



Using Data to Achieve Anticipated Savings

***FUPWG
Spring 2014***

May 7, 2014

Navy Meter Data Management Plan



Navy's AMI program goals:

- Capture minimum 60% and goal 85% of facility electric consumption
- Capture minimum 60% and goal 75% (Navy) / 85% (USMC) natural gas consumption
- Capture 100% pier-side vessel consumption (Navy)
- Identify individual facility steam usage & ship usage when pier side (Navy), steam plant production (USMC)
- Identify individual facility water usage and system losses for all water-intensive facilities
- Enable meter data to be automatically transferred to CIRCUITS MDM module (Navy) & MDM system (USMC)

Consists of meters, communication network, cyber secure enclave and data acquisition server

- Leverages capabilities for cyber-secure data transport network
- Cyber security is a major component and concern of Navy's AMI program

Status

- USN: 12,200 meters installed: 65% of planned electric, 89% planned natural gas, 75% of planned water, 43% planned steam meters installed (data collected 15 Mar 2014)
- 34 of 69 Navy installations have all meters installed
- 26 Navy installations transmitting meter data to CIRCUITS
- USMC: Currently metering 84% electric consumption, 85% natural gas consumption, 66% water consumption. Steam production metered at plant level (data collected 1 Mar 2014)

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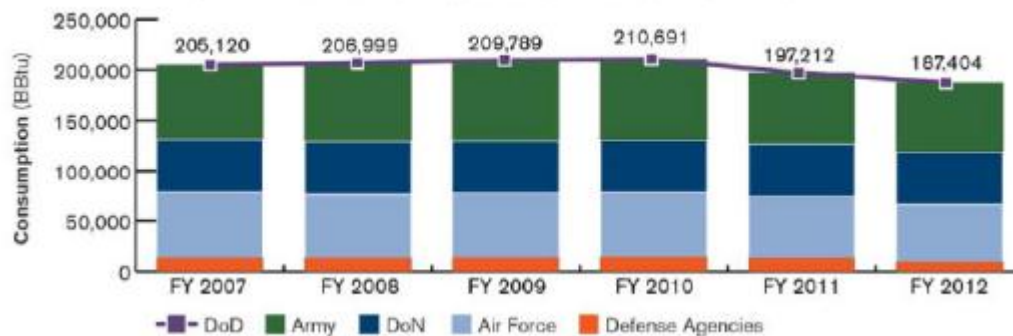
Strategic Data Use – Energy Performance / Policy



Defense Utility Energy Reporting System (DUERS)

- Formulate Energy Policy
- Management reports for senior Defense managers
- Measure energy conservation achievements
- Progress toward energy goals and targets
- Provide DoD energy data to Congress, DOE, others
- Identify energy usage and consumption trends
- Energy data for local, regional, and global analysis

Figure 3-3: FY 2012 Facility Energy Goal Subject Consumption by Military Service

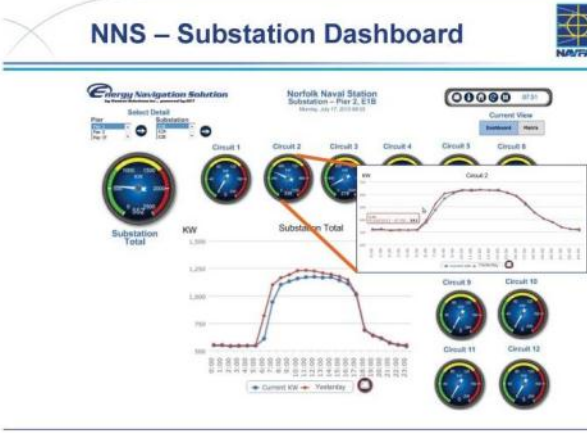
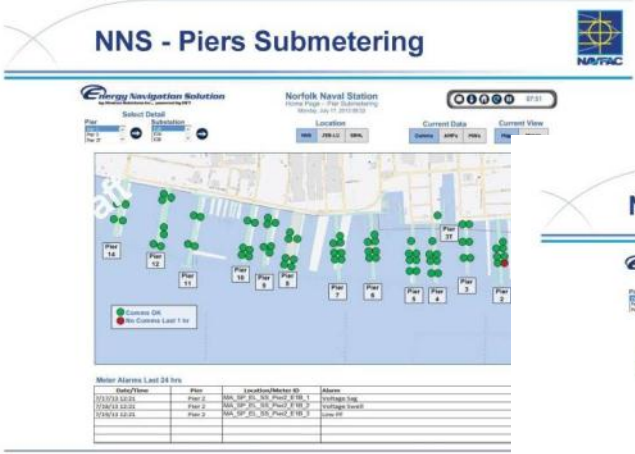


Annual Energy Management Report (AEMR)

- Program Measures for Policy Changes/Adjustments

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Tactical Data Use – Navy Waterfront - In Port Energy



Monthly reporting of ship pierside consumption



USS ALBANY Monthly Utility Report (Electric)
Billing Period – 9/7/2013 – 9/29/2013

USS ALBANY was pier side in Norfolk one time between 9/7/2013 – 9/29/2013. ALBANY consumed 566,107 kilowatt hours (kWh) of electricity during these port calls with cumulative cost of \$58,054 (based on \$0.10255/kWh). ALBANY's Average daily consumption was 24,613 kWh (\$41 & 397 kWh above monthly class average). The SSN class comparison is depicted below.

Tables: Utility Report Summary (Electricity)¹

#	Hull #	Ship Name	Usage in Period kWh ²	Average Daily Use kWh ²	Days in Port ³	Average Daily Cost ²	Cost in Period ²
1	SSN 714	NORFOLK	420,151	23,487	15	\$2,409	\$43,086
2	SSN 764	BOISE	262,906	23,901	11	\$2,451	\$26,961
3	SSN 753	ALBANY	566,107	24,613	23	\$2,524	\$58,054
4	SSN 783	MINNESOTA	89,529	25,975	3	\$2,664	\$9,181
Total			1,398,693			Total	\$137,283
				21,795	90%	\$2,238	\$39,906
Class Average				24,216	100%	\$2,483	\$44,340 ⁴
ALBANY				24,613	102%	\$2,524	\$58,054
				26,688	110%	\$2,732	\$48,774

Monthly Averages for ALBANY

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2013		7,767	20,048	22,803	23,851	24,046			24,591	24,613		

“With NAVFAC providing mock bills, TYCOMS can quantify consumption, improve awareness and ultimately change the energy culture on the waterfront. In refining ship class baselines, TYCOMS need to look for outliers and target them first. Additional progress will come as we implement common procedures (similar to Great Green Fleet efforts) to identify standardized plant alignments, ultimately minimizing variance within ship classes.”

Joseph Murphy
SES, USFF

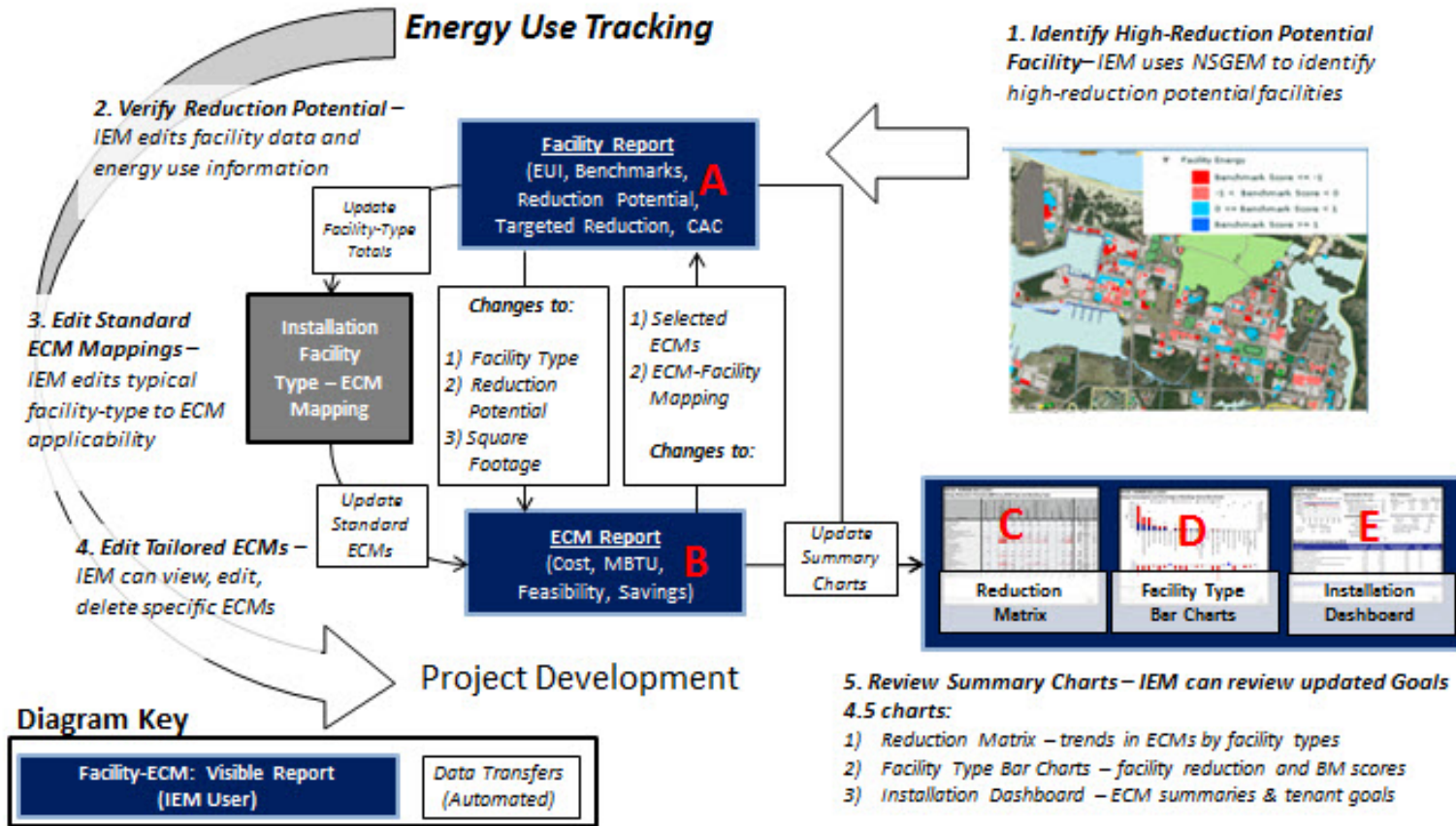
1) AMI system under construction—provided for energy management awareness only
 2) Not Used for Billing – represents ship's contribution to total USFF utility cost
 3) Daily averages and days in port computed by using only days where usage is a least 50% of maximum usage during a port call
 4) Class averages (avg. usage/day, avg. cost/day and avg. cost/mo.) are weighted by days in port

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Tactical Data Use – Energy Project Development



Goals 4.5 Facility ECM Workflow and Capabilities



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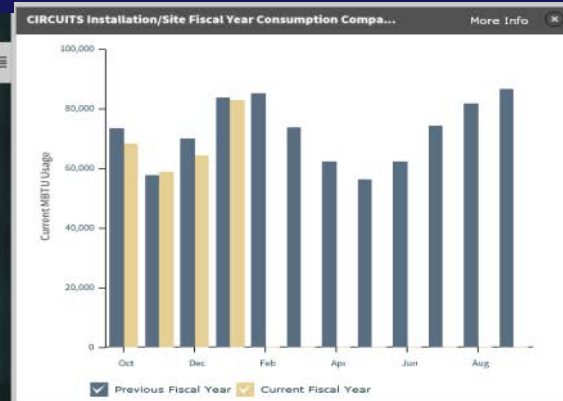
Tactical Data Use – CIRCUITS Utility Billing/Reporting



NAVY Facility Energy Efficiency Score color coded to show potential savings based on ASHRAE Standards. Red and pink facilities are potential target for energy projects, blue facilities are performing per or above standards



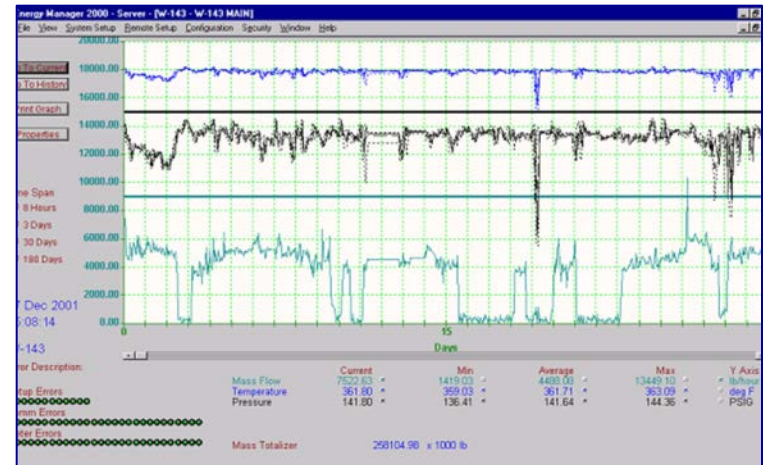
Installation Monthly Consumption compared to FY-1



NSGEM focused on energy consumption reporting – monthly summary

CIRCUITS upgrade -->reports focused on utility mgr needs.

- This steam meter display shows temperature, mass flow, and pressure.
- Electric AMI meters report amperage, voltage, phase, load on each phase, power factor, etc
Example – use to diagnose blown fuse
- Currently only seen from Data Acquisition Server



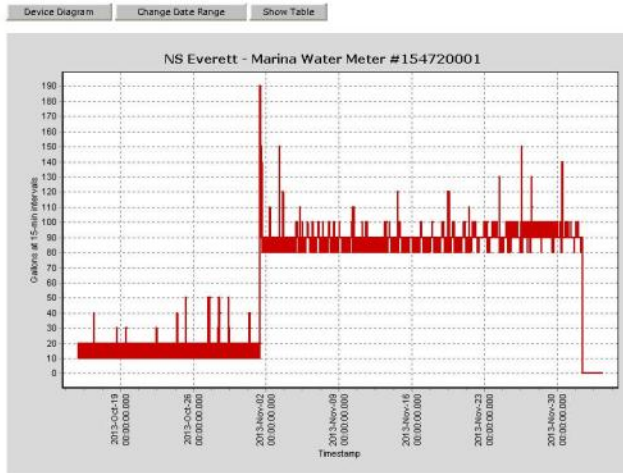
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Tactical Data Use – Leak Reductions / Ops Efficiency



WebReach - Graph

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Left-click and drag to zoom. Right-click and drag to pan.

AMI report identified water leak

- Water use increased from 1 gpm to 4 gpm
- Leak was below the pier and below the water line and would never have been identified without AMI



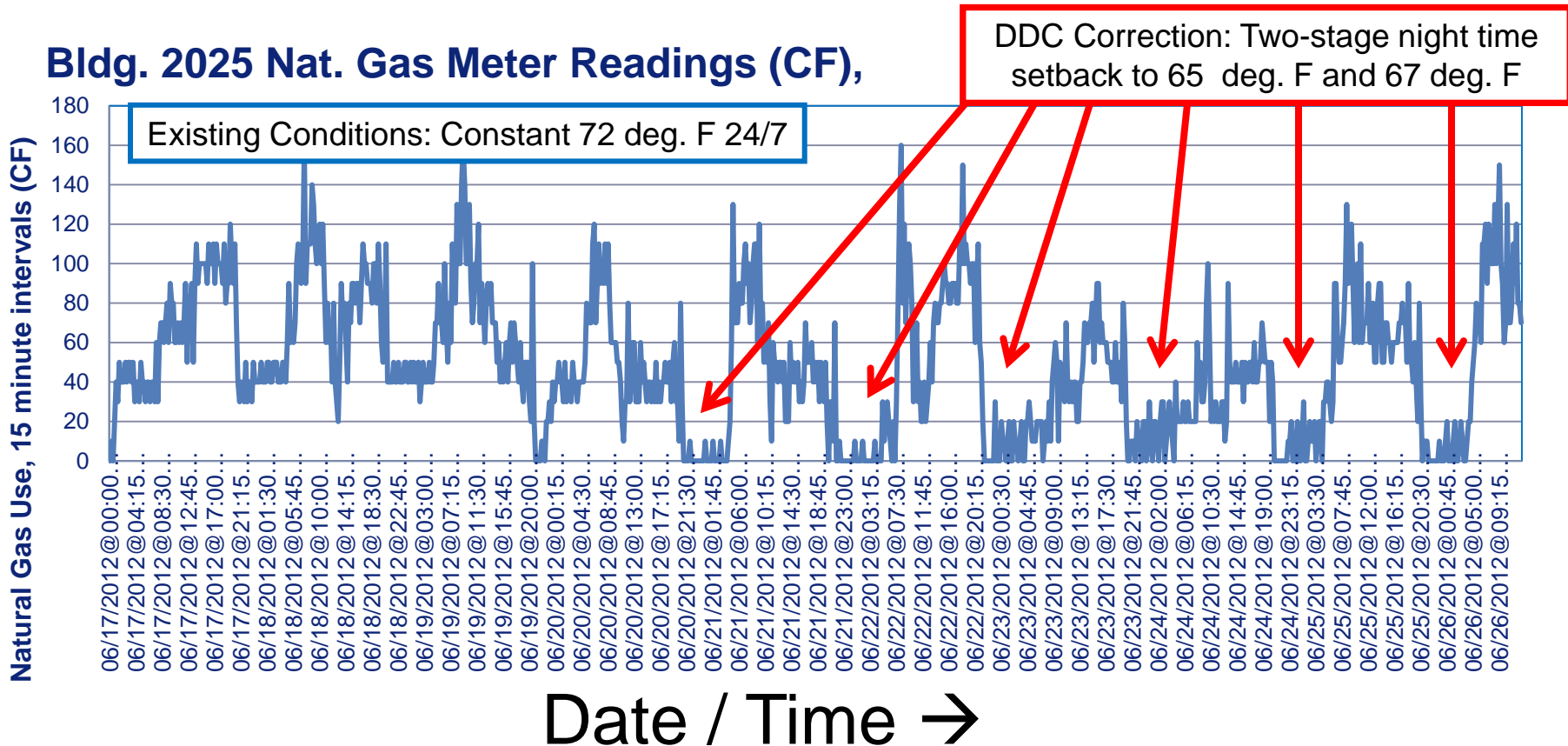
Well pump maintenance

AMI tech observed an excessive amount of consumption (~5000 gallons per day) at the bowling alley after hours. Working with the BOS, determined only 1440 were needed to lubricate adjacent well pump. This same remedy is being initiated at all 3 well pumps on station.

<http://fonserver/ION/Historical/DisplayGraph.asp?id=1c942faf-a0c0-4a46-8739-4eb122a17bc&node=154...> 12/31/2013

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Tactical Data Use – HVAC/DDC Optimization



- AMI Estimated Annual Energy Savings: 312 MBTU
- AMI Estimated Annual Utility Cost Savings: \$2,831

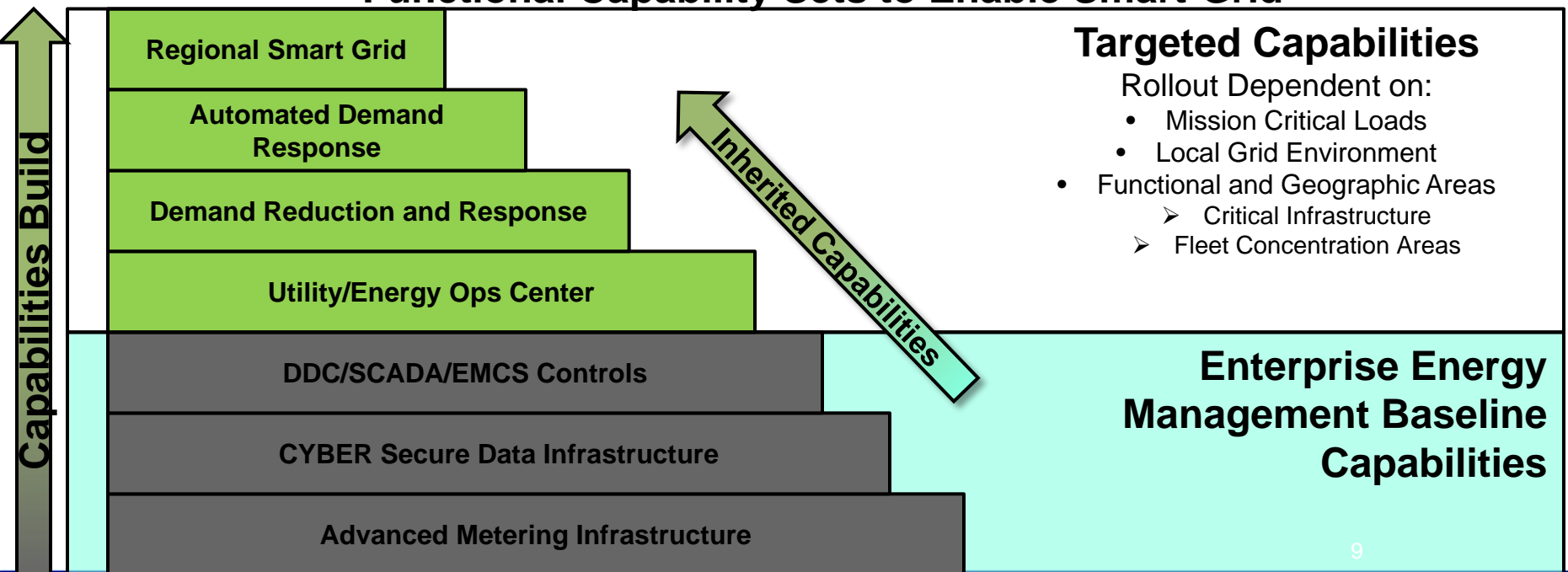
Using Data to Achieve Anticipated Savings Way Ahead – Navy “SmartGrid” Enabling Capabilities



Smart-Grid: Energy management to enable efficiency and demand response. **FOC Capabilities:**

- Automated Energy Consumption Data Collection and Delivery (AMI)
- Cyber Security - Defense-in-Depth (PSNet, with ICS protected enclave)
- Interoperable Command and Control of Enterprise Industrial Control Systems
- Automated Demand Reduction and Response

Functional Capability Sets to Enable Smart-Grid



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