



Navy Smart Grid Pilot - Naval District Washington

Industrial Controls Systems Integration with
Critical Infrastructure Monitoring

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NDW Command Information Officer (N6)

- Metering (AMI and Legacy)
 - CIRCUITS (billing and reporting)
 - DDC
 - SCADA
- } Legacy Industrial Control Systems (ICS)
- Facilities Management Systems
 - GIS Systems

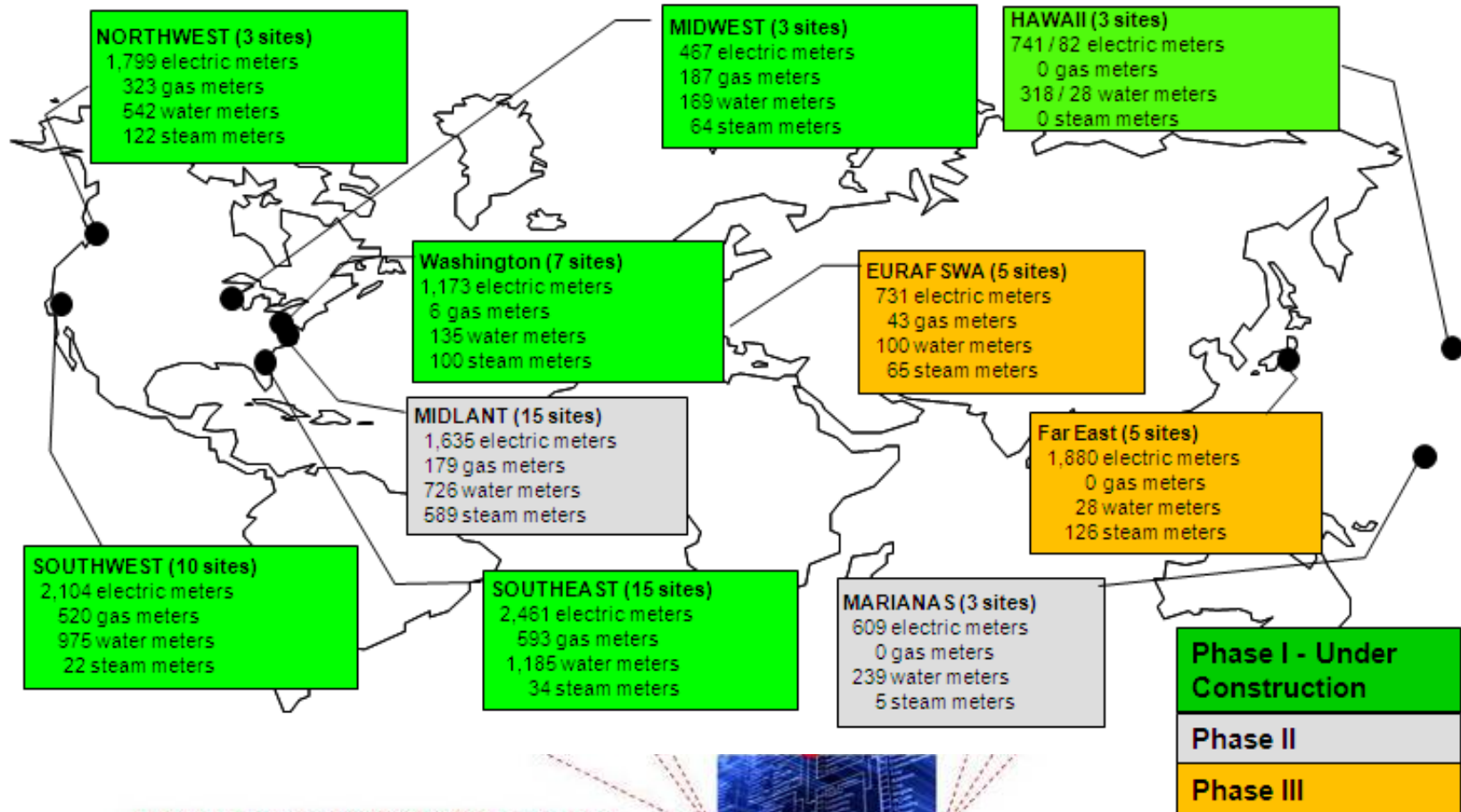
Secure integration of systems to provide transparency

Enabling - Command & Control, Emergency and Security Management, Data Management, Energy Management)

Navy Advanced Metering (AMI) Program



Total Over 21K Advanced Meters across 73 Installations and ~120 sites



**MDM as part of CIRCUITS program:
Enterprise metering database
and data analysis tool**



Enterprise Industrial Controls Systems (ICS)



Mission

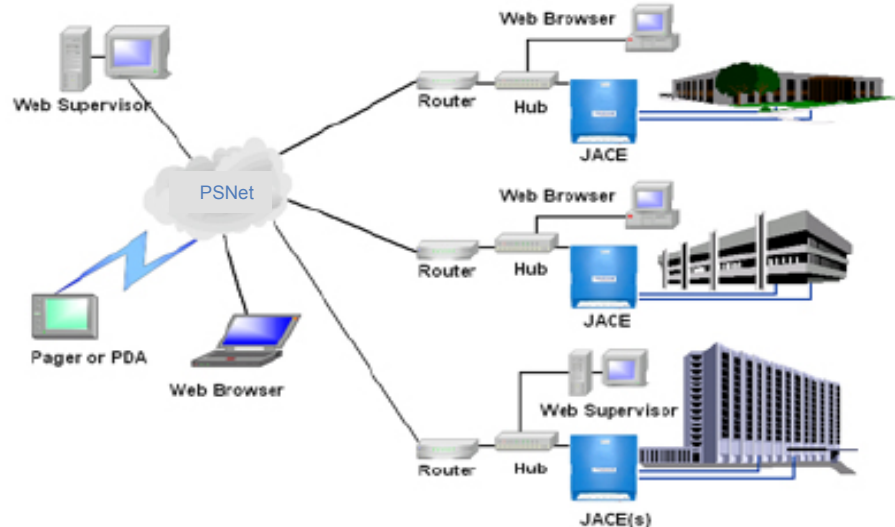
- Develop a centralized energy monitoring capability which integrates DDC & SCADA systems in support of Region Energy Reduction Initiatives
- Develop an EICS model scalable for Navy enterprise-wide deployment

Capabilities

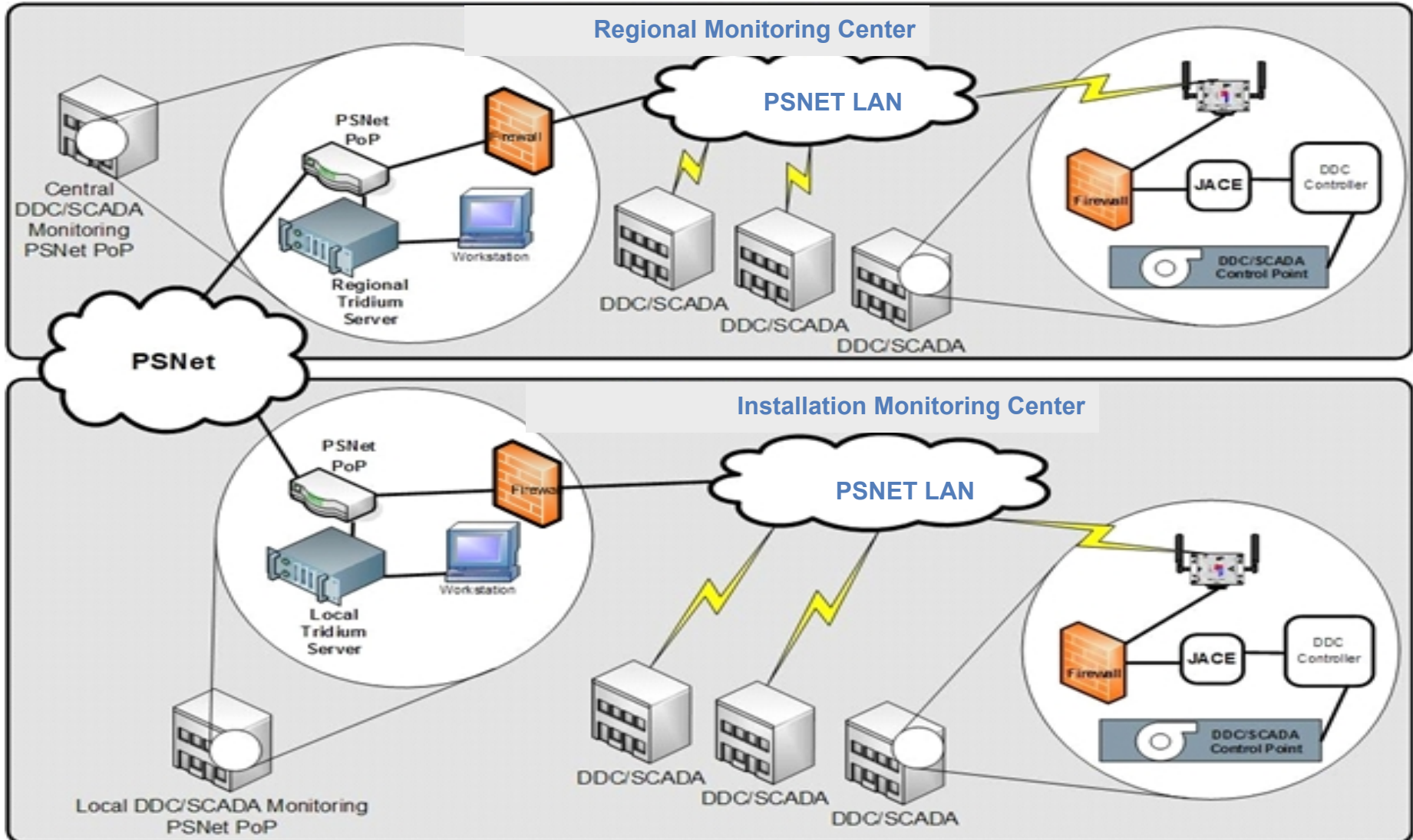
- Integrated EICS solutions
- Critical Infrastructure Monitoring using the Virtual Perimeter Monitoring System (VPMS™)

EICS Subsystems

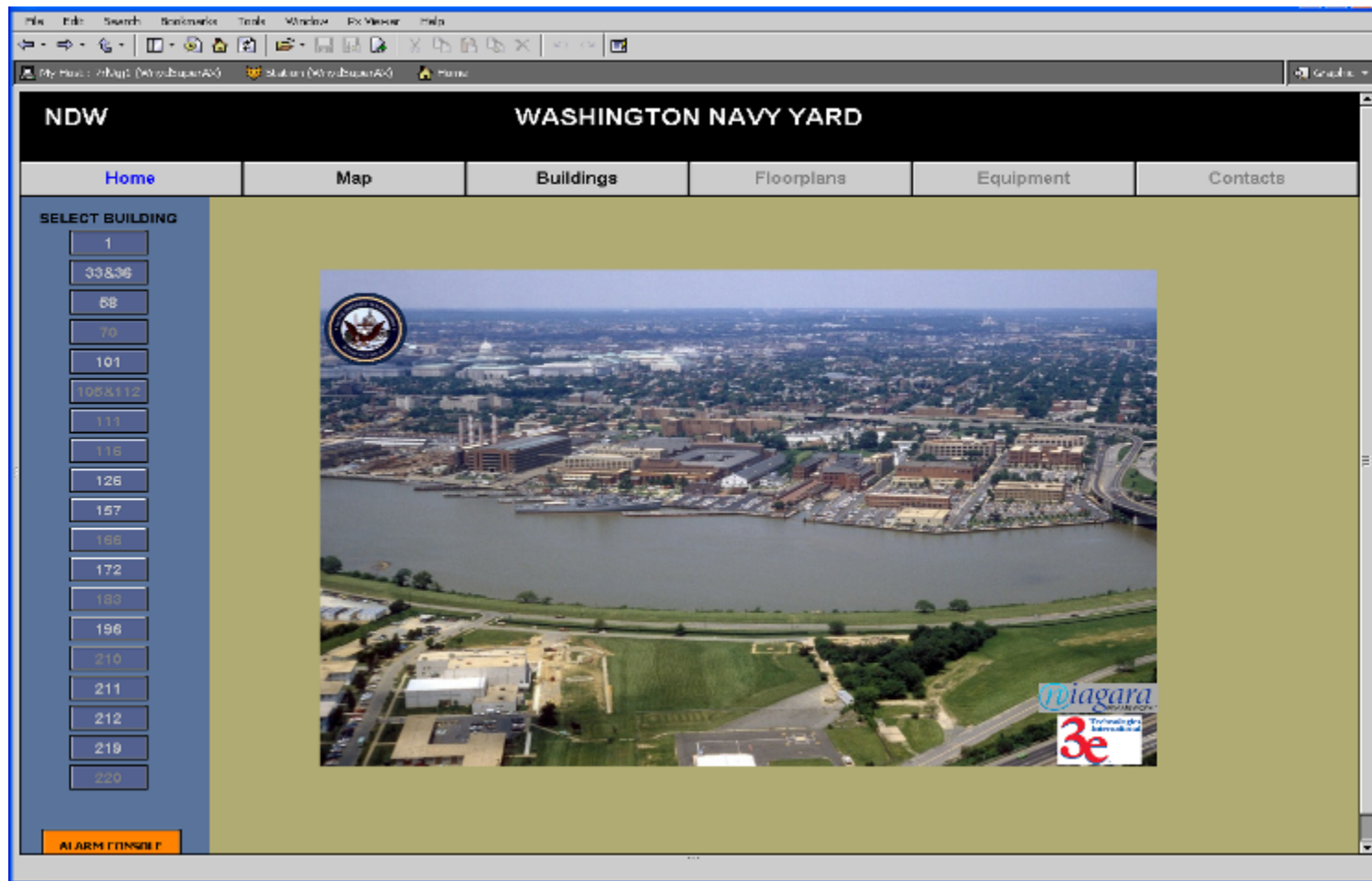
- Wireless Mesh Network
- “PSNET” Network Interface & Firewall
- Networked Programmable Logic Controller (PLC)
- Legacy DDC PLCs and Secondary Controllers
- EICS Management Server & Graphical User Interface



Secure ICS Architecture



System Capability Vignette



Device Page Example - Chillers



File Edit Search Bookmarks Tools Window Px Viewer Help

My Host : 7r19gj1 (WnydSuperAX) Station (WnydSuperAX) Files px WNY B172 WNYBldg_172_CHILLERS.px Wb Px View

NDW **WASHINGTON NAVY YARD** **Bldg.172**

Home Map Buildings Floorplans Equipment Contacts

CHILLERS

AHU-1
AHU-2
Chiller
Exhaust Fan
Glycol System
Heating System

ALARM CONSOLE

Outside Air Temp
Chillers Enable
Lead Chiller
Lag Chiller
On-Delay Timer
Off-Delay Timer

CHLR 1 Enable
CHLR 1 Status

CHLR 2 Enable
CHLR 2 Status

CHLR 3 Enable
CHLR 3 Status

CHLR 1
CHLR 1 Temp

CHLR 2
CHLR 2 Temp

CHLR 3
CHLR 3 Temp

CHLR Supp Temp
CHLR Ret Temp

CHW Pump 1
CHW Pump 2
CHW Pump 3

To AHU'S From AHU'S

Alarm Console Example



Pop up

Time Range ? to ?

Open Alarm Sources 22 Sources / 500 Alarms

Timestamp	Source	Alarm Class	Msg Text
28-Sep-10 5:04:23 PM EDT	WnydRegionalAX:NiagaraNetwork WnydSuperAX	defaultAlarmClass	Ping Success
29-Sep-10 10:53:59 AM EDT	WnydRegionalAX:IHNYDSuperAX_Working_9_13_10:NiagaraNetwork WnydRegionalAX_Working_9_27_10	defaultAlarmClass	Ping Failed
30-Sep-10 2:31:45 PM EDT	WnydRegionalAX:IHNYDSuperAX_Working_9_13_10:NiagaraNetwork B327	defaultAlarmClass	Ping Success
30-Sep-10 2:32:06 PM EDT	WnydRegionalAX:IHNYDSuperAX_Working_9_13_10:NiagaraNetwork B339	defaultAlarmClass	Ping Success
30-Sep-10 2:32:27 PM EDT	WnydRegionalAX:IHNYDSuperAX_Working_9_13_10:NiagaraNetwork B2172	defaultAlarmClass	Ping Success
30-Sep-10 2:32:48 PM EDT	WnydRegionalAX:IHNYDSuperAX_Working_9_13_10:NiagaraNetwork Firehouse	defaultAlarmClass	Ping Success
01-Oct-10 10:14:07 AM EDT	Supply Air Low Limit Alarm	High Priority	Check AHU-1
04-Oct-10 12:22:47 PM EDT	WnydRegionalAX:NiagaraNetwork IHNYDSuperAX_Working_9_13_10	defaultAlarmClass	Ping Success
04-Oct-10 1:28:22 PM EDT	WnydRegionalAX:IHNYDSuperAX_Working_9_13_10:NiagaraNetwork WnydRegionalAX	defaultAlarmClass	Ping Success
08-Oct-10 8:54:54 AM EDT	NiagaraNetwork WnydRegionalAX	defaultAlarmClass	Ping Failed
08-Oct-10 8:55:02 AM EDT	NiagaraNetwork Bldg196	defaultAlarmClass	Ping Failed
08-Oct-10 8:55:02 AM EDT	NiagaraNetwork Bldg126	defaultAlarmClass	Ping Failed
12-Nov-10 7:50:43 AM EST	NiagaraNetwork WNYDJACEB212A	defaultAlarmClass	Ping Failed
15-Nov-10 11:47:24 AM EST	NiagaraNetwork WNYDJACEB172A	defaultAlarmClass	Ping Failed
15-Nov-10 3:48:59 PM EST	NiagaraNetwork WNYDJACEB58A	defaultAlarmClass	Ping Failed
16-Nov-10 9:13:28 AM EST	NiagaraNetwork WNYDJACEB219A	defaultAlarmClass	Ping Failed
16-Nov-10 9:55:43 AM EST	NiagaraNetwork WNYDJACEB101A	defaultAlarmClass	Ping Failed
18-Nov-10 8:26:37 AM EST	NiagaraNetwork WNYDJACEB33A	defaultAlarmClass	Ping Failed
24-Nov-10 8:52:57 AM EST	NiagaraNetwork WNYDJACEB1A	defaultAlarmClass	Ping Failed
24-Nov-10 9:29:21 AM EST	NiagaraNetwork WNYDJACEB211A	defaultAlarmClass	Ping Failed
24-Nov-10 10:21:14 AM EST	NiagaraNetwork WNYDJACEB210A	defaultAlarmClass	Ping Failed
24-Nov-10 2:23:43 PM EST	NiagaraNetwork WNYDJACEB157A	defaultAlarmClass	Ping Failed

Acknowledge
 Hyperlink
 Notes
 Silence
 Filter
 Review Video

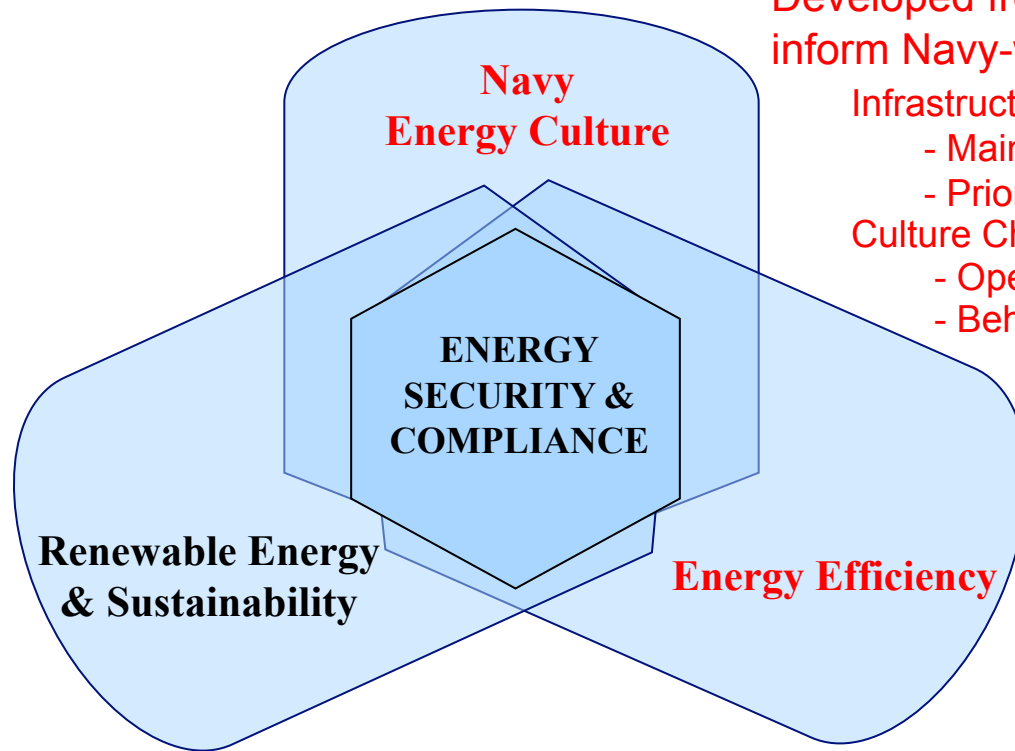


Navy Shore Energy Program

Navy Smart Energy Concept of Operations (CONOPS)

Developed from NDW Pilot to inform Navy-wide deployment

- Infrastructure Change
 - Maintenance Action
 - Prioritized Energy RECAP
- Culture Change
 - Operations
 - Behavior



The Foundation: Secure, Integrated Enabling Systems (NDW Pilot)

Secure Integration of Legacy Systems with Advanced Metering



Energy Billing/Reporting Systems
Facilities Management Systems



Real-time Energy Decision Support