





Navy AMI Program Progress and Future

Taking Energy Management to a
higher level



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OVERVIEW

- DON Metering Plan
- Business Case
- Strategy
 - Strategic Opportunities
- AMI Benefits
- Energy Management
- Point of Contact

Core Elements of the DON Metering Plan



EPACT 2005/EISA2007 Requirements

Program structure

Criteria for metering cost, benefits and impacts

Implementation plan

Performance measures

- **25% of installation level plans completed annually, 2008-2011**
 - Reported Via FEC Plans
- **IPT commissioned in fall 2005 still meeting to push strategy**
- **Prioritization of deployment will be driven by criteria**
- **Phase one will build AMI at Naval Base Ventura County (NBVC), Marianas, Northwest, and Southeast (if possible); follow-on per POAM**
- **Will evaluate based upon benefits desired**

* Requirement is hourly recording from meter with at least daily collection, 2007 update includes steam and water meters as well as TOU billing



BASELINE: ORIGINAL ESTIMATE WAS CLOSE TO CURRENT NUMBERS

- ~20,000 electric meters based upon a threshold of \$35K per building in electrical consumption using ~\$750M electric bill in FY06 and installed cost of \$6K/meter
- Based on original approach to reduce consumption by 2% per year (based on \$.05/kwh) yielding a payback in 10 years
- Initial estimate did not include other commodities, i.e. gas, water, steam ...and did not foresee dramatic cost growth in fuel costs



BUSINESS CASE ANALYSIS (BCA)

Basis

- EPA Act 2005 requires the Navy to implement interval metering for all facilities larger than a set value “where economically viable”
- Business model was designed to assess the cost effectiveness of the AMI solution
 - Identify where savings opportunities are from AMI
 - Itemize the usage and energy costs for all FECs
 - Create a tool that allows the benefits to be weighed against the costs of an AMI system
 - Show the differences between utility AMI approaches and savings areas for the Navy (Utility vs. End User)



BUSINESS CASE ANALYSIS (BCA) Cont'd

Results

- Expenditure for Energy and Commodities (Gas, Water Steam) amount to \$1 Billion annually
- A limited number of meters (less than 12,000 incl. all commodities) will capture 95% of the consumption at only ~25% of buildings.
- Pay back period of full AMI deployment less than 10 years (Based on BCA)
- Reduction in unallocated consumption and conservation effect are quick benefits at each FEC.
- Benefits accrue every year of incremental implementation to completion.



AMI BCA METER THRESHOLDS

Threshold Description	Threshold (annual)	Conversion
Electricity (\$)	20,000	Factor In Metering Strategic Document is listed as \$35,000 per meter. Subsequent meetings have indicated this value and bar to be lowered to \$20,000 for new construction. Model used this value to maximize potential buildings
Electricity (Kw)	70 (max demand)	Used a formula to base off usage. Both \$ value and kW formula was used in threshold calculation
Gas(\$)	20,000	Used same reasoning for Gas
Gas(mmbtu)	21,900	2,500 SCF per hour = approx 2.5 mmbtu per hour = 21,900 mmbtu per year
Water (\$)	20,000	Per Metering Strategic document, "\$" values were listed as cumbersome to deal with, hence formula for meeting threshold triggered off both \$ and Flow listed below
Water (kgal)	18,250	50,000 gal per day = 50kgal per day = 18,200 per year
Steam (\$)	20,000	No Threshold listed in Metering Strategic Document, used same as gas meter
Steam (mmbtu)	20,000	no factor, use same as gas meter



PROCESS FOR SHORT AND LONG TERM MANAGEMENT WILL ENSURE INVESTMENT IS REALIZED

Existing Processes

- Existing means of meter data collection (manual) will continue until the system is fully tested and Authorization To Operate (ATO) is issued
- Piers and drydocks will be metered

Integration of Local Processes with AMI

- Maintenance personnel in each region will be trained through the installation contract to troubleshoot, modify, and replace AMI networks
- Metering maintenance will improve, utilizing the “alarms” and “events” capability. The MDM flags problematic accounts
- Local access to on-site Data Acquisition Systems for consumption and power quality monitoring will be delegated at each region



PROCESS FOR SHORT AND LONG TERM MANAGEMENT WILL ENSURE INVESTMENT IS REALIZED Cont'd

MDM Data Estimation and Validation

- Data estimation will take place at the MDM level, based on industry-accepted statistical equations
- Data validation will become a part of data processing operation
- Additional Functionality, Utilities Management (Outage Load Control) and Energy Management (EMCS, etc) at building level, not just base level. AMI communication provides ability to integrate building automation.
- Additional communication systems in some FECs (such as Supervisory Control and Data Acquisition (SCADA) and Data Distribution Centers (DDC) in Northwest) will be integrated with the AMI network



PROCESS FOR SHORT AND LONG TERM MANAGEMENT WILL ENSURE INVESTMENT IS REALIZED Cont'd

Benefits

- Meeting Regulatory Requirements
- More accurate Billing
- Reduced Meter Maintenance of reading
- “Conservation effect” * - % savings of costs due to improved awareness of consumption
- Energy Management % - savings off costs for Commercial Facilities (Support, MWR, etc)
- Ability to allocate per TOU rates (future)

*Documented studies from EEI, EPRI, and other utilities yield 2-7%



ACQUISITION STRATEGY WILL ENSURE AMI SOLUTION IS DELIVERED EFFECTIVELY

Integration

Will modify previous AMI designs for site specific issues, provide start-up support on activity-specific basis, provide standard design layouts, and specification development

Will ensure fusion of Energy, Utilities, IT, and communications requirements

Existing A/E contract with URS/KEMA to provide program integration support of AMI industry contractors

URS contract expires Dec 2010; follow-on procurement anticipated

3-to-5 contractors selected under fixed price IDIQ MACC (Multiple Award Construction Contract) vehicle

\$250M capacity (to accommodate HQMC and other BSOs) w/ base year and four option years

Contractors chosen for proven capability to install functioning AMI networks globally

Specialty Center Acquisition NAVFAC (SCAN) will award and administer the Contract and Task Orders

RFP# N62583-08-R-0051 advertised 24 April; proposals due 14 July

Procure, Install, Sustain



STRATEGY: NAVY PLAN TO INSTALL ADVANCED METERS

Benefits desired

- Accounting/Billing
- Energy consumption
- Energy Management

Requirements to deliver benefits

- Network Design (meter data desired)
- Meter choice/application
- Building controls architecture

Strategy

- Deployment
- Operation
- Evolution

Prototype or 1st phase execution that delivers/enables energy & utility benefits



AMI INFORMATION ASSURANCE: STRATEGIC OPPORTUNITIES

- Platform IT Designation
 - Mission Assurance Category (MAC) III Sensitive
- System Architecture Vulnerability Mitigation
 - Platform IT Interconnection is a significant issue to be solved
- Type Accreditation for System Vendors
 - Enables predictable procurement, compliance and accreditation in timeline
- Vendor Compliance with IA Controls
 - IA enabled applications included in Common Criteria Accreditation
 - Device scans and evaluation performed prior to procurement
- Interim Authority to Build - IATB – Authority to Operate ATO
 - 12 Months from May



Process Improvements & Benefits

- AMI System will enable
 - Better visibility of utilities management
 - Better visibility of energy management
 - Enterprise wide Benchmarking
 - Burden analysis and comparison
 - Greater granularity of consumption
 - Outage monitoring and management
 - Power quality monitoring and management
 - Consumption management and reduction
 - Carbon analysis and management
 - Green House Gases (GHG) management
 - Distributed Generation (DG) and Storage
 - Renewable DG (i.e. Marianas)



GENERAL CONCLUSIONS

- **High level conclusions**

- Navy consumes a large amount energy – over \$1 billion annually combined in Electricity, Gas, Water, Steam (based on FY07 costs)
- Navy pays ~\$750M (FY07) electrical costs annually.
 - Approximately 10 percent of electrical costs is unaccounted and uncontrolled
- Based on savings that can be drawn from accurate billing and “conservation” effects → total savings were compared against the cost of the general AMI system
- Analysis did not account for costs of CIRCUITS and customization of the MDM
- Because the ratio of meters to infrastructure is very low, infrastructure is a much larger driver to the costs rather than the number of meters utilized



AMI IS ON TRACK/ON SCHEDULE

Functionality

- Energy benefits
- Utilities benefits
- MDM interface

Business Case Analysis

- Positive Net Present Value (NPV)
- Benefits exceed Cost
- Stable projected investments

Strategy

- Roadmap going forward
- Acquisition Strategy Underway
- Information Assurance (IA) Underway

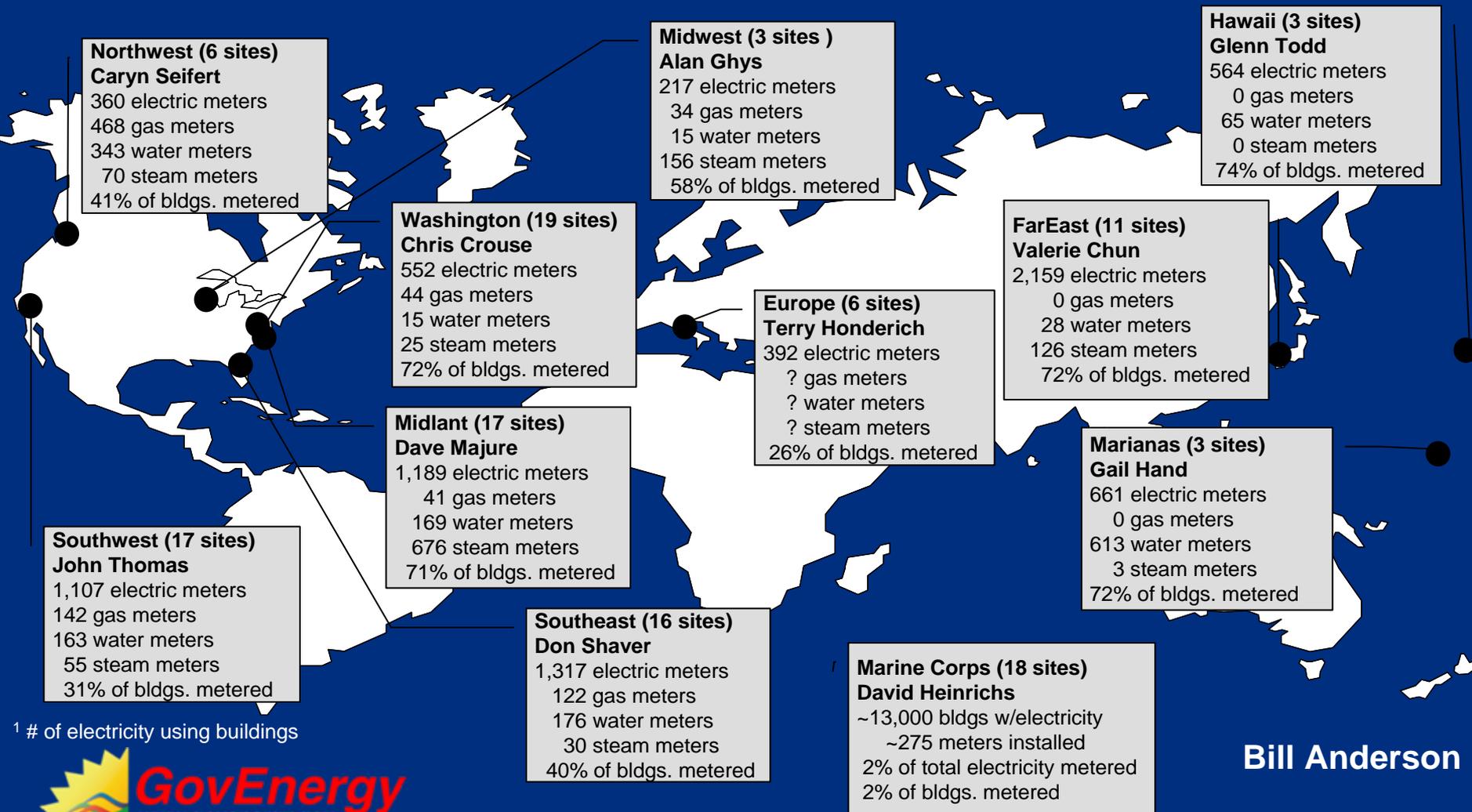


AMI PROGRAM STRATEGY WILL DELIVER MAXIMUM BENEFIT

- The AMI Functional Requirements and Systems Architecture is flexible to accommodate the FECs common and unique requirements and constraints and capture enterprise wide objectives.
- The system may be incrementally implemented incorporating best practices and lessons learned over the installation plan.
- Full implementation of AMI may yield a pay back period of 10 years or less.
- The NBVC Design will demonstrate an operational system that may be expanded easily
- The Procurement materials have been released.

AMI VISION BY 1 OCT 2012

~12K meters across ~40K¹ facilities
throughout ~120 installations



¹ # of electricity using buildings



AMI WILL EXPAND ENERGY MANAGEMENT CAPABILITIES

- Ability to monitor 80 – 90% of energy consumption on base
- Create load profiles for individual buildings and ships
- Establish trend lines and thresholds for alarms
- Reduce base load, not just peak loads
- Monitor and manage results of energy efficiency programs
- Provide realistic criteria for scheduling energy audits of buildings. Cubic data assumes 13% occupancy and based primarily on square footage

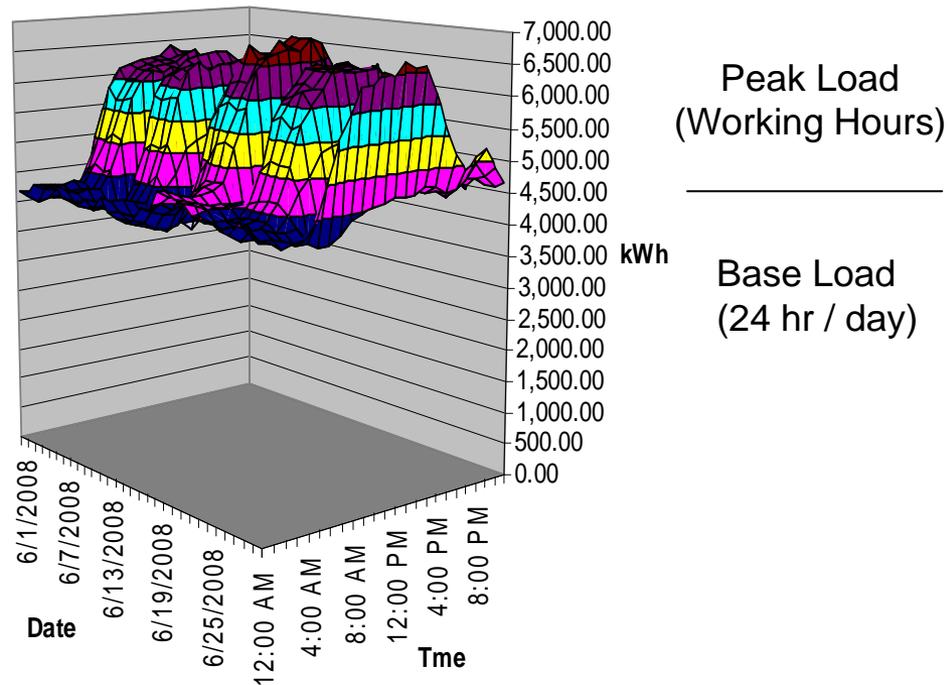


AMI WILL EXPAND ENERGY MANAGEMENT CAPABILITIES – Cont'd

- Eliminate need for physical access to program meters or read meters in secure areas
- Improved meter accuracy
- Ability to enact TOU billing of tenants
- Enable Demand Response and Outage Management programs
- Assess impact of non-scheduled loads, such as ships, personnel mobilizations

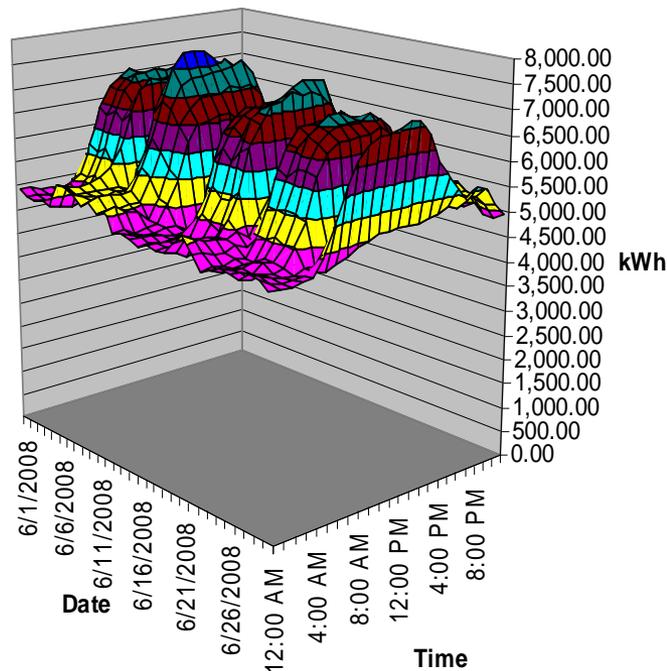
ENERGY MANAGEMENT – PEAK LOADS VS BASE LOADS

Point Mugu Electrical Usage
June, 2008



ENERGY MANAGEMENT – PEAK LOADS VS BASE LOADS

Port Hueneme Electrical usage



Peak Load
(Working Hours)

Base Load
(24 hr / day)

AMI will aid in
targeting these
loads



TRADITIONAL EM INITIATIVES AIMED AT REDUCING PEAK LOADS

- HVAC
- LIGHTING – T5, T8 and CFL PLUS OCCUPANCY SENSORS
- ENERGY AUDITS BASED PRIMARILY ON SQUARE FOOTAGE AND ESTIMATED CONSUMPTION
- BUILDING AUTOMATION WITH DIGITAL CONTROLS
- NBVC REDUCED 46% FROM 1985 LEVEL
- MOST LOW HANGING FRUIT IS PICKED



AMI WILL PROVIDE THE TOOLS TO REDUCE BASE LOADS AS WELL

- BASE LOAD EXCEEDS INCREMENTAL PEAK LOAD AND IT'S CONTINUOUS
- 80 to 90% OF BASE CONSUMPTION TO BE METERED
- CREATE DAILY LOAD PROFILES OF BUILDINGS AND SHIPS BASED ON 15-MINUTE INTERVAL DATA
- ENERGY AUDITS WILL BE BASED ON ACTUAL DATA, NOT ESTIMATES
- TARGET FACILITIES WITH HIGH USAGE DURING NON-WORKING HOURS
- 2-WAY COMMUNICATIONS TO MONITOR AND MANAGE ENERGY MANAGEMENT AND EFFICIENCY PROGRAMS



For More Information

- Would you like to know more about this session?
- Bill Anderson
- DON AMI Program Manager
- Naval Facilities Engineering Service Center
- 1100 23rd Avenue, Port Hueneme, CA 93043
- bill.anderson1@navy.mil

Don't forget to fill out and drop off your session evaluations!

