 09**



- **Energy Security Strategy for the broader AOR**
  - **To be completed in fall 09**
- **Over-arching rationale:**
  - **Be good neighbors to the State of Hawai'i**
  - **Improve energy security across the Pacific**
  - **Free up resources for mission requirements**



# **Strategy Structure**

- **A PACOM Energy Partnership Strategy with:**
  - **Vision Statement**
  - **Goals**
  - **Sub-goals**
  - **Objectives**
  - **Supporting information**
  
- **Consistent with and supportive of:**
  - **Nat'l Security Strategy**
  - **Nat'l sea state change & new administration's views on energy**
  - **Nat'l Defense Strategy and other OSD policies/strategy**
  - **PACOM mission, vision and priorities**
  - **Service strategies**
  - **Host nation and state policies/strategy**
  - **Other COCOM energy strategies**



## ***Progress to Date***

- **Convened a forum of mid-level stakeholders**
  - **PACOM J3, J4, J5, J8, PACFLT, PACAF, USARPAC, MARFORPAC, NAVFAC, IMCOM, Corps of Engineers, Coast Guard, DESC, DOE, State of Hawaii, Asia-Pacific Center, etc. (Inclusive rather than exclusive)**
  - **Chaired by J8. Facilitated by J81**
  - **Collaborative vice directive process**
  - **First step in permanent decision-making body and possible funding conduit**
  
- **Developed Organizational Charter**
  
- **Developed vision statement, strategic goal and sub-goals for partnership with the State of Hawaii**



## ***Progress to Date (cont)***

- **Charter Statement:**

**“The PACOM Energy Partnership and Strategy Council (PEPSC) develops and supports implementation of energy partnership strategies in the Pacific.”**

### **State Partnership**

- **Vision Statement:**

**“USPACOM, in partnership with the State of Hawaii, develops key strategies and implements innovative solutions to harness clean, efficient, secure, renewable and sustainable energy for the benefit of the people of Hawaii and the Asia Pacific Region.”**

- **Strategic Goal:**

**“Match or exceed the State of Hawaii goals.”**



## **Progress to Date – State Partnership Sub-goals**

- **Minimize dependence on fossil fuels**
  - **Reduce power consumption**
    - **Reduce consumption at least 3% per yr and 30% by 2015**
  - **Reduce petroleum use in ground transportation (TBD)**
  
- **Develop renewable energy resources**
  - **Maximize clean alternative energy**
    - **10% renewable by 2010, 15% by 2015, 25% by 2020, 40% by 2030**
    - **100% of new on-base distributed generation electricity will be renewable with the following exceptions:**
      - **Fuel fired electric plants will be biofuel capable and will use biofuel when feasible**
      - **Tactical and mobile electrical generating systems are excluded**



## ***State Partnership Strategic Sub-goals (cont)***

- **Reduce greenhouse gas emissions**
  - **Meet or exceed all federal goals and assist the State of Hawaii in meeting their goals**
  
- **Emphasize sustainability**
  - **Design new building to use 30% less energy**
  - **Design new buildings such that fossil fuel-generated energy consumption is reduced 55% by 2010, 65% by 2015, 80% by 2020, 90% by 2025, and 100% by 2030 (2003 baseline)**
  - **Design new buildings 30% better than ASHRAE standards**
  - **Design major renovations to use 20% less energy**
  - **Ensure 15% of facilities meet the Federal Leadership in High Performance and Sustainable Buildings MOU by 2015**
  - **All new construction/major renovation will be LEED Silver**





## ***Progress to Date – State Partnership Sub-goals***

- **Exercise leadership**
  - **Establish a replicable model for the Pacific**
  - **Increase energy security**
    - **Protect 100% of Task Critical Assets**
    - **“Island” 100% of Oahu installations**
      - **Schofield Barracks**
      - **Kaneohe Marine Corps Base Hawaii**
      - **Pearl/Hickam Joint Base**
      - **Fort Shafter**
  - **Implement demonstration projects**
  - **Improve technical education outreach to the local schools**
  - **Increase our collective knowledge of energy**



## Recent PACOM Energy Projects

- 6.8 MW photovoltaic (PV) project on roofs of Army family housing units in Hawaii
- 64 KW rooftop PV project on 2 buildings at Kaneohe Marine Corps Base, HI
- 309 KW PV project on a hangar roof at Ford Island, HI
- 250 KW molten carbonate fuel cell at Pacific Missile Range Facility (PMRF) Kauai, HI
- Fuel cell hybrid vehicles & experimental prototype hydrogen fuel station powered by 120 KW solar array at Hickam AFB, HI



Rooftop PV K-Bay



Hydrogen fuel station - Hickam



## ***Recent PACOM Energy Projects (cont.)***

- Installation of solar water carports at Pearl Harbor (\$2M project)
- Solar hot water for dorms and rooftop PV for Intermediate Maintenance Facility (\$3M project funded) at Pearl Harbor, HI
- Solar hot water systems on privatized homes
- 40 KW wave energy “PowerBuoy” experimental prototype in Kaneohe Bay housing, fitness centers, dorms, etc.



Wave energy generating  
“PowerBuoy” – Kaneohe Bay  
FOUO



## ***Funded PACOM Energy Projects - ARRA***

- Rooftop PV project, Pearl Harbor & Barking Sands (\$32M)**
- Energy efficiency projects, Schofield & Wheeler (\$21M)**
- New roofs and rooftop PV, Schofield & Wheeler (\$13.2M)**
- Repair windows etc., Kaneohe MCB Hawaii (\$3.4M)**
- Solar water heaters, Ft Shafter (\$1.4M)**
- Range control wind/solar system, Kahuku Range (\$750K)**
- Repair lighting, energy efficiency upgrades, Hickam (\$303K)**
- Solar powered security lights, Schofield Barracks (\$91K)**
- Solar heating systems, Schofield Barracks (\$83K)**



## ***Unfunded PACOM Energy Projects***

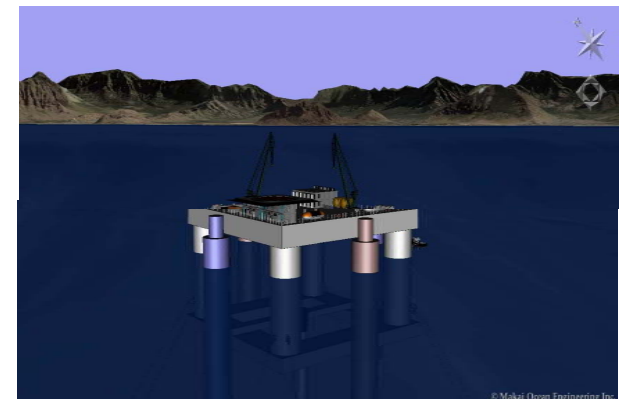
- **Smart metering (\$18M)**
- **Building energy audit & re-commissioning, Pearl/Hickam (\$11M)**
- **Design smart grid, Pearl/Hickam (\$9M)**
- **Electric vehicles & charging stations, Army & Navy (\$37M)**
- **Energy conservation for data centers (\$10M)**
- **A/C upgrades (\$40M)**
- **Retro-fit spray foam insulation for all DoD buildings (\$80M)**
- **Voltage regulators (\$40M)**
- **Solar hot water systems, K-Bay (\$1M)**



## ***Unfunded PACOM Energy Projects (cont)***

- Smart grid & islanding circuitry, Schofield/Wheeler, Pearl/Hick (\$232M)
- Lighting and window upgrades, Pearl Harbor (\$2M)
- Solar photovoltaic (PV) rooftop and ground arrays (\$363M)
- Energy mgt control systems, Pearl/Hickam (\$3M)
- Net zero energy installation, Pohakuloa, Big Island (\$50M)
- Biofuel electrical power plants, K-Bay and Pearl Harbor (\$195M)
- Landfill gas-to-energy, PMRF Kauai (\$10M)
- OTEC pilot plant (\$323M)

**TOTAL = \$1.42B**



10 MW OTEC Pilot Plant



# ***FEMP Proposal***

- **OSD submitted PACOM FEMP proposal on Friday 22 May**
- **5 Tasks**
  1. **Comprehensive Energy Assessment**
    - **Priorities for 5 assessment areas: Energy efficiency, renewables, data centers, industrial, new construction**
    - **\$1.189M**
  2. **Energy Manager Training and Development**
    - **\$625K**
  3. **Smart Grid and Islanding Circuitry**
    - **Cost TBD**
  4. **Liquid Desiccant Solar A/C Demos**
    - **\$500K FEMP, \$400K Army & Marine Corps, \$120K manufacturer**
  5. **Program Management**
    - **\$265K**



# Joint Experiments

## 1. Energy Efficient Data Center Experiment

- Data centers represent 1.5% of energy consumption in the U.S.
- 10% of data center usage is federal, costing govt \$450M
- Data center power consumption doubled from 2000-2006
- Inefficient - 50% goes to powering equipment, 50% to cooling
- State-of-the art energy efficient servers and data centers can reduce power consumption by as much as 80% (EPA)
- Partnering with MARFORPAC Experimentation Center (MEC), DISA and NAVFAC to experiment on the DISA Defense Enterprise Computing Center
  - Advanced metering
  - Baseline data collection
  - Voltage regulators
  - Energy efficient windows
  - Upgraded ventilation, chillers
  - Blade servers, etc.



DISA DECC Pacific, host of the data center experiment





## ***Joint Experiments (cont)***

### **2. Spray Foam Insulation Experiment**

- **OSD Power Surety Task Force (PSTF) has had great success with spray foam insulation in desert environment – energy savings up to 60%**
- **Texas A&M University installed \$7M sq ft of insulation in the 1980s with payback in 4.5 yrs & virtually no maintenance costs**
- **Need to test it in Hawaii's climate**
- **Partnering with PSTF, Hawaii ANG, Hickam AFB, Forest City and Kaneohe MCBH**



Forest City military housing duplex at Kaneohe MCBH **FOUO**



Guard bldg on Hickam with spray foam insulation on roof



## ***Joint Experiments (cont)***

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### **3. Liquid Desiccant Solar Ventilation A/C Experiment**

- **Awaiting FEMP approval**
- **New technology that could reduce cooling costs in humid climates as much as 30%**
- **Developed by DOE's National Renewable Energy Lab (NREL) in conjunction with commercial developer**
- **USPACOM is partnering with NREL, U.S. Army, and U.S. Marine Corps to test at two sites on Hawaii**



## ***Joint Experiments (cont)***

### **4. Proposed Joint Concept Technology Demonstration (JCTD) on Energy Security**

- Will look at**
  - 1. Cyber defense**
  - 2. Smart grids**
  - 3. On military installations**
  
- Partners**
  - OSD, DOE, Military Services, HECO, State of Hawaii**
  
- Problem: The joint warfighter's ability to command, control, deploy, and sustain forces is adversely impacted by a fragile, aging, and fossil fuel dependent electricity grid that makes our military installations, and their critical infrastructure, vulnerable to incident, whether natural event or deliberate attack, posing a significant threat to national security**

