



# **Marine Corps Installations West**

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## **Energy Efficiency and Renewable Energy Initiatives at MCIWEST**



# MCIWEST Energy Policy

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- Conservation
- Energy Efficiency
- Then renewable energy
  - Exceed requirements of ALNAV 068/09
  - SecNav defines alternative energy to include nuclear
  - MCIWEST Policy Letter 2-09 *Renewable Energy Development Policy*



# Federal Energy Mandates

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- Energy Policy Act of 2005
- Executive Order 13423
- Energy Security & Independence Act of 2007
- ALNAV 068/09
- Executive Order 13514



# Typical Energy Efficiency Measures

- Lighting
  - Replacement of incandescent lamps and others with Light Emitting Diode (LED) lamps
  - Replacement of High Intensity Discharge lamps with new T-5 lamps
  - Occupant sensors
  - Daylighting





# Typical Energy Efficiency Measures

- HVAC (Heating, Ventilation, and Air Conditioning)
  - Variable Frequency Drives (VFDs)
    - Fans
    - Water Pumps
  - High Efficiency Boilers
  - Tankless water heaters
  - “Turboacor” chiller compressors





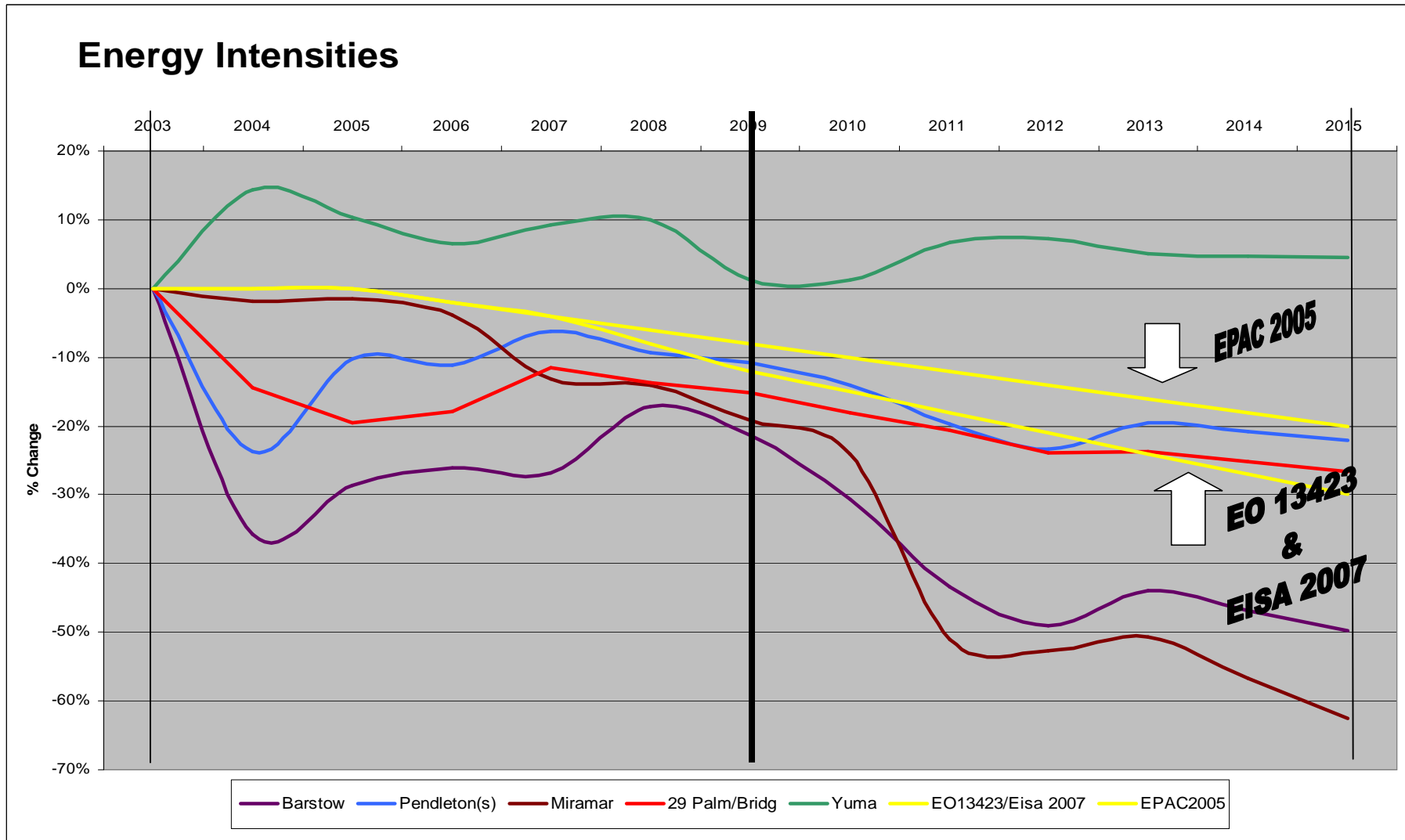
# Typical Energy Efficiency Measures

- MCIWEST Energy Initiatives
  - Advanced Metering Infrastructure
    - Exceed EISA 2007 requirements beyond 75%
    - Emphasize development of “back end”
- Smart Grid participation
  - Viewed as critical part of the future
  - Currently reviewing vendor proposals
  - Intent is to coordinate with energy providers
  - MCAGCC 29 Palms currently working with GE on “microgrid” project



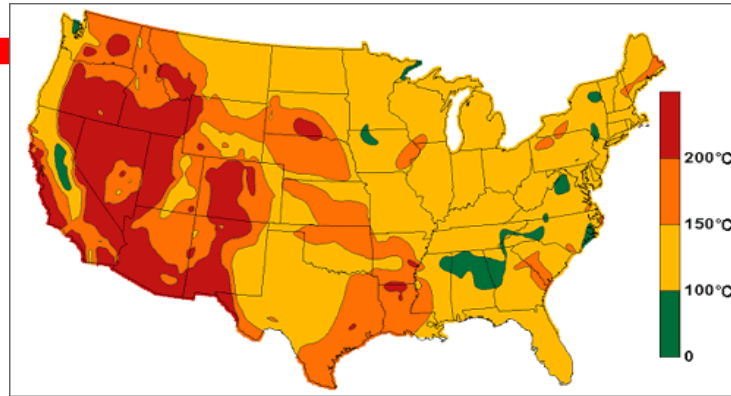


# Alternative Energy Tracking

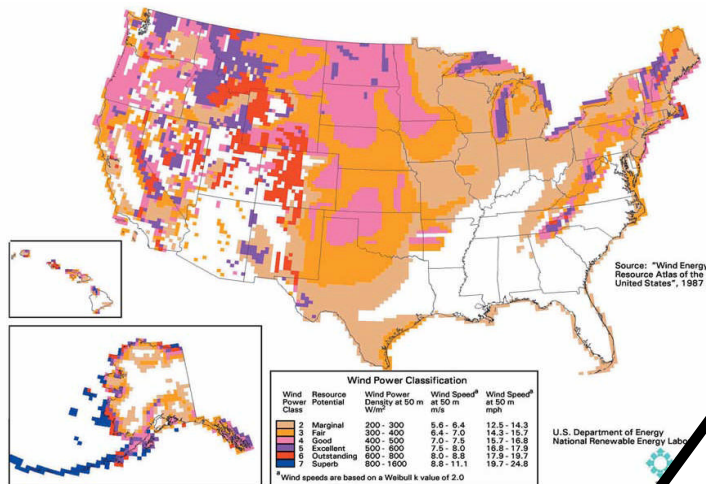




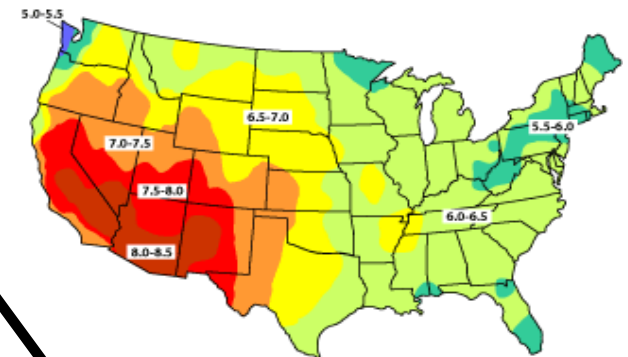
# MCIWEST and Alternative Energy



Geothermal



Wind



Solar



# MCI WEST ALTERNATIVE ENERGY ROJECTS

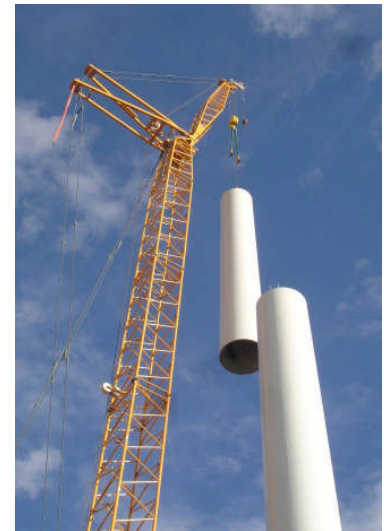
- MCLB Barstow
  - Geothermal capacity for 40,000 sf building area
  - 100 photovoltaic streetlights installed
  - \$17M solar PV project planned as PPA
  - \$50,000 for solar pool heating
  - One 1.5 MW wind turbine at Nebo Annex installed; another planned for Yermo





## MCI WEST ALTERNATIVE ENERGY ROJECTS

- Award – Nov 2007
- Completion – Mar 2009
- Cost after \$1.5M CA rebate – \$4.6M
- Size - 1.5MW
- Annual Payment - \$475,610.34
- % of base powered by turbine - 23%-30%





# MCI WEST ALTERNATIVE ENERGY PROJECTS

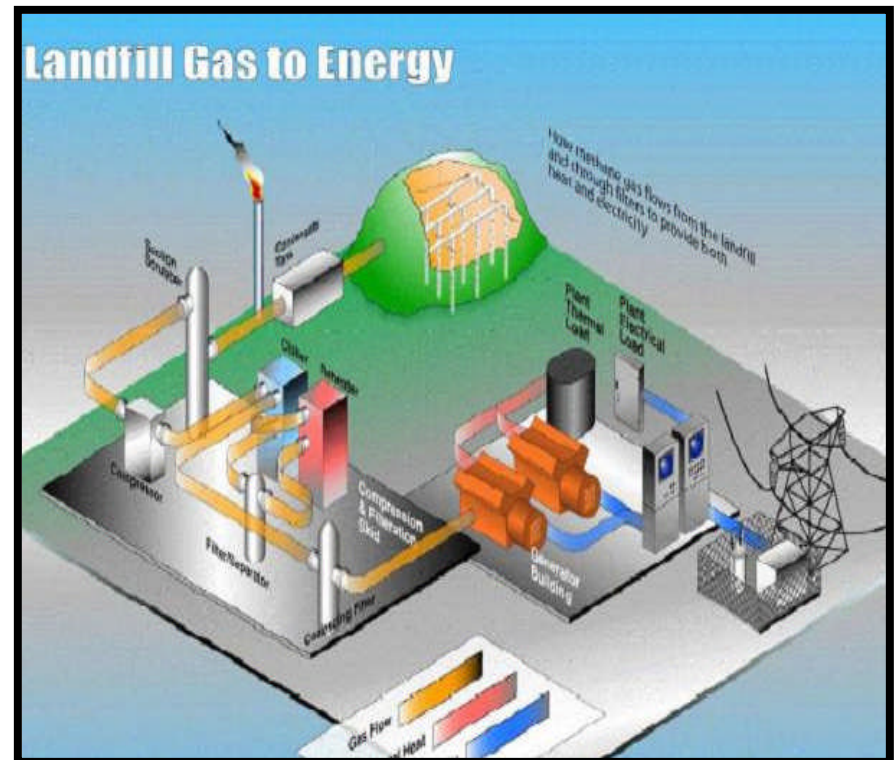
- MCAS Miramar
  - Installed 300 solar-powered parking lot lights
    - 400 more planned (Est. EOY award)
  - Installed 250 kW PV carport structure
    - 500 KW carport planned (Est. EOY award)
  - Installed 30-kW PV Roof mount





# MCI WEST ALTERNATIVE ENERGY PROJECTS

- Miramar's Landfill
  - Negotiations are underway for a 15 year Power Purchase Agreement (PPA) for 3.2 MW's of landfill power.
    - Est. 24,000 MWh/yr ~ 81,000 MBTU
  - Significant portion of the entire Marine Corps renewable energy goal





# MCI WEST ALTERNATIVE ENERGY ROJECTS

- MCAS Yuma

- 7 kW electric vehicle PV charging Station
- 32 kW of "Thin Film" roof-mounted PV installed
- 20 kW "cool roof" project with NFESC
- 32 kW "ARRA" Solar PV Project
- 38 kW "cool roof" project on 1 Million Gallon water storage facility
- Currently testing geothermal sites in Chocolate Mountains for potential power generation





# MCI WEST ALTERNATIVE ENERGY ROJECTS

- **MCAGCC 29 Palms-** Total PV installed 2.3MW
  - Site of 1.1 MW ground-mounted PV system since 2003
    - Built with ESPC
    - \$4.5M utility incentive
  - Power Purchase Agreement (PPA)
    - Contract through FEC SW
    - 1-5 MW upon contract award
    - To be installed by Dec 2010
  - Additional 1.2MW solar via sunshade PV
    - Sizes from 30-150 KW
    - 1.2 MW installed so far
    - 750 KW Still waiting funds





# MCI WEST ALTERNATIVE ENERGY PROJECTS

- **MCAGCC 29 Palms**

- Existing 7.2-MW dual-fueled Combined Heat and Power (CHP) – Operating since 2/2003
  - Annual savings of \$5.8M
  - \$16.2M cost => less than 3-year payback
- Future 7.0-MW dual-fueled Combined Heat and Power (CHP) – Operational FY12 (P129)
  - Dual turbine
  - Includes chilled water and Heat plant facilities in one plant
- Geothermal Study
  - Shallow wells completed positive
    - Positive indication of resource
  - Deep wells to identify potential
    - Start drilling in June



# MCI WEST ALTERNATIVE ENERGY ROJECTS

- MCAS Camp Pendleton
  - 3 PV arrays installed
    - Total capacity 185 KW
  - LED Taxiway Lighting
  - Replacement of Parking Lights with energy efficient lamps





# MCI WEST ALTERNATIVE ENERGY ROJECTS

- MCB Camp Pendleton
  - 17 PV arrays installed
    - Total capacity 640 KW
    - Annual output 1,152,000 KWh
  - 5 solar thermal arrays installed
    - Annual savings \$150K
  - 300 solar streetlights





# MCI WEST ALTERNATIVE ENERGY ROJECTS

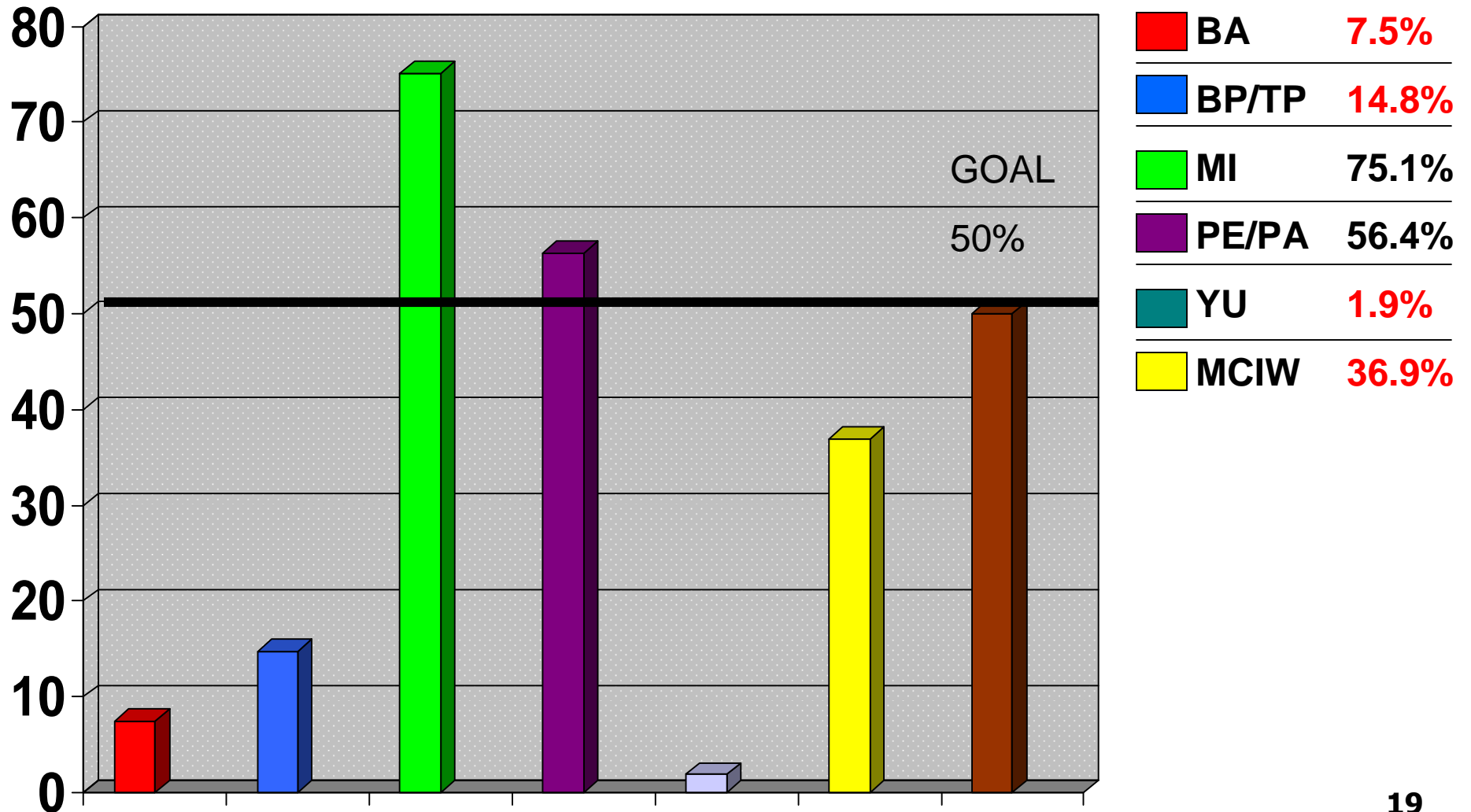
- MCB Camp Pendleton (cont'd)
  - 15 solar bus shelters
  - 154 KW PV array under construction
  - 1.45 MW under design (ARRA)
    - Total investment in FY 09 \$15M





# FY12 PERCENTAGE OF USE BY RENEWABLE ENERGY SOURCES

(TARGET 50% BY FY20)





# GREEN BASE TEMPLATES

## MCAS Miramar and MCLB Barstow

Objective: Create a repeatable template for planning and developing net zero energy installations.

- Green purchasing
- Energy efficient building design and retrofit technologies.
- On or near base renewable energy generation.
- Electricity system interconnection and control.
- More efficient vehicles and renewable fuels for non-tactical



# GREEN BASE TEMPLATES

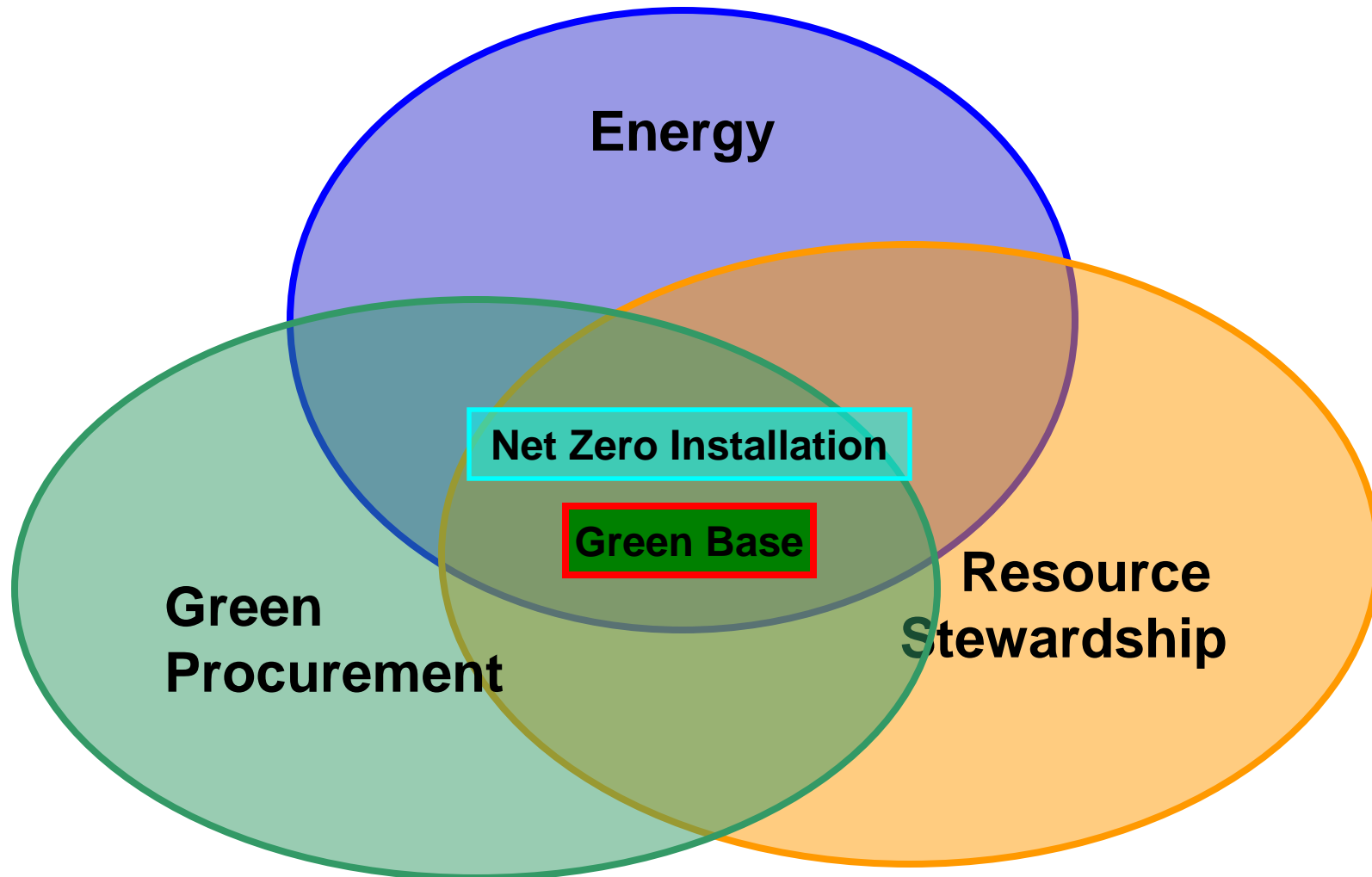
## MCLB BARSTOW

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- MCLB Barstow Green Installation Campaign Plan
  - Alternative Energy Sourcing and Conservation
    - Solar
    - Wind
    - Geothermal
  - Green Procurement
    - No VOC cleaners
    - Recycled Paper Products
    - LED/CFL lighting)



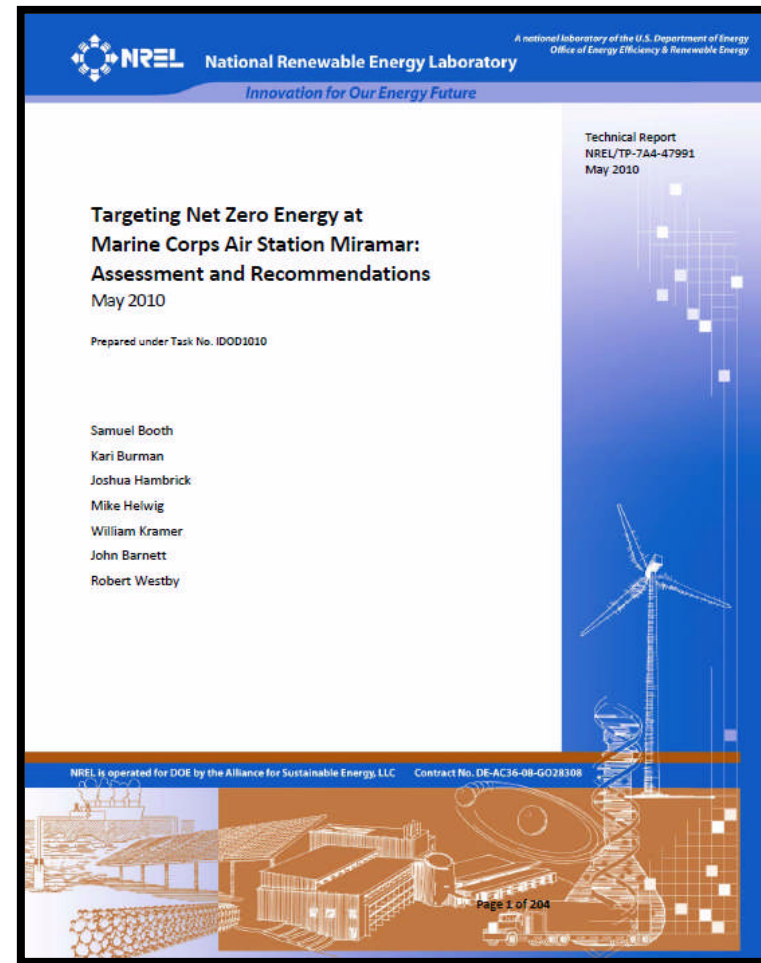
# MCAS MIRAMAR'S PLAN





# NET ZERO TEMPLATE

- MCAS Miramar
  - is working with NREL/DOE to create a repeatable template for planning and developing net zero energy installations.





# GREEN BASE TEMPLATES

## MCAS MIRAMAR

- Additional Facilities Energy Initiatives
  - All supervisors in the Public Works Department will be LEED certified.
  - As custodial contracts come up for renewal, green cleaning products will be used.
  - As specific building components get replaced, the new components will be energy-efficient and promote sustainability.

