

Renewable Energy & Conservation Initiatives at PMRF



2008 Kaua'i Renewable Energy Conference
Kaua'i Marriott Resort & Beach Club
8 & 9 September, 2008
CAPT Aaron Cudnohufsky, Commanding Officer



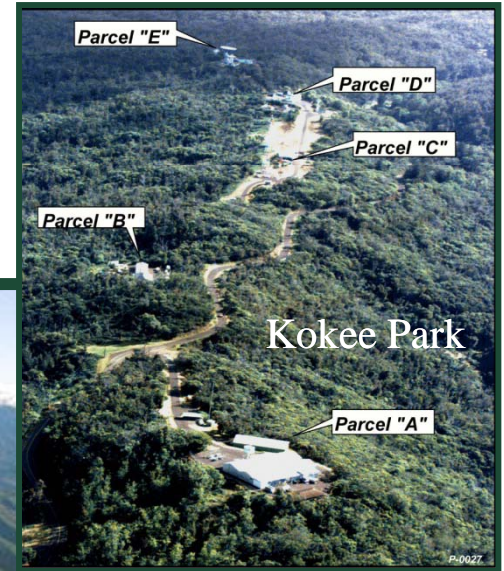
PMRF Range Complex



Makaha Ridge



Pacific Missile Range Facility



Kokee Park



Niihau (PERCH Site)



Port Allen



Pacific Missile Range Facility Barking Sands/Mana Plain





Annual Energy Consumption

- ❖ Electric: 13,800 MWH (4-year average)
- ❖ Water: 56.5 MGAL (2-year average)
- ❖ Fuel Oil: 256,964 GAL (2-year average)
- ❖ Propane: 3150 GAL



Setting the Example

- ❖ **Historical mandates to reduce electrical & water consumption**
 - **Energy Performance Act 2005 (EPACT 2005)**
 - **Executive Order (EO) Guidance**
 - 13423 signed Jan 2007
 - 13123 signed Jun 1999
 - 12902 signed Mar 1994
 - 12759 signed Apr 1991
 - **Navy Region Hawaii Energy Management Program**

- ❖ **Historical Executive level recognition of conservation efforts**
 - **Secretary of Navy (SECNAV) Energy Conservation Award Fiscal Year (FY) 1986**
 - **Federal Energy Efficiency Award FY 1989**
 - **SECNAV Energy Award- Small Shore FY 2002**
 - **SECNAV Energy Award- Small Shore FY 2005**
 - **SECNAV Energy Award Gold Level of Achievement FY 2007**



Executive Order 13423

Strengthening Federal Environmental, Energy, and Transportation Management

❖ Mandated Goals

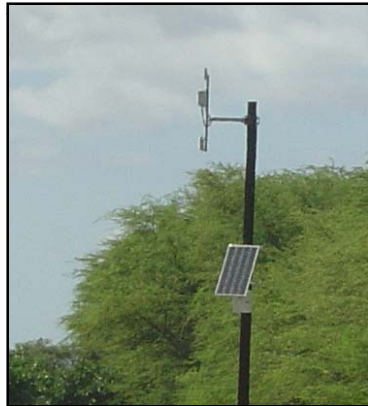
- ✓ Reduce energy consumption 3% annually or 30% total by FY 2015, relative to 2003 usage baseline.
- ✓ Reduce water consumption 2% annually or 16% total by FY2015, relative to 2007 usage baseline.
- ✓ Reduce quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of by the agency
- ✓ Reduce motor vehicle fleet total consumption of petroleum products by 2% annually by end of FY 2015, relative to 2005 consumption baseline
- ✓ Consume at least ½ the statutorily required renewable energy from new renewable sources annually.
- ✓ Implement renewable energy generation projects on agency property for agency use, where feasible.
- ✓ Use plug-in hybrid (PIH) vehicles when commercially available at a cost reasonable to non-PIH vehicles.
- ✓ Maintain cost effective waste prevention and recycling programs
- ✓ Ensure new facility construction and major renovations comply with the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings* set forth in the *Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding (2006)*,
 - 15% of existing Federal capital asset building inventory incorporates sustainable practices by end of FY 2015
- ✓ Increase total non-petroleum-based fuel consumption by 10% annually.
- ✓ Increase diversion of solid waste as appropriate.



Past Initiatives



Solar Powered Applications



Model A704-5 Wireless

❖ Street Lighting

- 27 units installed in 2005
- Another 35 scheduled in 2009
- Reliable, low maintenance, effective

❖ RDT&E

- Primary power source to a variety of base sensor platforms

❖ Airfield Lighting

- 252 units installed in 2008 along runway
- Projected ROI by 2012
- Meets all safety & military specification requirements
- Control system provides same degree & flexibility as a conventional system



Base Housing Solar Hot Water & "Mana Splash" Pool Heater



- ❖ Solar hot water systems
 - Installed in 55 housing units
 - In-place for over 10 years with minimum operation and maintenance problems

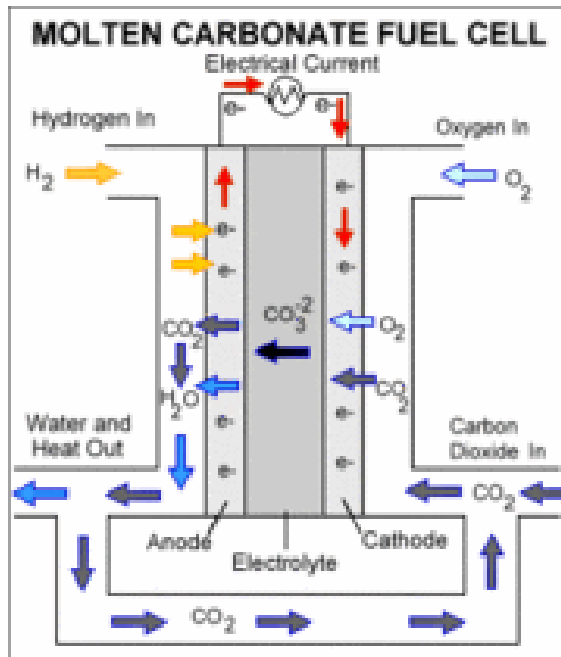
- ❖ Currently, investigating the addition of a solar collection farm within the residential area



New & Ongoing Initiatives



Molten Carbonate Fuel Cell



- ❖ Alternative energy production demonstration project
- ❖ Increased propane's fuel energy release efficiency without conventional combustion
- ❖ Reduced emissions
- ❖ Process by-product is H₂O



Used Oil Burner



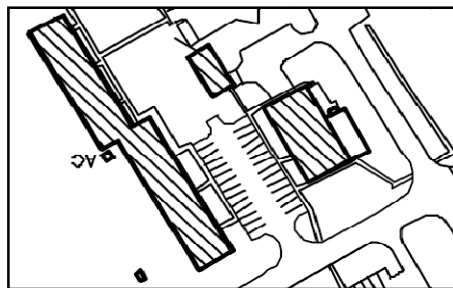
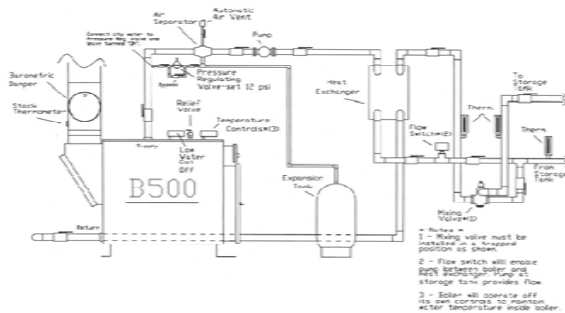
- ❖ Units ≤ 0.5 MBTU/hr authorized use for space heat to heat air or hot water for beneficial re-use by the “used oil” generating activity.

- ❖ Operations covered under Specific USEPA and HDOH.

- ❖ Generating activity can only burn their own “used oil”

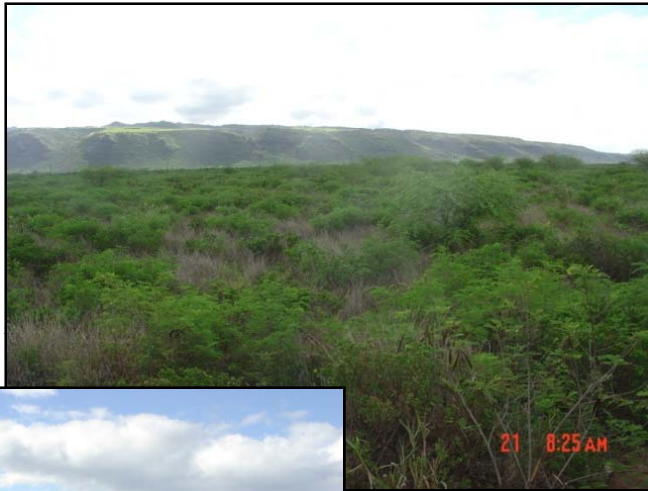
- ❖ PMRF will use an on-spec used oil as fuel with a 141,000 BTU/gal value versus propane @ 91,000 BTU/gal.

- ❖ Intend to replace existing propane system for domestic hot water to base BEQ & Galley





Biofuels Research Support



- ❖ PMRF exploring potential partnerships in use of leased agricultural land as 1-2 acre test plots for non-food biofuel crop research.



- ❖ Lands among the poorest soils on the Mana Plain for conventional crop production.



- ❖ If a biofuel crop can be identified for economic growth on these marginal lands, then scale-up to more productive lands can be explored.



Landfill/Methane Project



This landfill gas-to-energy power plant completed in 2005 supplies 1.2 MW of clean renewable energy to Hill Air Force Base in Davis County, Utah.

- ❖ Ongoing feasibility investigation with Kauai County on ways to bring landfill gas-to-energy power capability to Kauai using the methane gas from the County Landfill.



Future Initiatives

- ❖ Commissioned additional studies to identify future projects
 - Renewable Energy Study
 - Evaluate best cost-effective opportunity to implement PV, wind, solar ventilation, solar hot water heating, day-lighting, biomass, concentrating solar power, or ocean technologies at PMRF
 - Study results expected Aug 2009
 - Update Power Systems Study
 - Examine best cost-effective opportunity for implementing future, energy efficient power generation and distribution systems at PMRF
 - Study results expected Aug 2009
- ❖ Partner with Forest City to install PV farm in base housing area
- ❖ Energy Savings Performance Contracts



The Big Picture

- ❖ Fun Fact: The Navy spends \$752,000,000 on shore facility utilities each year—the single largest line item in the shore facility operating budget. Utilities consume, on average, 38 percent of a base operating support budget.
- ❖ PMRF's conservation initiatives reflect Big Navy's mandate, globally as well as in Hawaii, to become leading stewards of energy conservation and beneficial reuse
- ❖ PMRF operations are highly sensitive to rising fuel cost. Increased fuel costs create unplanned budget issues and contribute directly to already limited tax payers dollars not being spent where critically needed.
- ❖ Renewable energy in the State of Hawaii IS the future.



Dept of Navy Usage Reduction

