Marine Corps Base Hawaii
Sustainability Program

20 May 2011
MCB Hawaii Installations
Our Mission

- Provide facilities, programs and services to units, individuals and families
- Sustain combat readiness for all operating forces and tenant organizations
Tenant Commands

Marine Corps
- 3D Marine Regt (Infantry)
- 1st Bn, 12th Mar Regt (Arty)
- Combat Logistics Bn-3
- Marine Aircraft Group-24
- VMR Detachment (USMC’s only C-20 (Gulfstream IV)
- 3D Radio Battalion
- 4th Force Reconnaissance

Navy
- 4 Navy P-3 Squadrons
- US Navy Anti-Submarine Helicopter Squadron
- US Navy C-20 Logistics Support Squadron
Economic Impact

- Population at MCB Hawaii:
  - Over 10,000 active duty military
  - Over 7,000 USMC family members
  - 2,100 civilian employees & contractors
  - Over 19,000 total at Kaneohe Bay, Camp Smith & communities
    (Doesn’t include local retirees)

- Well over $1/2 Billion per year into the local economy

- MCB Hawaii, Kaneohe Bay is Windward Oahu’s largest employer
Family Housing Construction & its Economic Impact

- Employment of local construction personnel between 2004 and 2014
- $150M per year into the local economy
- 1,136 new homes on line
- 868 homes refurbished
- Beginning Phase III
- Total of 2,592 units upon completion of Phase III
Real Property Assets

- Real estate / grounds – more than 4,600 acres
- 2,600 family housing units
- 900 Buildings – more than 6 M ft²
- Roads / pavement – more than 2.8 M yd²
- Utility Systems – electrical, water, waste water

Total Current Plant Value = $4.0B
MCB Hawaii Sustainability Goals

- Societal, Environmental, Financial
  - Good stewards of the environment and the taxpayer’s dollar
  - Become a “Power Provider” to benefit the community and the Marine Corps
Environmental Stewardship

From 1970 – 2009:
SECDEF Awards: 9
SECNAV Awards: 29

Recently:
2009 – SecDef and SecNav Environmental Quality Award
2007 – SecNav Environmental Quality Award
2006 – SecDef and SecNav Award in Pollution Prevention
2005 – SecDef Natural Resources Conservation Award and SecNav Awards in Environmental Quality and Natural Resources Conservation

Environmental Compliance, Conservation & Protection
Environmental Conservation

- Natural resources - wildlife management areas
- Cultural resources - ancient Hawaiian archaeological sites and historic structures
- Water & energy
- Public outreach
Environmental Compliance and Protection

- Reduction in hazardous and solid wastes
- Robust recycling program
- Fuel spill response capability
- Federal conservation law enforcement officer on staff
MILITARY HISTORY & LAND USE
- 1918 Army: Camp Kuwa`a`ohe
- 1939 -1949:
  - Army: Fort Hase
  - Naval Air Station (NAS) Kaneohe Bay
- 1952 – Present:
  - Marine Corps Air Station (MCAS) Kaneohe Bay
  - Marine Corps Base Hawaii

NATIONAL HISTORIC LANDMARK (NHL)
- Hangar 101 & Seaplane Ramps (World War II)
MCB Hawaii engages multiple government, non-government, and community organizations in partnerships that benefit the Base, the community and the environment.
MCBH Sustainability Initiatives

- LEED Silver or better
- 30% more efficient than ASHRAE standards
Renewable Energy Initiatives

- 30 MW Biofuel Power Plant
- Up to 15 MW in Solar PV Power Purchase Agreements
- Off-island Wind Power
- BIPV Roofing & Solar Hot Water Systems

### MCBH KBay Renewable Energy Projections

<table>
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<tr>
<th>Year</th>
<th>Total MCBH KBay Use KWh/Year</th>
<th>Renewable KWh/Year</th>
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<tr>
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<td>92%</td>
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<td>92%</td>
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<tr>
<td>FY15</td>
<td>100%</td>
<td>100%</td>
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Energy Surety Initiatives

- 30 MW Bio-Fuel Power Plant

Firm Power Generation for Total Load at MCBH K-Bay + Excess Off-Base

Need Locally Grown Biofuel!
Up to 400 megawatts (MW) of wind power available in Maui County

- 3rd party power generation and undersea cabling, HECO owned switchyard/transmission
- MCB Hawaii, Pearl Harbor and Kakaako considered for 200 MW cable landing sites

US DOE and State of Hawaii serving as lead agents for programmatic EIS
- Notice of Intent published in Federal Register, 14 Dec 10
Renewable Energy Initiatives

Building Integrated Photovoltaic (BIPV) Roofing
2009 Federal Energy & Water Management Program Award and FY09 SECNAV Gold Award

Bldg 1027 (1045 similar)
32KW BIPV

Bldg KW/day Before (Yellow) and After (Orange) PV Installation
Bldg 268 – Solar BIPV Shingles

- 26KW BIPV
- Building Manager Online Monitoring System
- On-site Meteorological Station
- Estimated Output = 38,000 KWh/yr (~38% of annual electrical demand)
Preserving a historical home and making it energy independent/Net Zero

Renovation includes extra energy related enhancements:
- Exterior insulation wrap
- Attic radiant barrier
- 21 SEER A/C and 0.95 EF water heater
- Home Energy Management System.

Renovation complete and home occupied in September 2010
- Photovoltaic panels provide 10.6KW of peak power
  - Photovoltaic panels provided by a grant from the US Department of Energy

First Known Historic Net Zero Home in Hawaii and the USMC
Project FROG

ONR grant to Hawaii Natural Energy Institute (HNEI) to erect, monitor & analyze a Net Zero FROG bldg at Marine Corps Base Hawaii

FLEXIBLE RESPONSE TO ON-GOING GROWTH (FROG)

GREEN ROOF
PHOTOVOLTAIC (PV) PANELS
CREASED DAYLIGHTING
VENTILATING OPERABLE WINDOWS

RAINSCREEN / THERMAL INSULATION SYSTEM
24 - 4'x10' solar thermal panels
1,500 gal storage tank
Serves Bldgs 6533 – 6536
Estimated Savings = 407,000 KWh/yr ($39,000/yr)
Renewable Energy Initiatives

Family Housing
Solar Hot Water Systems
Family Housing Resident Energy Conservation Program

- Program resulting in over 15 percent reduction in electrical consumption
  - Conservation program incentivizes reduction in consumption
    - Residents receive rebates for consuming less or pay for excess consumption
Energy Efficiency Initiatives

- Daylight harvesting with lighting controls

Hangars

Warehouses
Energy Efficiency Initiatives

- “Smart Rooms” in Temporary Lodging Facility and Bachelor Enlisted Quarters
  - Computer-controlled system
  - Allows room temperature to rise in unoccupied room
  - Automatically cools room when occupied
Energy Efficiency Initiatives

- Energy Management and Control System

Building Air Conditioning

Building Lighting/Daylighting

56 Buildings Monitored and Controlled Remotely Via Internet
Energy Efficiency Initiatives

- Air Conditioning Improvements and Waste Heat Recovery

Ice Storage Air Conditioning

Waste Heat Recovery for Domestic Hot Water
Technology Demonstration Projects

- Exterior LED Lighting Evaluations

- Airfield LED Lighting
Energy Research, Testing & Development

- **Wave Energy Technology (WET) Project, Buoy #3B**
  - Redeployed Dec 2009

- **Ocean Thermal Energy Conversion (OTEC)**
  - Fledgling technology being examined internally
Renewable Energy Initiatives

- 88 E85 Flex-fuel vehicles and dispenser now
- 42 Low-Speed Electric Vehicles now
- 3 Hybrid Vehicles now, more coming
- 3 GM Hydrogen Fuel Cell Vehicles now with dispenser in the works
Facilities Dept Vehicle Breakdown

2010

End of 2013

Gasoline Free by 2020!
B-20 Biofuel Demo

- **B-20 Fuel Demonstration Project**
  - B-20 biofuel tested in two tactical vehicles since May 10
  - Part of a larger study examining its use in similar vehicles in different climates
  - The AF, Navy, and Marine Corps are all participating at various installations on the mainland

**Used Mess Hall cooking oil converted to Biofuel!**
Bike Friendly Base Initiative

- Existing Bike Routes
- Existing Shared Roads
- Existing City Bus Route
- Proposed Bike Routes
- Sidewalk Improvements for Bikes/Strollers
Marine Corps Base Hawaii
Building Green So We Can’t Be Seen