



CNIC GOALS 5.0



The Navy Shore Energy Program is part of the Department of the Navy (DON) effort to minimize energy consumption, reduce energy expenditures and utilize alternative energy resources and environmentally sustainable technologies where it is reasonable, affordable and practical to do so while still assuring superiority in the execution of its national defense mission.

GOALS 50%

- Ashore consumption reduction from 2003 baseline by 2020
- Total ashore energy from alternative sources by 2020
- Installations net-zero consumers by 2020
- Petroleum reduction used in the commercial vehicle fleet by 2015

OBJECTIVE

In response to Navy Shore Energy objectives, CNIC developed a Navy Shore Energy Management Tool Suite to assist stakeholders in identifying, optimizing and tracking energy opportunities and investments.

- Shore Energy Implementation Portfolio (SEIP)
- Goals 5.0 and Facility Energy Report
- Navy Shore Geospatial Energy Module (NSGEM)
- Energy Return on Investment (eROI)

GOALS 5.0

Goals 5.0 is a dynamic analysis tool used to benchmark energy consumption and identify efficiency opportunities for achieving the Navy-wide 50% energy reduction requirement.

More specifically, Goals 5.0:

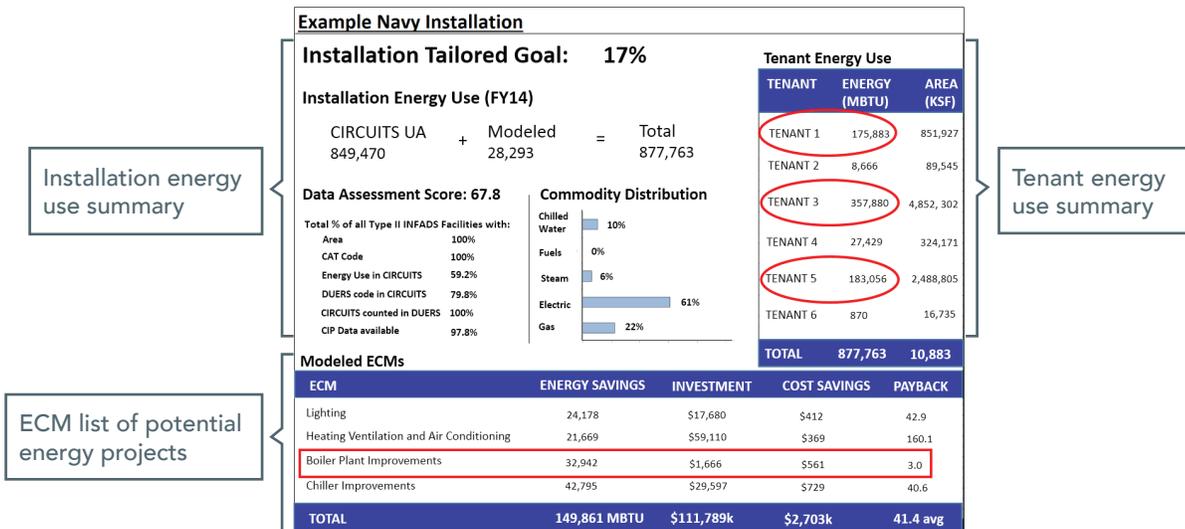
- Models missing utility data from CIRCUITS to provide complete information for all iNFADS Type II Facilities
- Calculates benchmarks by climate and building type
- Tailors energy reduction goals by Installation and Region
- Suggests potential project concepts (modeled energy conservation measures (ECMs)) to reduce energy and costs
- Combines all applicable Facility energy management data into one centralized report and list of ECMs

CNIC NAVY SHORE ENERGY ACCOMPLISHMENTS

- Developed the Navy Shore Energy Tool Suite actively used by 150 energy managers representing global Navy Installations
- Since 2010, programmed projects are on target to save the Navy more than \$600M in utility costs by FY20
- In 2014, four Navy Installation users received Federal Energy and Water Management Program (FEMP) awards



Goals 5.0 dashboard provides a summary view of all energy use mapped in NSGEM as well as modeled ECMs to consider for future projects. In the example Installation below, Tenants 1, 3 and 5 are the highest consumers. To address this trend, boiler plant improvements are predicted to be the best project based on payback.



Goals 5.0 dashboard links to datasets of (1) Facilities and (2) modeled ECMs. An Installation can view its Facility data (1a), review benchmark scores (1b) and update data (1c) to recalculate those scores (1d). It can also find modeled ECMs for those Facilities (2a), update the ECM data (2b) and select ECMs to build a list for project development (2c).

(1) Facilities

INFADS			CIRCUITS UA & GOALS Benchmarks				USER UPDATES		NEW BENCHMARK	
BUILDING No.	BUILDING NAME	AREA	ENERGY USE (MBTU/KSF)	Actv Modeled?	Benchmark (MBTU/KSF)	Outlier Status	UP CONSUMPTION	UPDATE AREA	Net Benchmark Score	Outlier Status
			877,763.5 TOTAL							
2269	MEDICAL WAREHOUSE	17,887	862.7	A	22.7	Normal	952	20,000	-2.1	Normal
2268	HOSPITAL-MAIN	360,613	137390.5	A	162.1	Normal			-4.5	Normal
2277	ADMINISTRATIVE OFFICE	21,663	516.1	A	82.8	Very Low	601			Very Low
2281	HOSPITAL MEDICAL STORAGE	861	49.1	A	18.5	Normal	67.2	900	-2.7	Normal
2282	INDOOR PHYSICAL FIT CTR	1,500	145.8	A	56.7	Normal			-0.8	Normal
707	FUEL OIL PUMPING STATION	1,344	206.9	E	118.4	Normal		1,300	-0.6	Normal
16	TRIAL SERVICE OFFICE, SE DET	9,521	322.1	A	39.7	Normal	449.3	9,675	-0.2	Normal
28	STORAGE QUARTERS CNT COM Q-1	6,681	30.4	A	18.5	Very Low			0.7	Very Low
34	VIP GUEST HOUSE	6,794	133.4	A	30.7	Normal	7,210	5,500	-51.5	Very High

1a **1b** **1c** **1d**

INFADS **CIRCUITS**

(2) Modeled ECMs

PLANNED ECMS				GOALS MODELED ECMS				USER UPDATES	
SELECT (Y/N)	DES	COSTS	SAVINGS (MBTU)	Facility No	ECM Category	SAVINGS (MBTU)	PAYBACK	COSTS	PAYBACK
Y	377-Lights	\$250	\$200	377	Lights	\$ 149 324	0.03	\$250	200 1.00
				800	Lights	\$ 1,258 2,686	0.03		
Y	3936-HVAC	\$2,000	\$797	3936	HVAC	\$ 464 797	0.03	\$2,000	797 3.00
Y	1951-Lights	\$131	\$218	1951	Lights	\$ 131 218	0.04		
				3938	CHILLERS	\$ 727 993	0.04		
Y	3942-BOILERS	\$3,500	\$1,200	3942	BOILERS	\$ 727 936	0.05	\$3,500	1,200 3.50
				3941	Lights	\$ 430 468	0.05		
Y	3935-CONTROLS	\$727	\$773	3935	CONTROLS	\$ 727 773	0.06		2.00

2a **2b** **2c**

Contact

For more information, training or access to the CNIC suite of tools and reports on the G2, please contact:

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CNIC GOALS RENEWABLE



The Navy Shore Energy Program is part of the Department of the Navy (DON) effort to minimize energy consumption, reduce energy expenditures and utilize alternative energy resources and environmentally sustainable technologies where it is reasonable, affordable and practical to do so while still assuring superiority in the execution of its national defense mission.

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OBJECTIVE

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- Shore Energy Implementation Portfolio (SEIP)
- Goals 5.0, Goals Renewable and Facility Energy Report
- Navy Shore Geospatial Energy Module (NSGEM)
- Energy Return on Investment (eROI)

GOALS RENEWABLE

Goals Renewable incorporates Navy real property, consumption and geospatial data to analyze and rank distributed generation projects. The tool facilitates informed investment decisions with respect to solar photovoltaic, wind, geothermal and ground source heat pump projects.

More specifically, Goals Renewable:

- Evaluates building and land areas to identify suitable project sites
- Calculates technology specific resource potential for individual facilities
- Compares cost of ownership alternatives (Navy-owned vs. power purchase agreement)
- Identifies opportunities for economies of scale by bundling multiple buildings into a single project
- Ranks projects according to highest return-on-investment and/or energy security impact

CNIC NAVY SHORE ENERGY ACCOMPLISHMENTS

- Developed the Navy Shore Energy Tool Suite actively used by approximately 1,000 individuals representing global Navy Installations
- Since 2010, programmed projects are on target to save the Navy more than \$600M in utility costs by FY20
- In 2014, four Navy Installation users received Federal Energy and Water Management Program (FEMP) awards



The Goals Renewable tool integrates the following data inputs to deliver facility-level project potential and feasibility:



The **Facility Database** allows users to update facility data and view the impact of their changes on project feasibility in real-time. Total installation potential (available square footage, total kilowatt production from recommended projects, etc.) is also displayed within the facility database.

A **Regional Analysis** dashboard is available within the Regional Goals Renewable workbook and delivers metrics on distributed generation potential within each Navy region.

The **Bundling Projects** dashboard offers users the ability to add multiple buildings (NFAIDs) together to and analyze the financial benefits of creating larger solar PV projects. The dashboard displays facility data (1), provides recommendations on project size and type (2) and presents data regarding the project’s environmental impact (3). The dashboard also allows users to compare project recommendations against other project types (4).



Title	Units	Amount
Usable Rooftop Square Footage*	SF	5,046
Total Annual Electric Usage of Project Buildings	kWh	17,999
Average Solar Potential	kWh/m ² /year	4.99
Recommended PV System Size	kW	31
Coverage of Total Annual Electric Usage	%	224%
Best Project Type (Cost/Savings)	Type	PPA
Best Net Present Value (NPV)**	\$	\$21,977.87
Payback Period	Years	15.5
CO ² Emissions Avoided per Year	Lbs	61,157
Tree Seedlings Grown to Offset Emissions(10 yrs)	#	719
Gallons of Gasoline Avoided	#	3,121

Other Project Types		
Title	Units	Amount
Project Type (Cost/Savings)	Type	Navy-Owned Sell-to-Grid
Net Present Value (NPV)	\$	\$8,615.60
Project Type (Cost/Savings)	Type	Navy-Owned Offset
Net Present Value (NPV)	\$	\$1,952.41
Project Type (Cost/Savings)	Type	Navy-Owned Standalone
Net Present Value (NPV)	\$	\$873.53

The **Ranking Projects** dashboard provides users with several weighted ranking preferences. Potential projects are ranked according to highest return-on-investment (NPV) and/or highest mission dependency index (MDI) to prioritize mission-critical facilities.

Rank	NFAID	Name	Project Size	Project Type	NPV	MDI Score
1	NFA000000000000	OPERATIONS BUILDING	168.9 kW	Navy-Owned Standalone	\$ 1,603,322.45	100
2	NFA000000000000	RECEIVER BLDG	2.34 kW	Navy-Owned Standalone	\$ 46.42	100
3	NFA000000000000	FED BUILDING	344.31 kW	PPA	\$ 1,682,145.70	99
4	NFA000000000000	COMMUNICATIONS CENTER	127.25 kW	Navy-Owned Standalone	\$ 1,421,619.33	99
5	NFA000000000000	OTTO FUEL STORAGE	4.34 kW	Navy-Owned Standalone	\$ 583.21	87

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CNIC SEIP TOOL



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Shore Energy Implementation Portfolio (SEIP) is an energy investment portfolio that reviews and forecasts Navy, Region and Installation performance towards achieving Navy-wide energy mandates.

More specifically, SEIP:

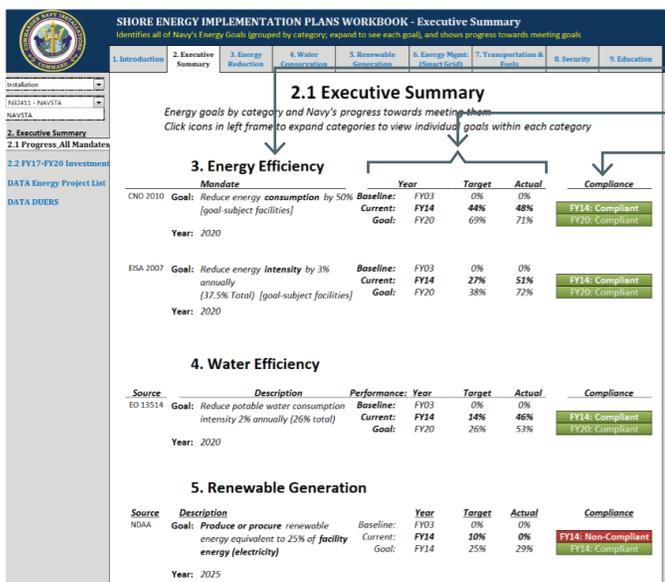
- Captures all Navy energy projects—past, present and future
- Summarizes energy management trends, projects and compliance progress
- Analyzes the effectiveness of all Navy energy investments
- Establishes future funding requirements to meet Navy objectives

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The SEIP summary view shows Installation targets and attainment progress. In the example below, the Installation is projected to meet its targets for energy consumption and intensity.



List all targets
Energy, Water, Renewables, etc.

Show progress

- Baseline year
- Current year
- Target year

Evaluate status of reaching target

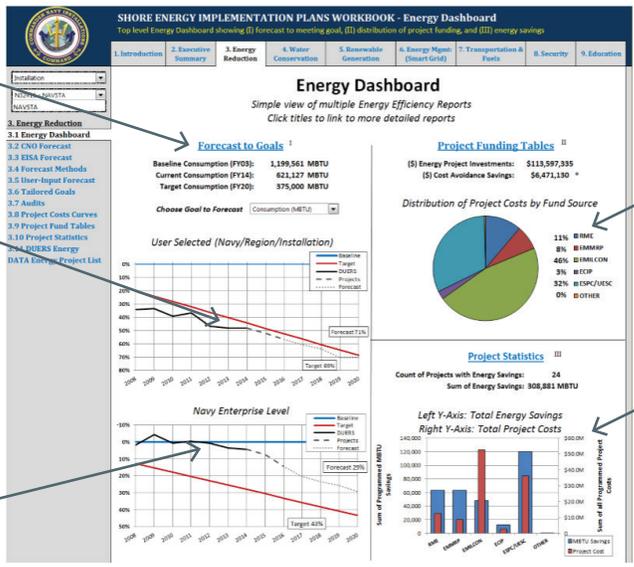
- Is interim target being met for current year?
- Will final goal be reached in target year?
- Green indicates target is being met
- Red indicates target is not being met

The SEIP energy dashboard view shows total cost and savings of energy projects. In the example below, most Installation projects have either been funded by the Navy or a 3rd party (Energy Savings Performance Contracts (ESPCs), Utility Energy Service Contracts (UESCs) and Power Purchase Agreements (PPAs)).

Total energy use
Baseline year
Current year
Target year

Installation progress
Project savings applied to current consumption to show future years

Navy progress
Compared to overall Navy progress



Project investments
Breakdown of funding for energy projects; 68% by Navy and 29% by 3rd party

\$/MBTU
Shows total savings from energy projects

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CNIC NSGEM TOOL



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NSGEM

Navy Shore Geospatial Energy Module (NSGEM) is an interactive web map that uses information from authoritative data systems to visualize monthly energy use Navy-wide.

More specifically, NSGEM:

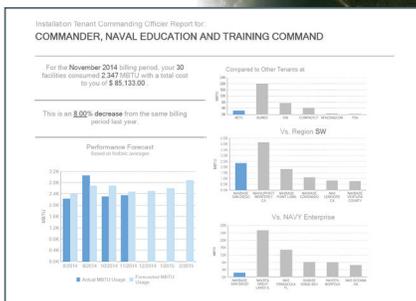
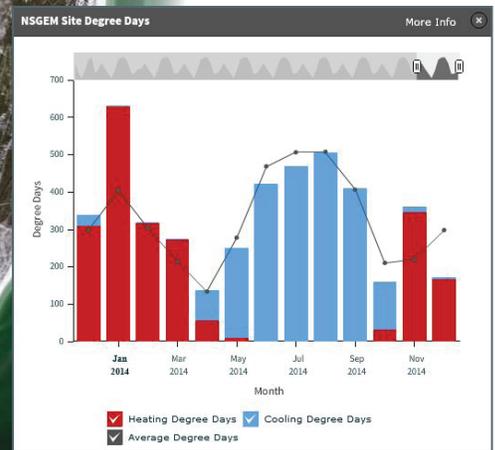
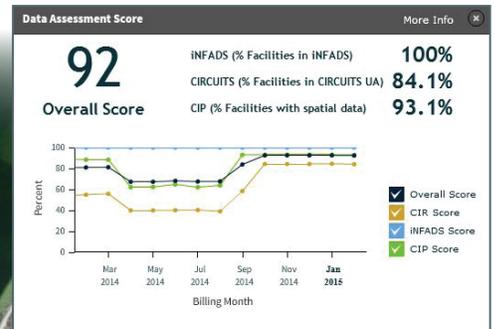
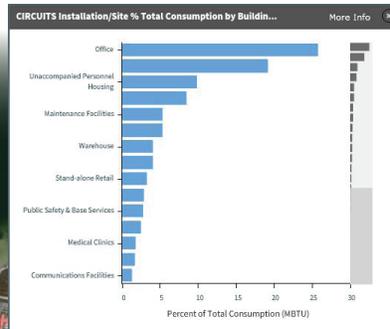
- Color codes all Facilities based on their energy use benchmarks
- Assesses data completeness within authoritative sources and encourages users to update missing or incorrect information
- Produces energy consumption reports for various levels—Navy, Installation, Region, Facility and Tenant
- Includes, but not limited to data from Common Infrastructure Picture (WW_CIP spatial for GRX), iNFADS (real property), CIRCUITS (consumption), Goals 5.0 (energy targets/goals) and Defense, Utility, and Energy Reporting System (DUERS consumption baselines)

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NSGEM offers a host of charts and reports at the Region, Installation, Facility and Tenant levels. Examples here include charts comparing total energy consumption by building type, data assessment score (DAS), site degree days, Tenant Commanding Officer report, Installation Facility Listing report and Preponderant User report. Customizable reports are also available.



NSGEM Installation Facility Listing

Facility Name	Facility ID	Facility Type	Facility Status	Facility Location	Facility Energy Use (MBTU)	Facility Energy Cost (\$)
NAVY SHIP YARD
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