Navy Shore Energy presented at GovEnergy 2010

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BLUF

- **Successes**
  - Received over 30% of all Federal Energy Awards 2004-2009
  - 14% Energy Efficiency increase since 2003
- **Challenges**
  - Culture & End User Accountability
  - Information Assurance
  - Systems Modernization
    - AMI/Smart Grid
- **Barriers**
  - Renewable Energy current ROI
  - Energy Storage Technology

Navy is a National Energy Leader Ashore

Shore Energy Key Drivers

Higher Level Guidance Alignment:

Key Legal Compliance Drivers

- **30% Energy Efficiency Increase (drop in Mbtu/KSF) by 2015 (EISA'07)**
- **25% Renewable Energy Increase by 2025 (NDAA'10)**
- **Advanced metering and annual energy audits (EPAct'05 and EISA'07)**
- **20% decrease in NTV fleet fuel by 2015 and Alt Fueling stations (EISA'07)**
- **Full analysis and plan to address vulnerability of critical assets (NDAA'10)**

SECNAV Shore Energy Goals and POM Guidance

- **50% Alternative Energy Ashore by 2020 (Net zero and consumption)**
- **50% decrease NTV fossil fuel by 2015**
- **Improve Energy Security by identifying shore energy supply infrastructure vulnerabilities**

CNOG

- **Reduce reliance on oil and improve resilience of our shore energy sources**

VCNO GP's

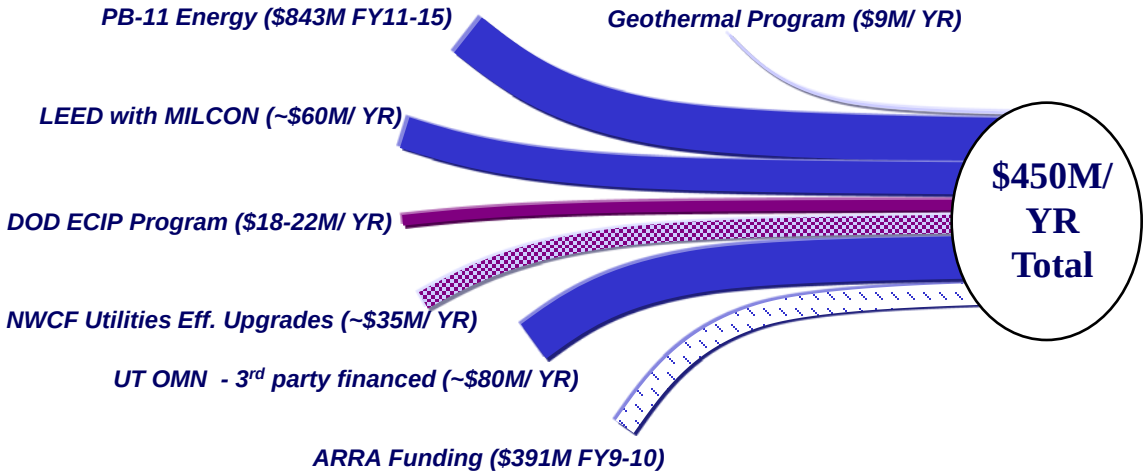
- **Provide energy security and a sustainable shore**

Investments in Efficiency most effective use of Energy $

Building the Foundation: ARRA & PB-11

FY	2009	2010	2011	2012	2013	2014	2015
Funded ($M)	$317M	$74M	$80M	$285M	$257M	$159M	$62M
Energy Saved (over 2003 B/L)	6.8 TBTU	6.9 TBTU	7.1 TBTU	8.1 TBTU	9.0 TBTU	10.6 TBTU	11.2 TBTU

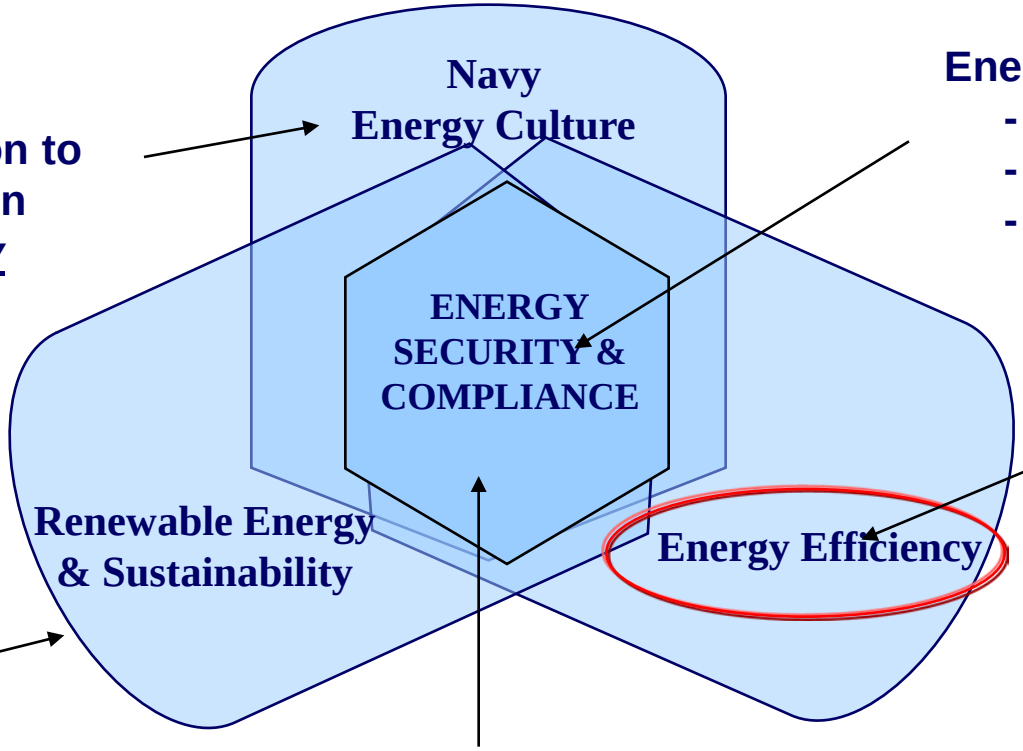
- ARRA made large strides in Direct Energy Funding
- PB-11 Funded Audits and Advanced Metering for Data to:
  - Drive Future Investments
  - Meet Near-term Prescriptive Mandates
- Critical Infrastructure Protection
  - Vulnerability Assessments/ Initial Mitigations
- Set Metering as Initial phase of Smart Grid
- Invest remaining in infrastructure efficiency upgrades via eROI modeling criteria



Energy Security-Enabling Infrastructure and Management

Navy Shore Energy Program

Transform Navy From Culture of Consumption to Culture of Conservation *Through Transparency and Accountability*



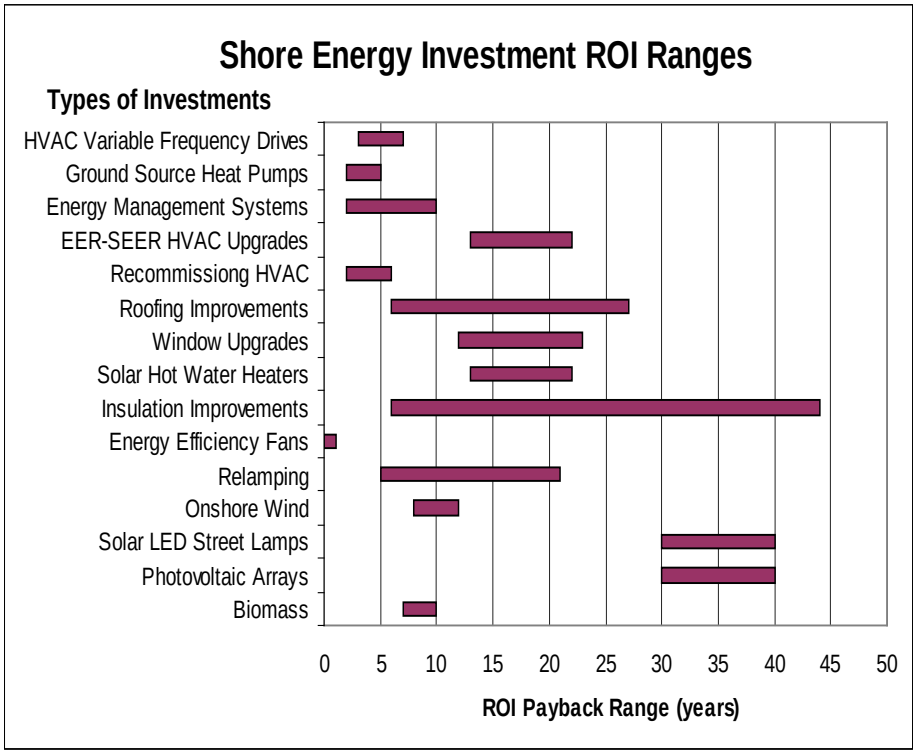
Energy Security:
- **Redundancy**
- **Resiliency**
- **Reliability**

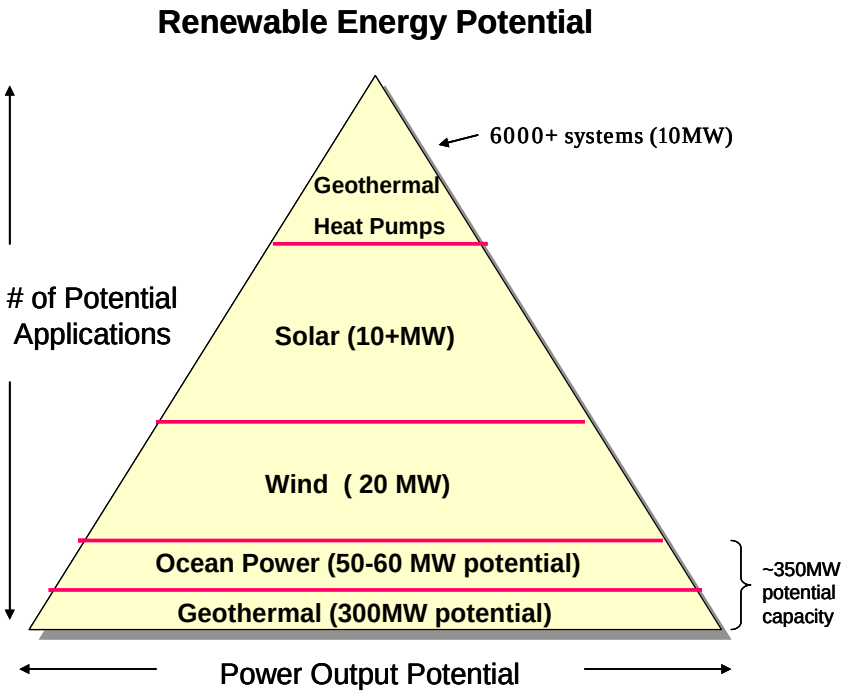
Energy Efficiency First

The *Right Technology* at the *Right Time*
- **Watch**
- **Partner**
- **Lead**

"Compliance" is unique to the Shore

Shore Energy – Simple ROI and Applicability



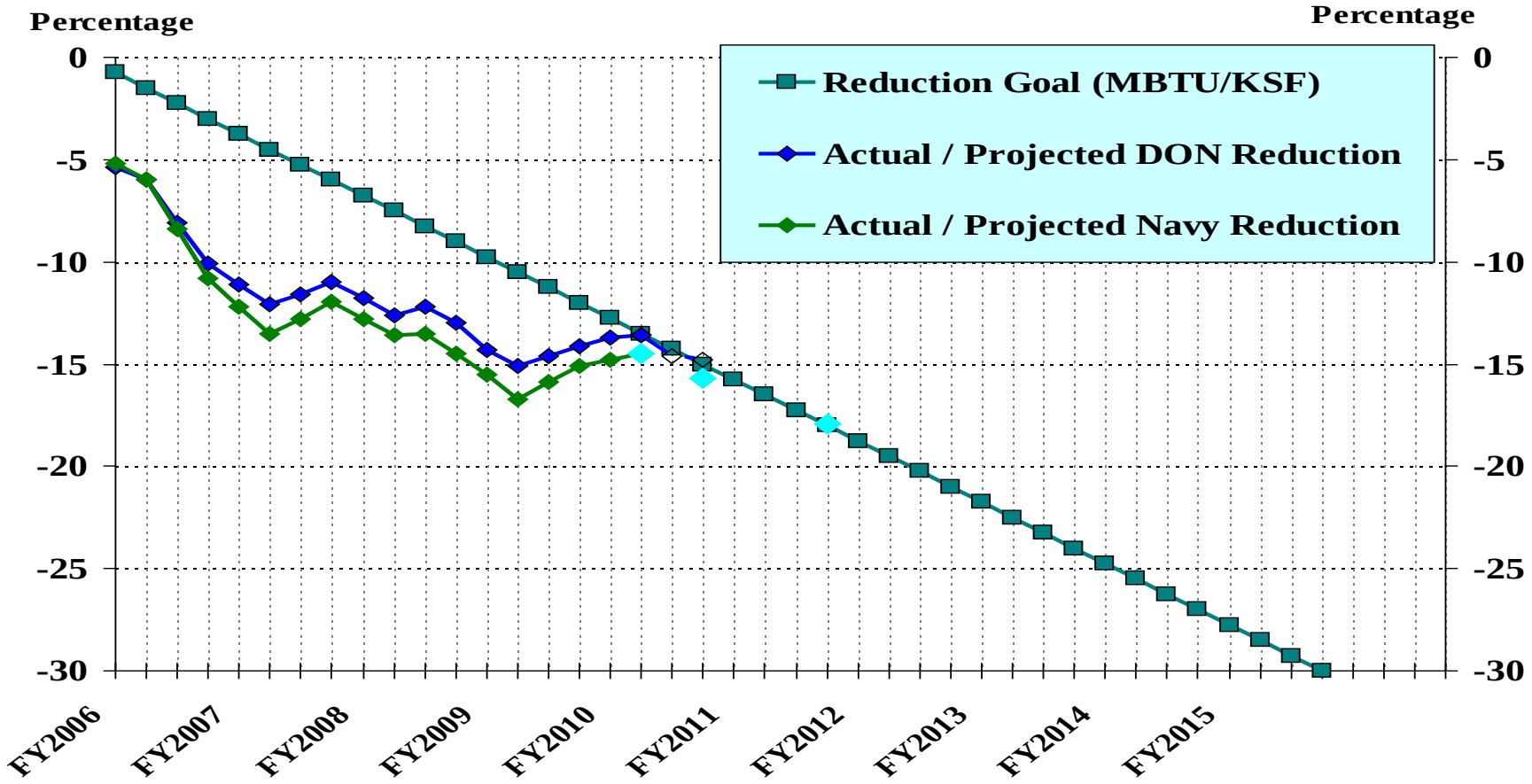


- ROI variance driven by geographic location (climate & state tax incentives/rebates) and individual facility characteristics

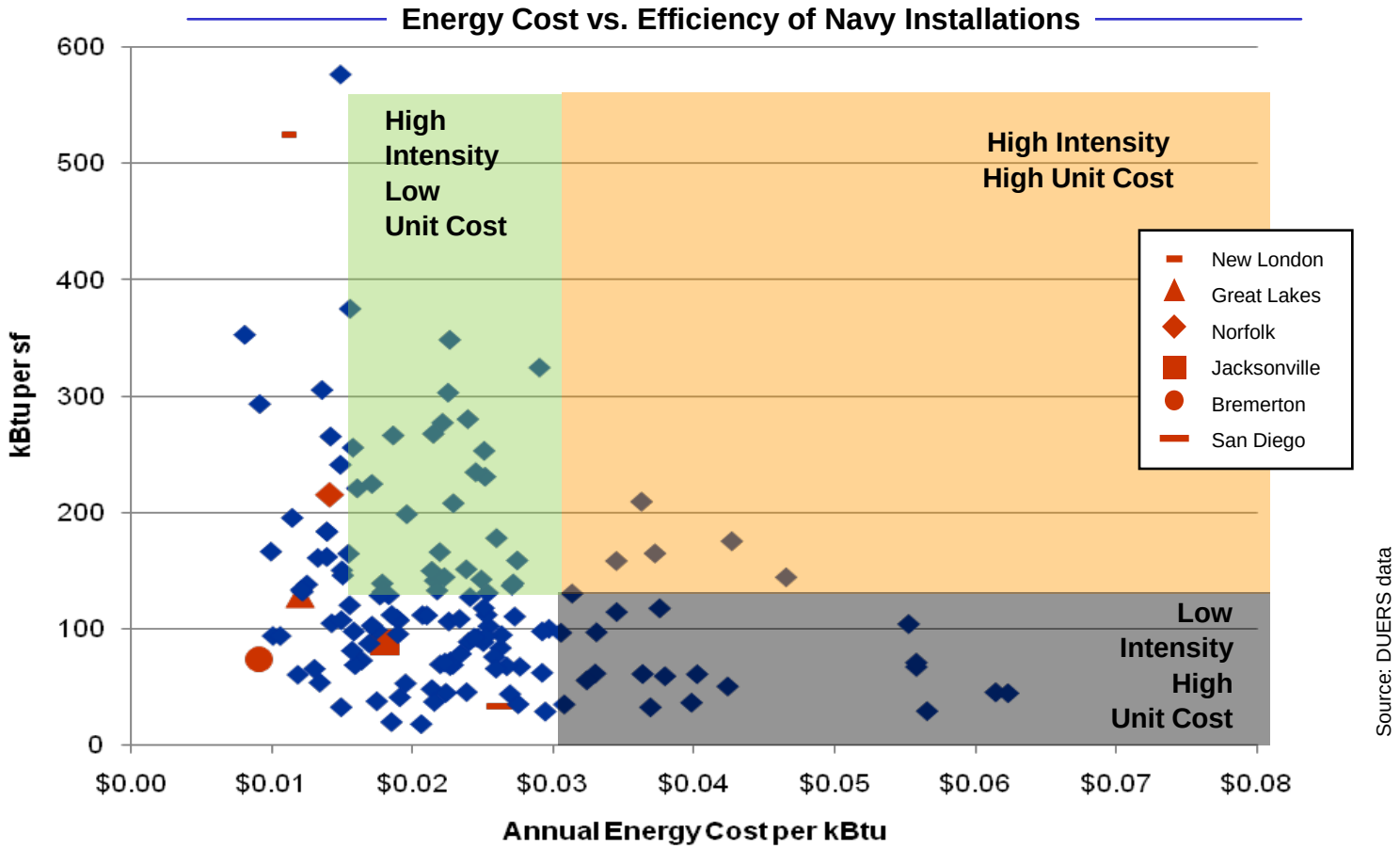
- Large power projects (geothermal & ocean power) have fewer applications and greater risk but greater reward

Investment in Energy Efficiency Measures Provides Overall Best ROI

Energy Intensity

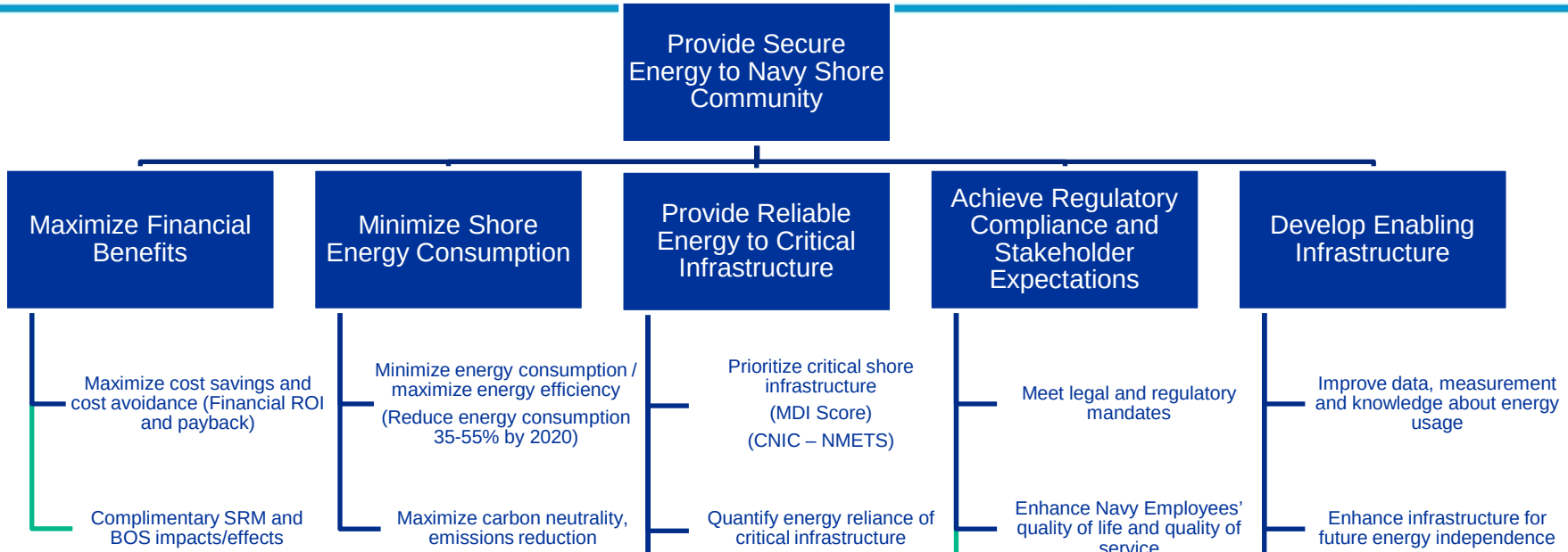


Culture – Transparency & Accountability



Metering Enables Implementation at Region, Installation, and Building Level

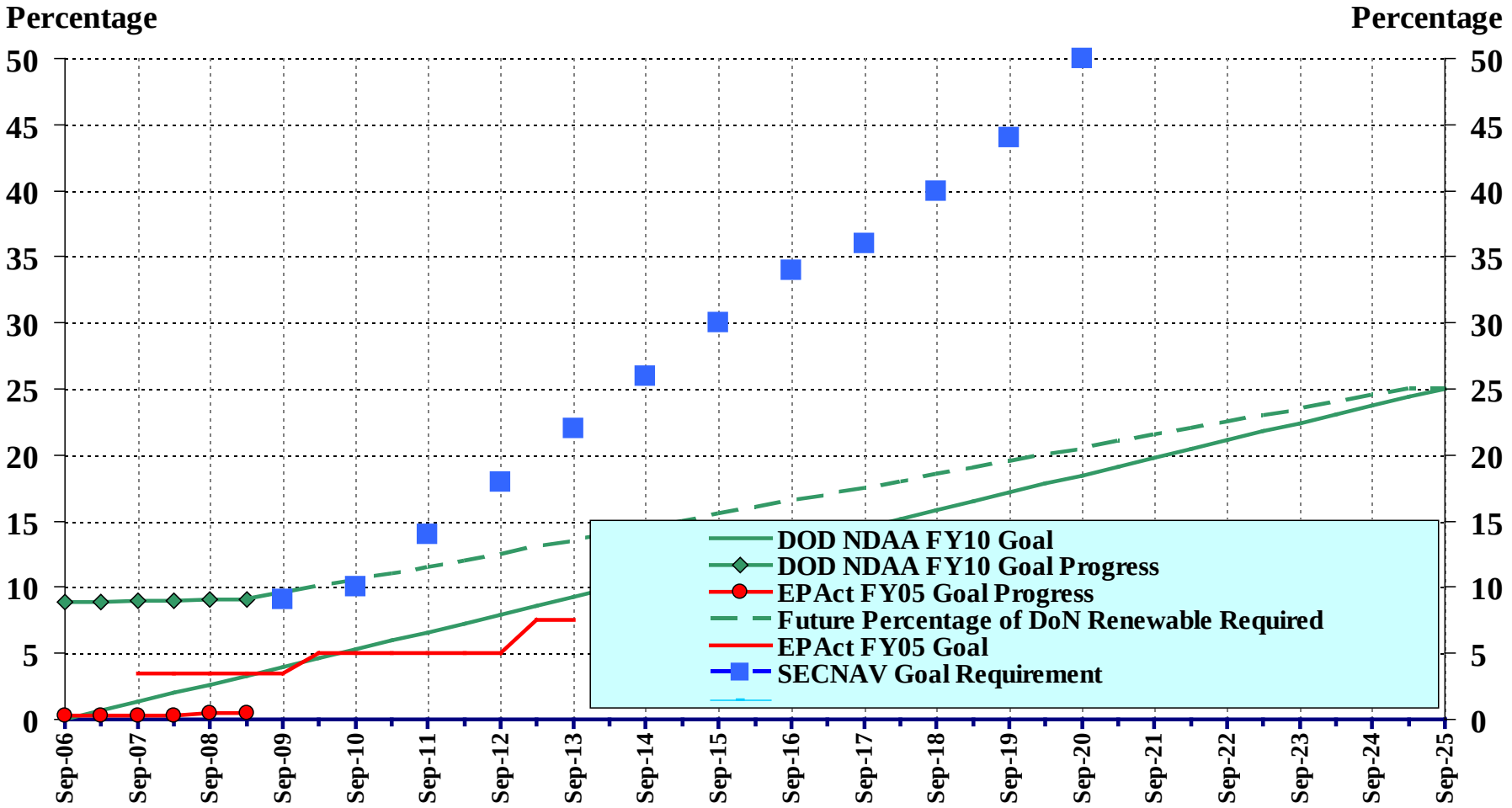
Implementation – Energy eROI Hierarchy



- N81, N46, CNIC, NAVFAC and TFE partnering to define a comprehensive objectives hierarchy and Navy specific constraints such as asset criticality necessitate a robust portfolio approach

Energy ROI is complex and consists of both quantitative & qualitative factors

Renewable Energy



RDT&E Strategy

Research & Development Levels

"Watch" **...technology advances which are not unique to Navy Mission and have Industry focus. Invest when/ where "deployable" with a favorable ROI's**

- Solar Photovoltaic
- Wind
- Fuel Cells
- Energy Storage (large scale)

"Partner" ...**when technology advances are advantageous to the Navy Mission and potential exists to "pool" resources with Industry or Government to advance**

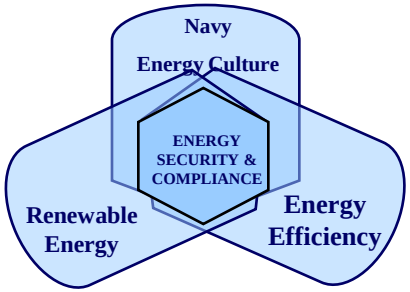
- Secure "Smart Grid"
- Building Parapet Wind
- HVAC Occupancy Sensors
- LED Lighting

"Lead" ...**Invest/ incentivize Energy R&D when uniquely advantageous to the Navy based on warfare capability requirements**

- Ocean Thermal Exchange
- Geothermal
- Wave and Tidal technologies

The Way Ahead

- Shore Energy Governance
- Leveraging Technology
- Transforming Culture and Behavior
- Embrace Sensible Partnering
- Strategic Communications



Shore Energy Strategy

Back Up slides

Navy Shore Energy

FY10 | FY15 | FY20

Energy Security Enabling Infrastructure

Security Enhancing Technologies and Information

- Critical Infrastructure Protection - Assessment and Initial Mitigation
- Use Audit and Advanced Metering data to inform future Investments and meet near-term prescriptive mandates
- Pilot initial phases of "Smart Grid" for system-wide deployment
- Accountability Policies to drive Navy Energy Culture

Reduce Requirements and Enhance Energy Security

Increase Shore Energy Efficiency and Extend Energy Security

- Increase capability of Energy Security/ vulnerability mitigations for Critical Assets
- Reduce Navy's Shore Footprint
- Increase energy efficiency of infrastructure; comply with statutes
- Mitigate exposure to fossil fuel price fluctuations

Maximize Energy Security

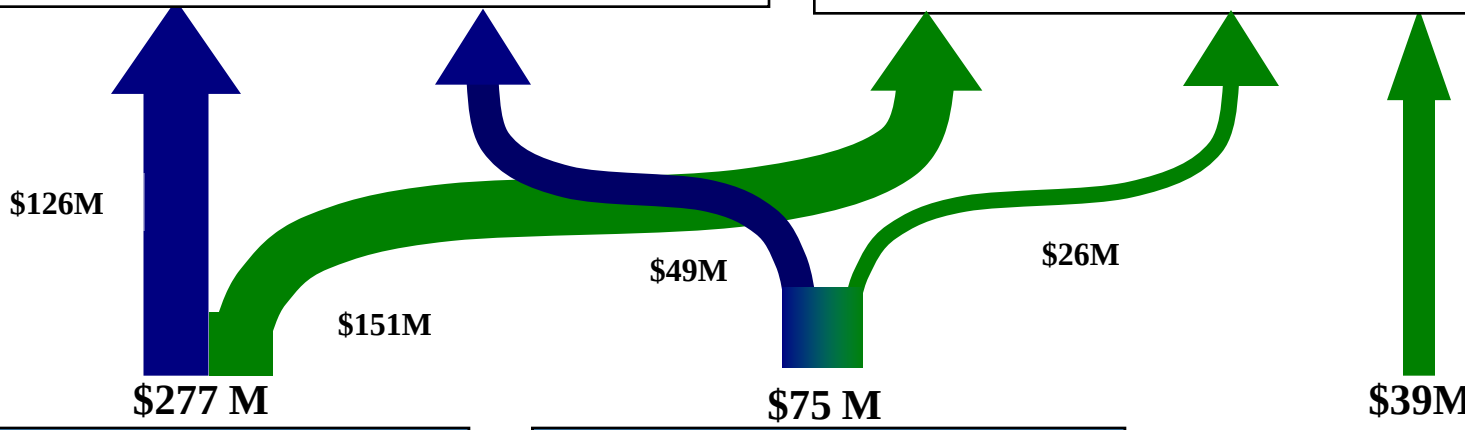
As Technology Allows:

- Replace Critical Carbon back-up systems with reliable and affordable RE systems
- Shift investments to Renewable generation and storage as technology advances allow
- Complete "Smart-Grid" & leverage Nat'l grid to direct energy to Critical Infrastructure/ bases in emergencies

Shore Energy – ARRA Impact

ENERGY CONSUMPTION REDUCTION
(EiSA'07, EO 13423 & 13415)
*Reduce **carbon footprint** by decreasing "brown" energy demand per SF*

RENEWABLE ENERGY GENERATION
(EPAct05, NDAA'10, EO 13423 & 13415)
Increase Energy Security Ashore / Reduce Carbon Footprint



OMN (FSRM)

- *Alternative Energy upgrades (Photovoltaic / Geothermal) - CA, DC, FL, HI, GA, MD, MS, NV, TX, VA ($151 M)*
- *Advanced Metering Infrastructure ($96 M)*
- *Facility Energy Efficiency Upgrades ($30 M)*

- $102M in other facility efficiency upgrades

MILCON

- *Alternative Energy - Photovoltaic in Hampton Roads ($26 M)*
- *Energy Efficiency Upgrade - Steam Plant Decent. Norfolk ($20M)*
- *Steam line distribution upgrades - various locations ($9 M)*
- *Water Efficiency Upgrades - Replace AC Water Distribution System, Whidbey Island ($20 M)*

ECIP / RDTE

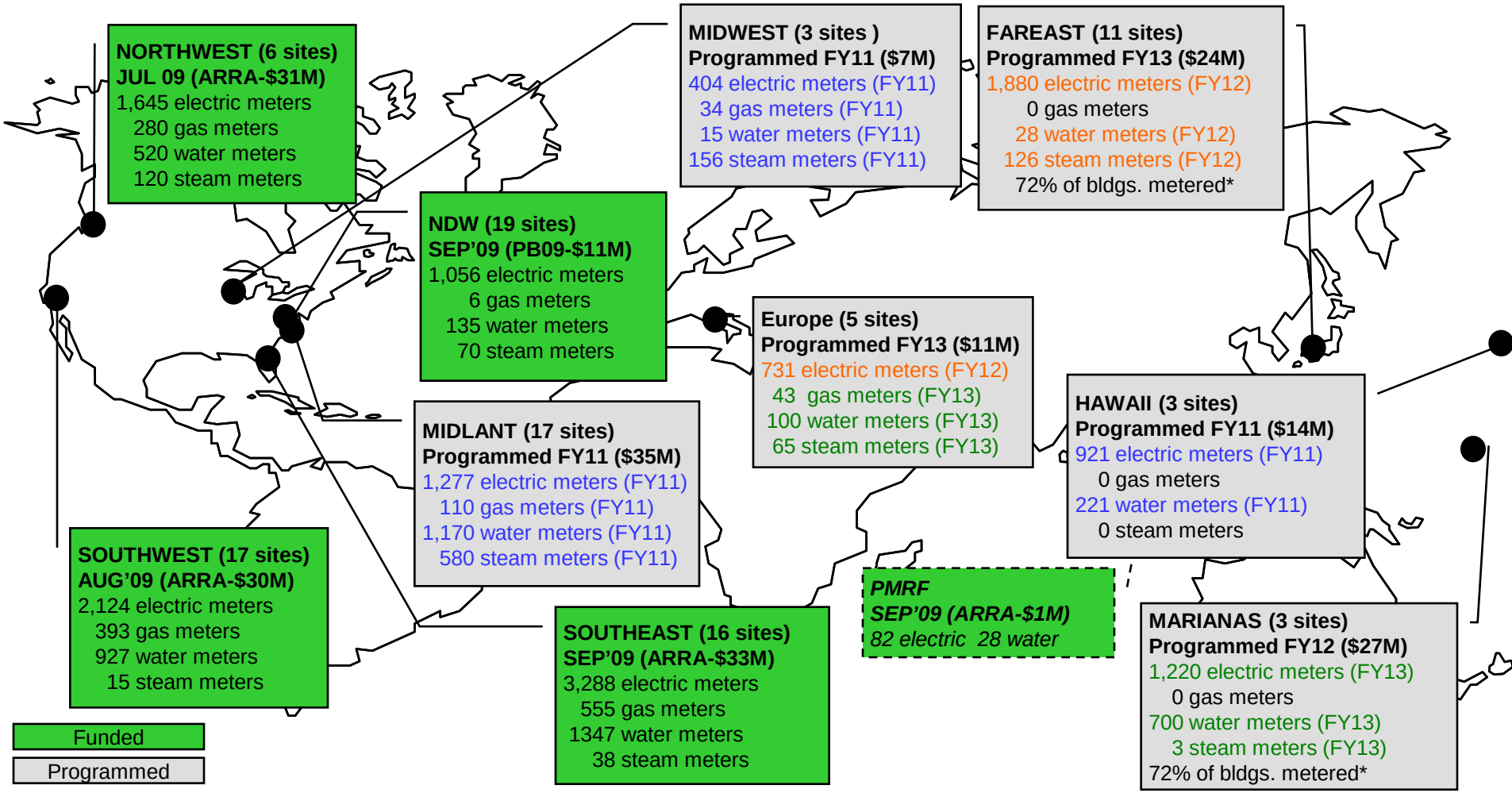
- *Alternative Energy – Wind and Solar PV in CA and VA ($30 M)*
- *Ocean Thermal Energy Conversion (OTEC) R&D ($9 M)*

$165M Efficiency Investment → 2% efficiency increase

$216M Renewable Investment → 0.3% renewable production increase

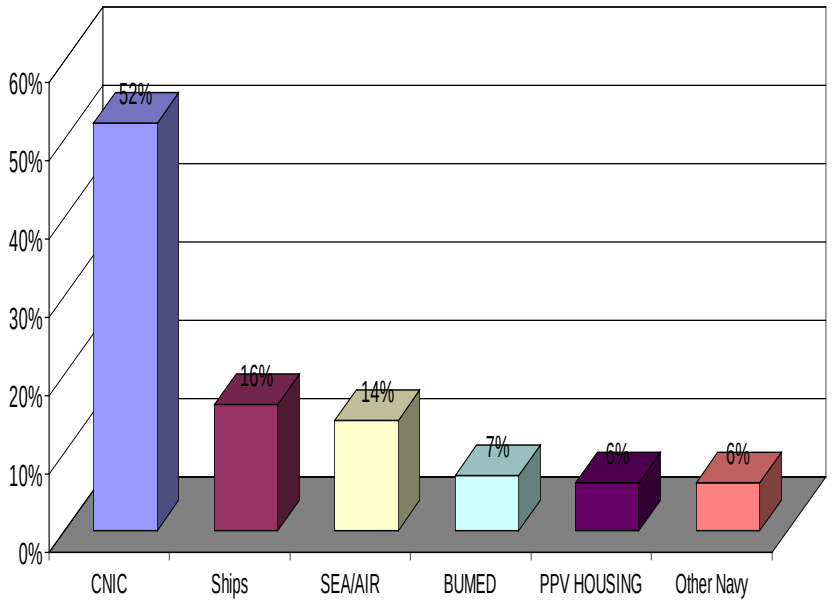
Advanced Metering Plan

Total *~22K advanced meters(1) for ~35K facilities at ~120 Sites on 74 Installations*

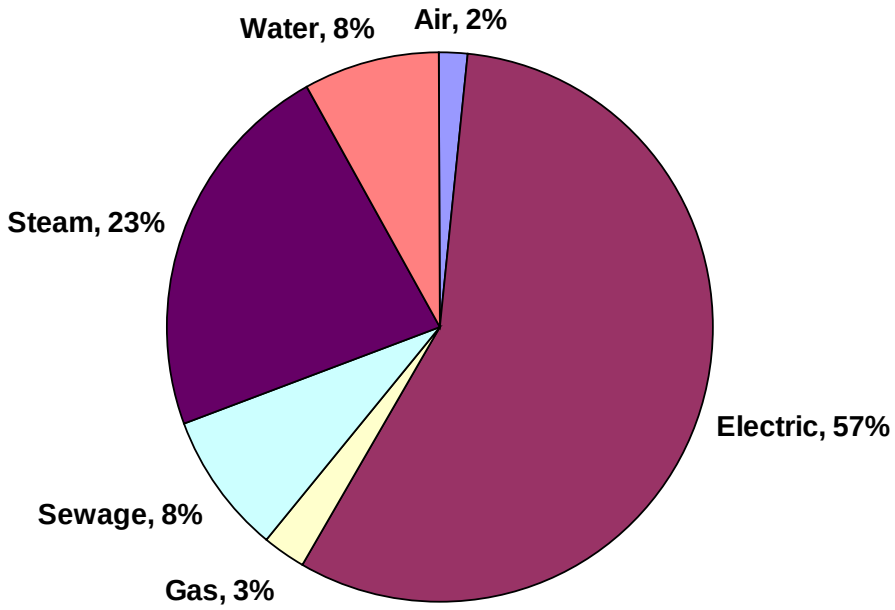


Navy Shore Utilities Volume of Business (FY09)

By Consumer



By Utility Type



Total FY09 Consumption: $1.41B

Non-tactical Vehicle Fleet

- **Current replacement approx 8% of fleet annually**
  - **Total of GSA and Navy-owned replacement (GSA controls their rate)**
  - **On cycle replace a mix of AFVs/ HEV/ low-GHG emitting vehicles**
  - **Reduce vehicle fleet (down from 45K to 37K vehicles since 2005)**

- Cost of SECNAV Goal of 50% reduction in Petroleum use by 2015 ($39M)
  - **$10M for fueling infrastructure at Federally mandated sites (>100KGAL per year) and remote sites with relatively high usage**
    - E85/B20 infrastructure
    - Electric charging stations to support NEVs and future electric vehicles
  - **$29M increase for vehicle replacement costs and higher life-cycle lease rates ($7-14K per vehicle add'l)**
    - Vehicle Availability – Quantities limited on new technologies

Shore Energy – THE LAWS

EiSA'07

- Reduce Energy Consumption per SF ("Intensity") 3%/YR, 30% total by 2015
- New construction/renovations >$2.5M, reduce facility fossil fuel use by 55% by 2010 and 100% by 2030
- 20% reduction in vehicle petroleum and 10% increase in Alternative Fuel use by 2020
- Comprehensive Energy Audits of 100% of buildings on a 4-year cycle (starting in 2012)

NDAA'07

- "Produce or Procure" 25% of Electricity used from Renewable sources by 2025
- Alternative Fuel Stations at each Fleet Fuel Center >100KGAL/YR by 2010

EPAct'05

- Renewable Electricity "Consumption" - 3% by 2009, 5% by 2012, 7.5% by 2013
- Electrical Metering on all Federal Buildings by 2012 (EiSA added Gas/ Steam by '16)
- Purchase 100% Alt Fuel Vehicles (extent practical)

EO 13423

- 15% of Building Inventory must be "Sustainable" by 2015 (LEED certified or similar)
- At least 50% of statutory renewable goals come from new sources (1999+)
- Reduce Water consumption 2% / year from a 2007 baseline (20% by 2020)
- ***Codified by Congress via 2009 Omnibus Appropriations Act***

Shore Energy – NEW REQT's

NDAA'10

- Changed Renewable Goals from an Electricity base to a "Total Energy" base
- **Full Analysis and a Plan to address vulnerability of critical assets**

EO 13415

- Reduce GHG Emissions 34% from a 2008 Baseline
- 100% of New buildings, designed after 2020, must be fully "Net Zero" by 2030

Next

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