DOD SERVICES PANEL

THE MILITARY'S ENERGY RESILIENCE PROGRAM UPDATE AND PROJECT OPPORTUNITIES

29 OCTOBER 2020

1500 - 1700 EDT

ENERGY AWARENESS MONTH

MILITARY ENERGY RESILIENCE CATALYST

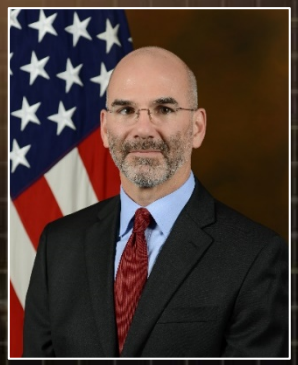
DoD Services Panel Introduction

Acquisition & Sustainment

- Welcome
- Moderator
  - Walter Ludwig, PE
    - Director of Energy Performance, Office of the Assistant Secretary of Defense for Sustainment
- Panelists
  - Michael F. McGhee
    - Executive Director, Army Office of Energy Initiatives
  - Matt Haupt, PE, CPP
    - Energy Division Director, Naval Facilities Engineering Command
  - Colonel Craig Rezac
    - Interim Director, Air Force Office of Energy Assurance

DoD Services DoD Services Panel - The Military's Energy Resilience Program Update and Project Opportunities

Mike McGhee, PE
Executive Director
Office of Energy Initiatives



29 October 2020 | 1300 – 1500

October is Energy Action Month!

OCTOBER 2020 ENERGY ACTION MONTH

Energy Resilience Gives Us the #PowerToWin

Army Installation Energy and Water Strategic Plan

VISION

Army installation energy and water infrastructure supporting critical missions in the Strategic Support Area will be:

RESILIENT

Ensure energy and water for critical missions under all conditions

Ft. Knox, KY
Energy Resilience Readiness Exercise

EFFICIENT

Manage energy and water use to meet requirements effectively and sustainably

Ft. Irwin, CA
Water Treatment Plant

AFFORDABLE

Manage energy and water costs to enable the Army to refocus investment

Ft. Carson, CO
Battery Energy Storage System

Our installations must make energy and water choices that allow installations to maintain critical operations during an unexpected grid outage.

October is Energy Action Month

OCTOBER 2020
ENERGY ACTION MONTH

Energy

Resilience

Gives Us the

#PowerToWin

RESILIENCE

ADAPTIVE SQUAD ARCHITECTURE

ARMY CLIMATE ASSESSMENT TOOL

ARMY BLACK START EXERCISES

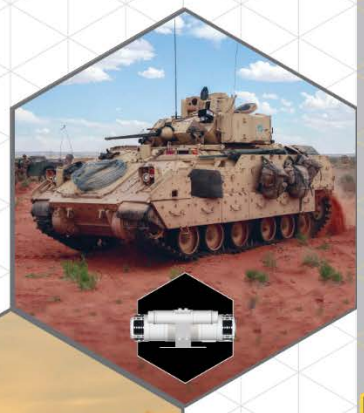
$1.9B

OPERATIONAL ENERGY INVESTMENTS

Army investments of more than $1.9B will modernize vehicles and weapons systems to maximize Soldier mobility and lethality to increase energy resilience and enable Army readiness.

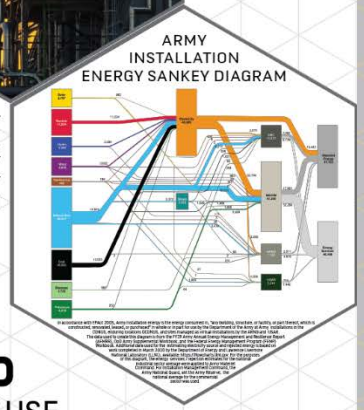
EFFICIENCY

HYBRID ELECTRIC DRIVE



COMBINED HEAT AND POWER (CHP) PLANT: FORT LEONARD WOOD, MISSOURI

ARMY INSTALLATION ENERGY SANKEY DIAGRAM



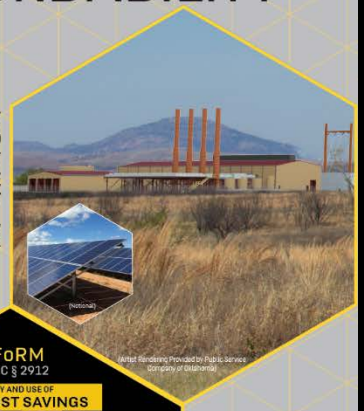
-4%

ENERGY USE INTENSITY

The Army reduced energy use intensity by 4% since FY15. Energy use intensity measures energy use per square foot of facilities.

AFFORDABILITY

PRIVATELY FUNDED ENERGY RESILIENCE PROJECT FORT SILL, OKLAHOMA



RESILIENT ENERGY FUNDING FOR READINESS AND MODERNIZATION (REFoRM) INITIATIVE 10 U.S.C. § 2912

THIRD PARTY FINANCING: U.S. ARMY GARRISON KWAJALEIN ATOLL ESPC MICROGRID

$4.7B

PRIVATE SECTOR INVESTMENTS

As of FY19, Energy Savings Performance Contracts and Utility Energy Service Contracts attracted $3B of alternative financing and OEI projects attracted $1.7B of private investment.

Implementation Methods

Appropriated

- Military Construction
- Energy Resilience and Conservation Investment Program
- Restoration and Modernization
- Army Working Capital

Third Party Financing

- Energy Savings Performance Contracts/ Utility Energy Service Contracts
- Utility Privatization
- Private Capital (Office of Energy Initiatives)
- Enhanced Use Leases

Low Cost/No Cost

- Planning
- Installation Energy and Water Plans
- Best Management Practices
- Energy Resilience Readiness Exercises

Schofield Barracks, HI: Lease
Project: 50 MW / 30 day contingency microgrid where Hawaiian Electric constructed, owns, operates and maintains a 50 MW multi-fuel power generation plant, fuel storage tanks, and controls.

The "OEI Way" to Acquire Resilient Infrastructure

First Preference

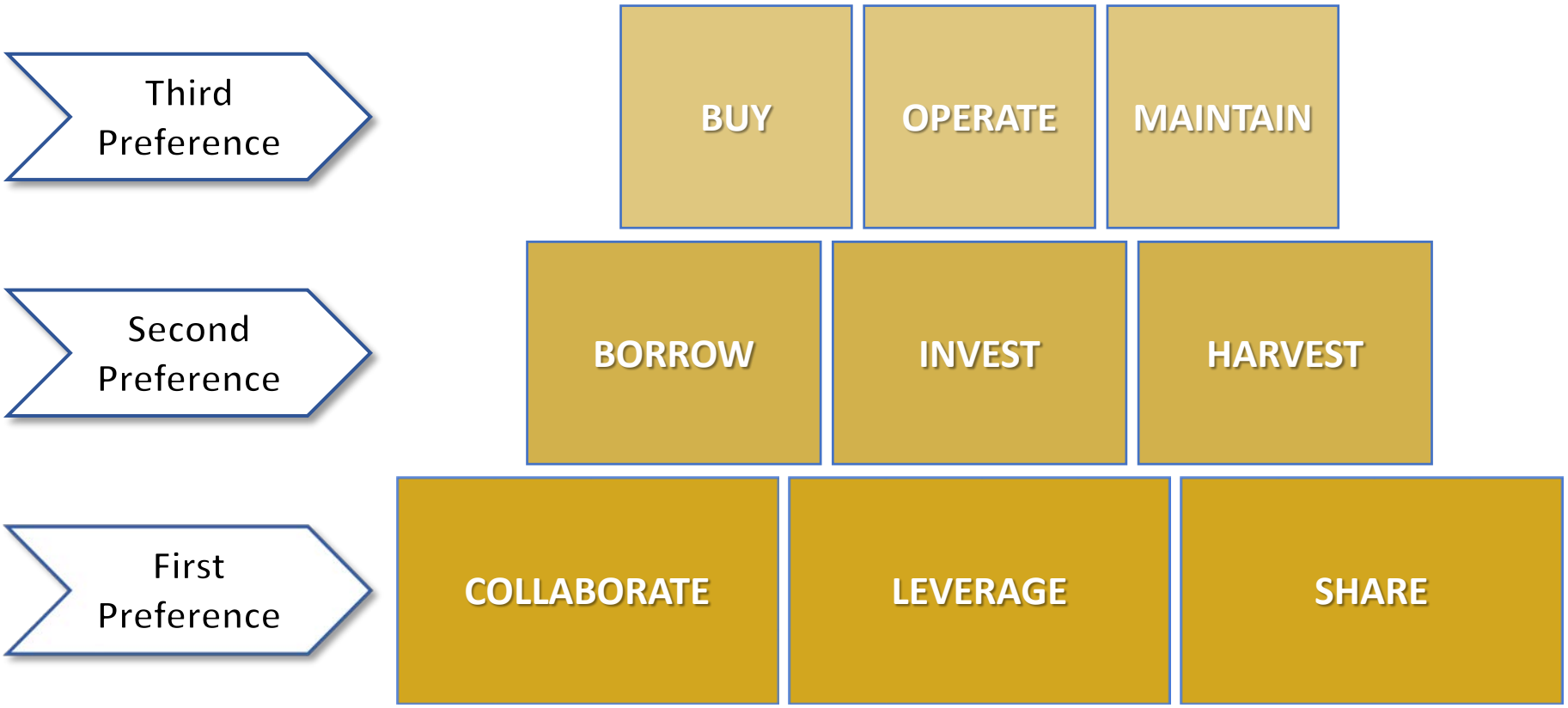
COLLABORATE

LEVERAGE

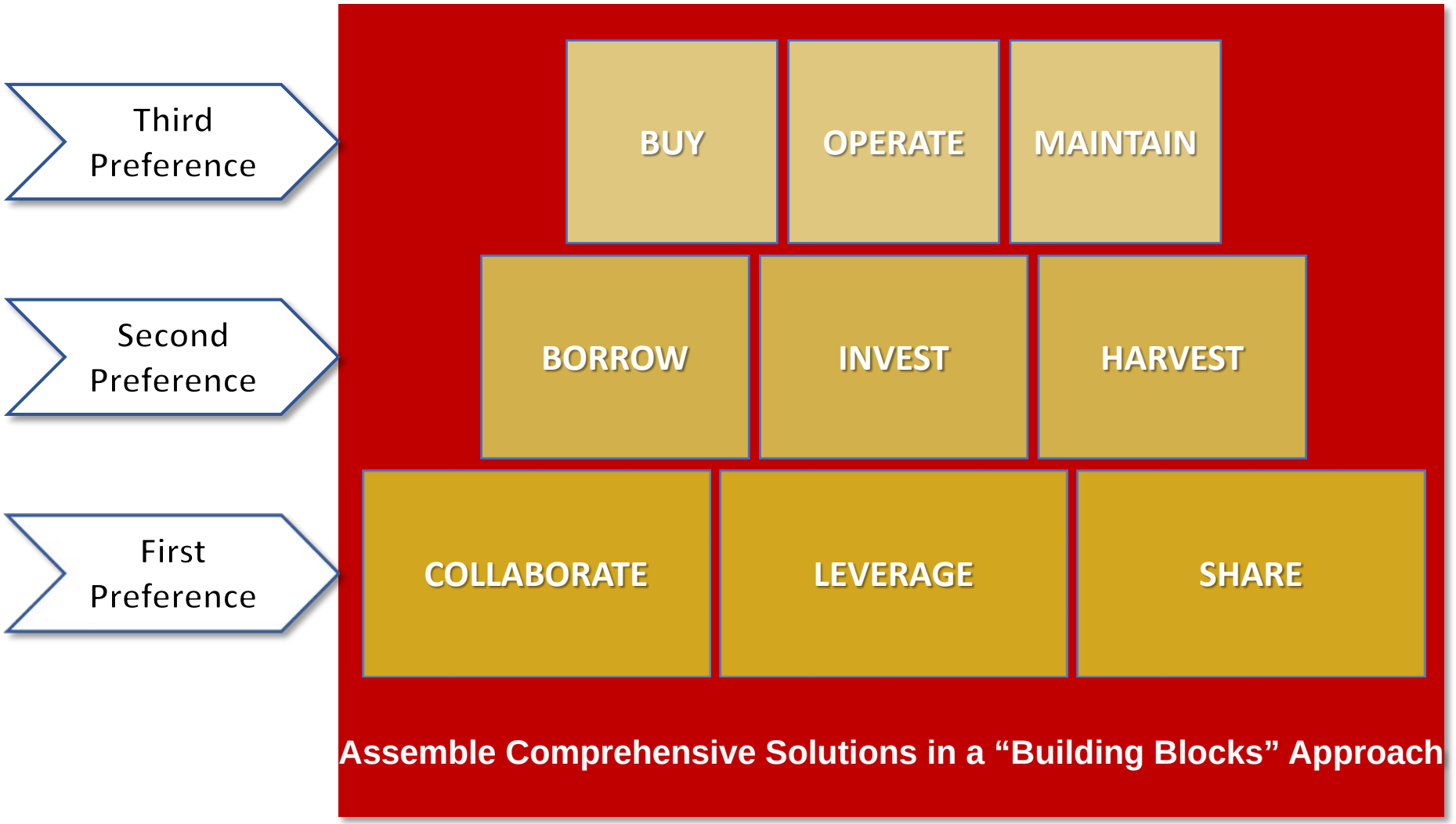
SHARE

The "OEI Way" to Acquire Resilient Infrastructure

The "OEI Way" to Acquire Resilient Infrastructure



The "OEI Way" to Acquire Resilient Infrastructure



REFoRM Pilot – Maximum Estimated Recoverable Savings (All Appropriations)

Maximum Estimated Recoverable Energy Savings					
REFoRM Account Savings ($M)	**Fiscal Year**	**TOTAL SAVINGS ($M)**	*Active Army Savings*	*USAR Savings*	*ARNG Savings*
	FY15 (Pilot Year)	*$42.45*	*$34.69*	$2.42	$5.34
	FY16	$73.46	$56.08	$5.00	$12.38
	FY17	$34.28	$28.78	$1.27	$4.23
	FY18	$26.20	$22.29	$0.29	$3.62
	Total (FY15-FY18)	**$176.38**	**$120.99**	**$8.98**	**$25.56**

Current Energy Projects Portfolio

FT. SILL, OK 1&2
Lease & ERCIP (FY19)

FT. CARSON, CO
Lease

REDSTONE ARSENAL, AL
Lease / PPA

ANNISTON ARMY DEPOT, AL 1&2
Easement & ERCIP (FY20)

FT. DRUM, NY
Lease / PPA

FT. DETRICK, MD
Lease / PPA

FT. HUACHUCA, AZ
Easement

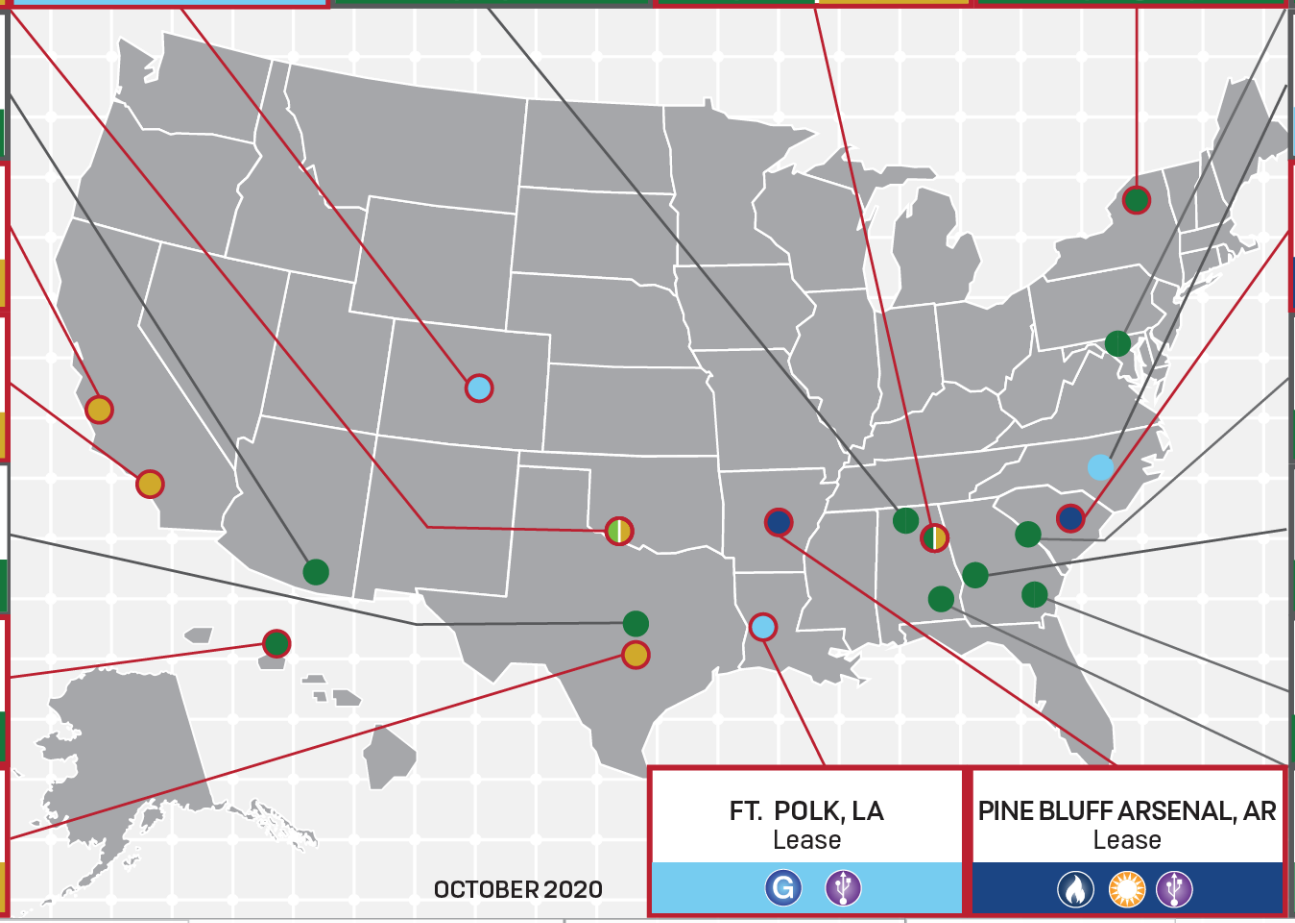
CAMP ROBERTS, CA
Lease / PPA

JFTB LOS ALAMITOS, CA
Lease

FT. HOOD, TX
Lease / PPA

SCHOFIELD BARRACKS, HI
Lease

CAMP MABRY, TX
ERCIP (FY19)



FT. BRAGG, NC
Easement

FT. JACKSON, SC
Lease

FT. GORDON, GA
Easement

FT. BENNING, GA
Easement

FT. STEWART, GA
Easement

FT. RUCKER, AL
Easement

FT. POLK, LA
Lease

PINE BLUFF ARSENAL, AR
Lease

Renewable and Alternative Energy Key

- Battery Storage
- Biofuel
- Biomass
- Controls
- Diesel
- Unspecified Generation
- Natural Gas
- Solar
- On-site Storage or Supply
- Wind

Islandable Capability

ERCIP - Energy Resilience and Conservation Investment Program

PPA - Power Purchase Agreement

Project Status

- Phase 1: Assessment
- Phase 2: Validation
- Phase 3: Contracts and Agreements
- Phase 4: Construction
- Phase 5: Operational

Energy Resilience at Fort Sill, OK

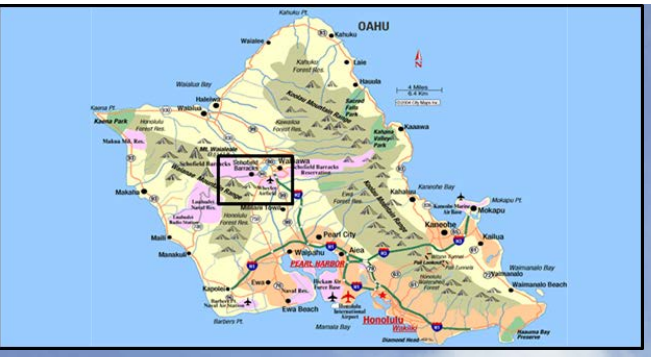
Notional

36 MW Natural Gas / 14 MW Solar PV with Controls

- Public Service Corporation of Oklahoma may construct, own, operate the generation facility to enhance grid reliability in normal operations
- Enhances energy resilience by developing on-demand generating assets on Fort Sill capable of suppling reliable power to mission critical facilities during a commercial grid disruption
- Project provides operational flexibility to improve electrical service in surrounding Lawton community

Photo: 30 MW Solar array; Ft. Gordon

Energy Resilience at Schofield Barracks, HI



50 MW Multi-fuel Plant / 30-Day Microgrid

- Hawaiian Electric constructed, owns and operates the generation plant to provide three installations with 100% of energy requirements during a grid outage
- Located above the tsunami inundation zone, the plant is equipped with "blackstart" capability; 5 days of fuel storage onsite and 30 days of fuel storage on the island
- Enhances Oahu grid resilience and provides power to the community during an outage

ARMY ENERGY

#PowerToWin

Michael F. McGhee, P.E.
Executive Director, U.S. Army Office of Energy Initiatives
O: 703-697-4100
E: michael.f.mcghee.civ@mail.mil

Dave Irwin
Opportunity Development Director, U.S. Army Office of Energy Initiatives
O: 256-200-1413
E: david.j.irwin22.civ@mail.mil

Headquarters U.S. Air Force

Integrity - Service - Excellence

Office of Energy Assurance

Colonel Craig Rezac
Interim Director

DoD Services Panel

29 OCT 20

Energy Focus Areas

- **Operational Energy** - Required for training, moving, and sustaining military forces and weapons platforms for military operations. The term includes energy used by tactical power systems and generators and weapons platforms[1]

- **Installation Energy** - Used to power all facilities located on military installations and enduring locations, as well as fuel for the non-tactical fleet vehicles used at those locations and the energy consumed in manufacturing, maintenance, and other processes[1]

- **Facilities Energy** - Used to power all facilities located on military installations and enduring locations

[1]As defined by the AF Energy Flight Plan, which can be accessed by clicking the image on the left

https://www.safie.hq.af.mil/Portals/78/AFEnergyFlightPlan2017.pdf?ver=2017-01-13-133958-503

OEA in 2021

Mission

Assure Air Force mission readiness through identification and development of impactful energy resilience solutions.

Vision

To secure Air Force warfighter superiority with the world's most resilient infrastructure.

2021 Targets – SAF/IEE
Bring energy resilience projects into the integrated priority list
Execution pathways are determined for identified innovative acquisition methods and technologies
Process established for regularly facilitated discussions between stakeholders to gain concurrence on resilience objectives

How OEA Supports Energy Focus Areas

STOREFRONT- A SINGLE POINT OF ENTRY

- Streamlines and standardizes energy project intake and execution pathways from internal and external stakeholders
- Serves to identify and prioritize energy needs based on Air Force mission requirements

PROJECT FACILITATOR

- Coordinates all aspects of the Installation Energy Plan (IEP) process to ensure resilience at installation level while also advancing enterprise energy and mission assurance goals
- Collaborates with industry and community partners to execute mutually beneficial resilience opportunities

PROJECT INTEGRATOR

- Develops partnerships with leading innovators to leverage best practices to ensure resilient installations
- Builds upon external partnerships to identify and implement holistic energy solutions
- Evaluates IEP results against industry, market and technology options to develop fully executable resilience solutions for our execution partners

Mission Assurance

Strategic Energy Goals

- **Improve Resiliency**
- **Optimize Demand**
- **Assure Supply**

Three Lines of Effort

- **Assess Requirements**
- **Develop Resilience Solutions**
- **Energy Integrator for Prioritization**

ENERGY ASSURANCE involves activities across the operational and installation spectrums designed to ensure the Air Force has the energy when and where it is needed to ensure it can accomplish its mission.

Resilience is the Priority

Attributes

What does the project need to achieve?

Qualities

How does the project make the Air Force more resilient?

Elements

How does the project deliver resilient qualities?

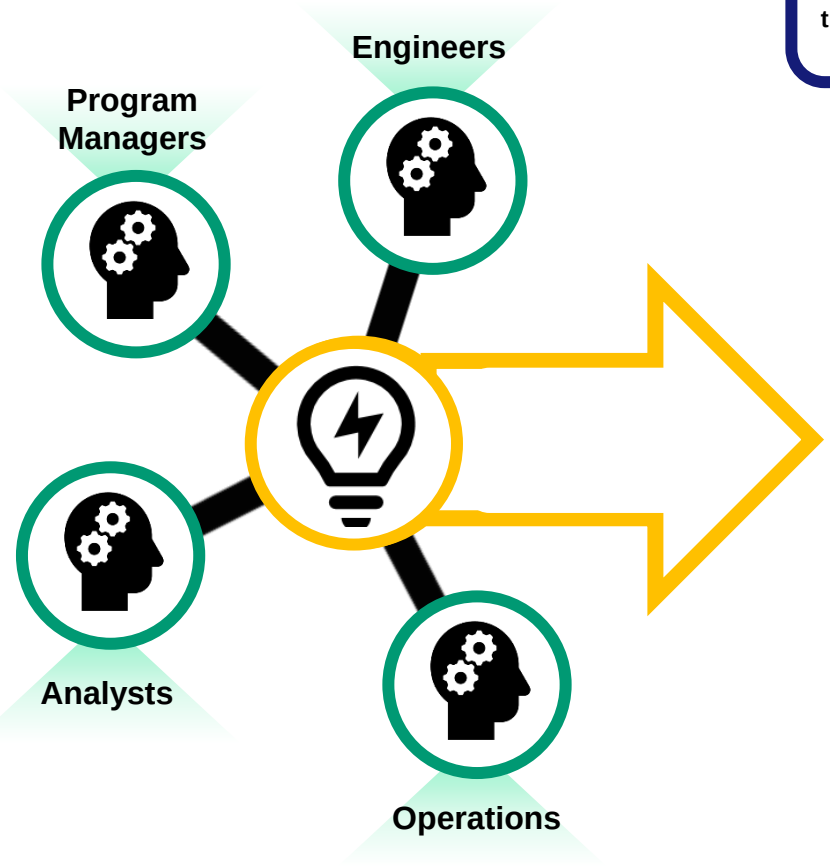
Modified from World Economic Forum, Global Risks 2013

Resilience Solution Development

STARTING POINT
Data & Report Template

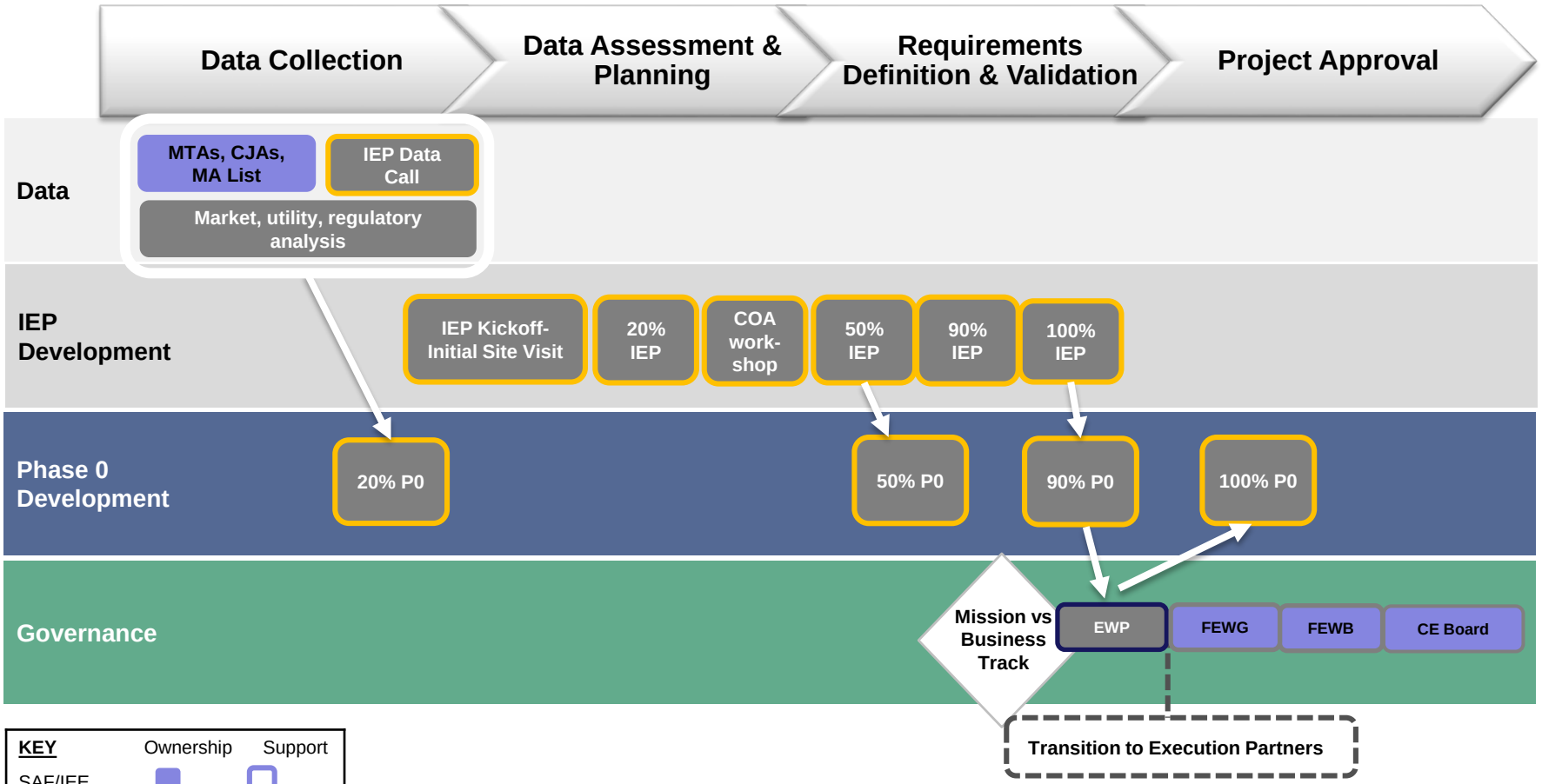
- Installation Energy Plans
- Mission Owner Interviews
- COA Workshop
- Report Development
- Resilience Scorecard
- Historical data
- Energy consumption
- Public records

OEA EFFORTS



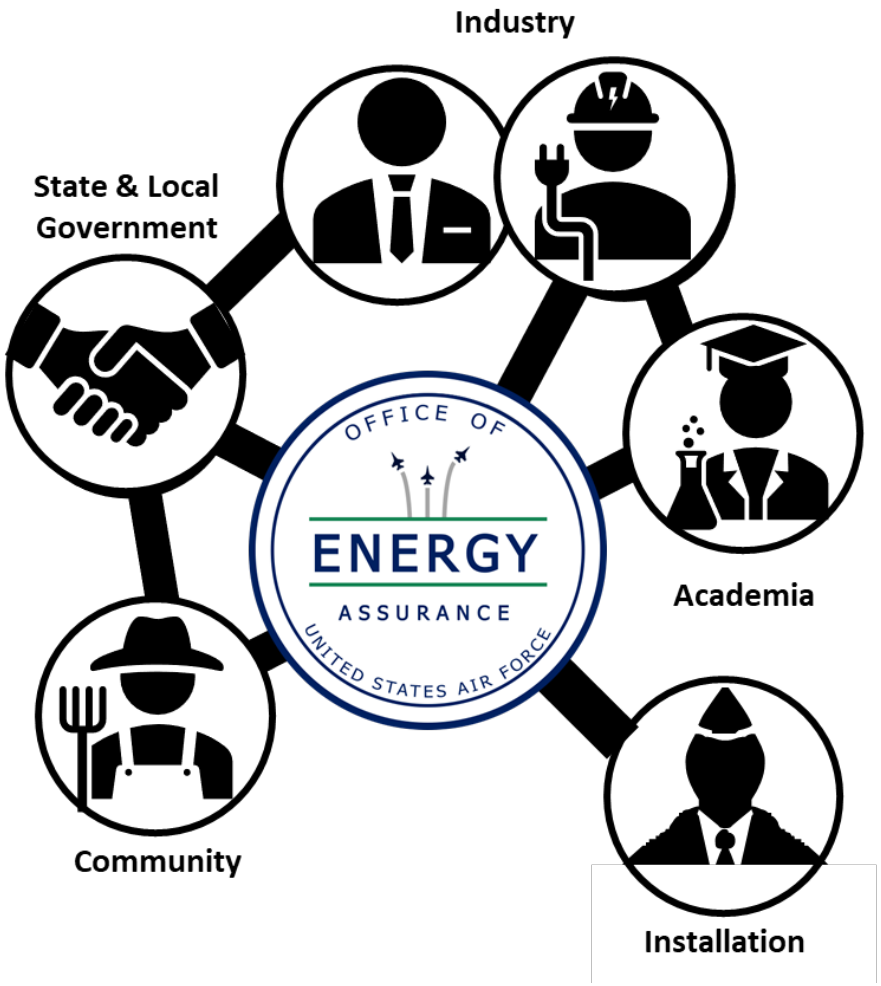
END RESULT
Report that outlines specific, executable solution that addresses a resilience need

Workflow Overview



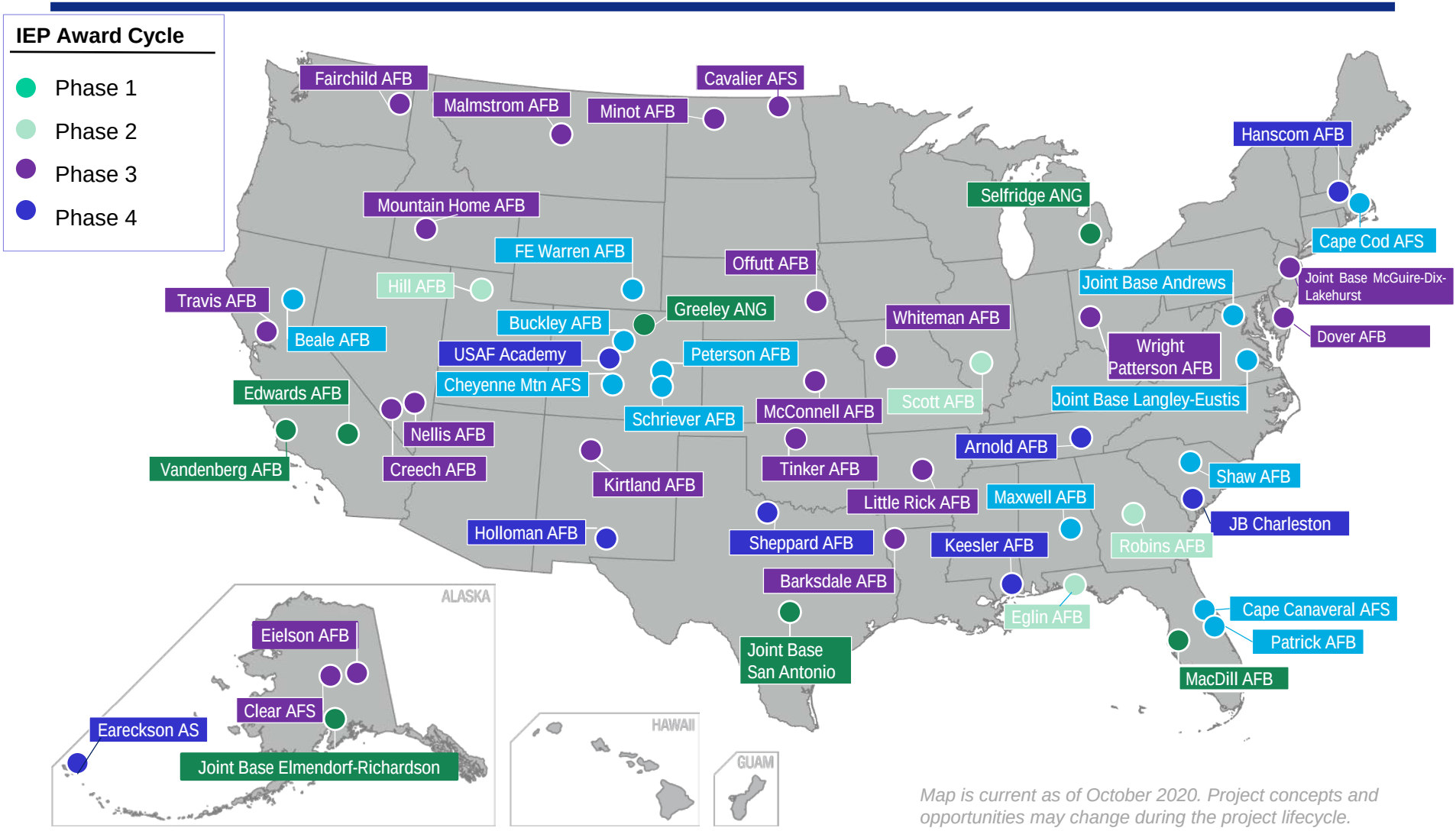
KEY	Ownership	Support
SAF/IEE		
OEA		
AFCEC/CN		
Installation		

Existing Partnerships



- Energy Assurance Lease at MacDill AFB
- Environmental Security Technology Certificate Program at Tinker AFB
- Community Partnership at Mountain Home AFB
- Community Partnerships in Colorado Springs

IEP Schedule



Map is current as of October 2020. Project concepts and opportunities may change during the project lifecycle.

Energy as a Service

- **The EaaS provider is responsible for optimizing the integration of the energy delivery chain. This covers commercial energy supply procurement, distribution, onsite generation, and load management**
- **Technology agnostic approach, focused on the desired level of service instead of prescribing exact technical solutions**

<u>Two Pilot Sites</u>:

Altus AFB, OK

Hanscom AFB, MA

EaaS Value Proposition

- **Thesis:** Meet energy requirements more cost effectively than current AF energy management & procurement approaches
- **Approach:** Contractor given authority to optimize across the energy delivery chain to minimize costs and maximize shared savings, including through:
  - Energy efficiency
  - Load management
  - Federal/state incentives
  - Onsite generation (eg, solar PV)
  - Operation & maintenance
  - Augments to labor & equipment
- **Outcome:** Performance guarantees aligned with mission requirements for reliability, resilience and cost

Micro-reactor Pilot Program

The Air Force believes nuclear micro-reactors may have potential to help materialize its vision of Mission Assurance through Energy and Water Resilience

The advantages of micro-reactors include:

- Resilient source of 24/7/365 power generation and process heat
- Simple design containing advanced safety features
- Small real estate footprint and compact facility

Recent Program Milestones:

- 11 SEP 2020: OSD Energy, DLA Energy and SAF/IEE coordinated to release the Air Force RFI to validate micro-reactor technology and determine viability of micro-reactors for future energy resilience efforts
- 9 NOV 2020: Receive RFI responses

Contact OEA

Col Craig Rezac
Interim Director
craig.rezac@us.af.mil

Mr. Shawn Bennett
Advisor / Energy as a Service (EaaS)
Chief, Innovation Division
shawn.m.bennett8.civ@mail.mi

Ms. Lucy Notestine
Program Administrator
Chief, Operations Division
Lucinda.A.Notestine.civ@mail.mil

Ms. Brittany Angle
Program Administrator
Chief, Project Development Division
brittany.angle.1@us.af.mil

Ms. Tammy Guhr
Program Administraor
Chief, Engineering & Analysis Dvision
tammy.guhr@us.af.mil

OEA Website: safie.hq.af.mil/programs/energy/oea
Subscribe to OEA Updates: safie.hq.af.mil/programs/energy/oea/oea-updates/

Questions?

NAVFAC Public Works 8 Energy Division

DoD Services Panel

The Military's Energy Resilience Program

29 October 2020

Navy Energy Program

ASN requirements

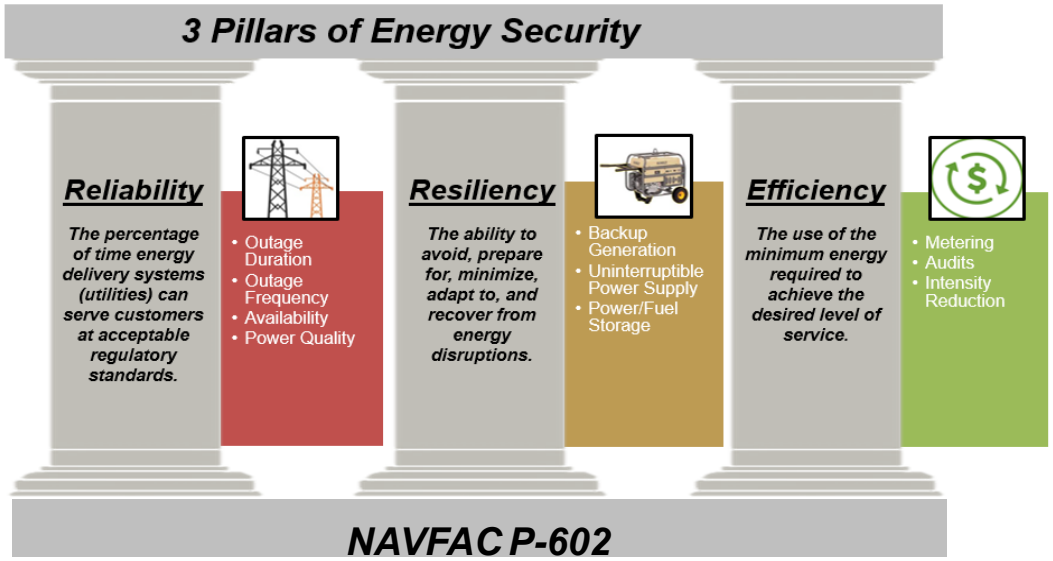
- 3 Pillars and 5 Metrics
  - Securing the Navy mission by providing Resilient, Reliable and Efficient energy… affordably and sustainably
- So What?
  - We learn from industry
  - Always looking at the art of the possible
  - Proven Innovation

NAVFAC and CNIC

- Execution of Energy Projects
  - Enhancing Warfighter lethality
  - Supporting the Shore Infrastructure
  - Leveraging the SYSCOM
- Smart Grid and Future Vision
  - Leveraging technology to meet energy needs
  - Close coordination with CIO
- Utility Improvements to gain resiliency

Energy Resilience – Strategy

Comprehensive Approach to Reach Energy Security



Positively Impacting Readiness via DoN's Five Objectives

- **Develop Installation Energy Plans – Critical for Path Forward**
- **Deliver Reliability**
- **Deliver Resilience**
- **Test Mission Continuity**
- **Invest in Energy Reliability, Resilience, and Efficiency**

DoN's Installation Energy Resilience Strategy

How Navy Energy Impacts the Mission

The Navy delivers energy security solutions that enhance resiliency – including but not limited to microgrids, nanogrids, smart grid, energy storage, energy controls, and other means to enable energy to continue during a disruption.

Execute Energy Projects

- Deliver **technology agnostic energy solutions** with a proven project approach

Leverage Innovative Financing Mechanisms

- Use **third-party financing** and **alternative contracts** to save appropriated funds

Improve Use of Technology

- Employ **Smart Grid** to prioritize energy gaps and securely manage energy

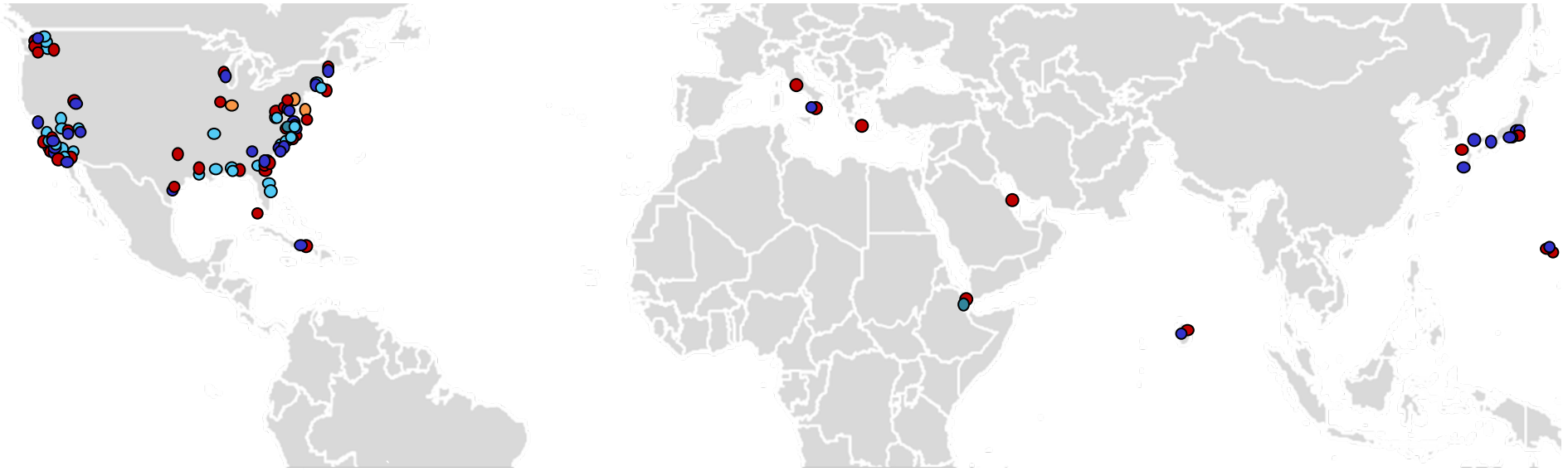
Navy Mission Impact

Close critical energy security gaps to enhance warfighter lethality

Preserve appropriated funds for high priority readiness requirements

Energy Division Projects Map

NAVFAC Energy Division portfolio includes **more than 200 projects across the globe**, whether in pre-award, construction, or sustainment.



Projects initiated since FY14 target over **$4B in delivered infrastructure improvements.**

Alternative Delivery and Partnering with Industry

ENERGY PROJECT AUTHORITIES

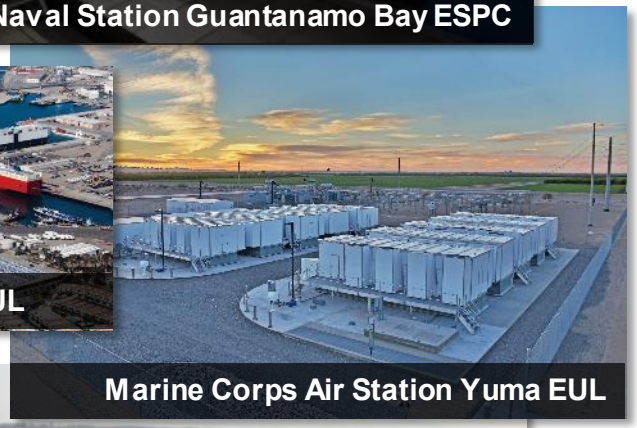
- **Enhanced Use Lease**
  10 USC §2667
- **Energy Savings Performance Contract**
  42 USC §8287
- **Utility Energy Service Contract**
  10 USC §2913
- **Power Purchase Agreement**
  10 USC §2922a
- **Utility Service Contract**
  40 USC §501, FAR Part 41
- **Energy Resilience & Conservation Investment Program**
  10 USC §2914
- **Utilities Privatization**
  10 USC §2668
- **Intragovernmental Support Agreements**
  10 USC §2679


Portsmouth Naval Shipyard ESPC


Naval Station Guantanamo Bay ESPC


Pacific Missile Range Facility EUL


Port Hueneme EUL


Marine Corps Air Station Yuma EUL


Naval Support Activity Mid-South EUL


Marine Corps Air Station Miramar IGSA

Portsmouth Naval Shipyard
Portsmouth, ME

DoN is executing an Energy Savings Performance Contract (ESPC) at Portsmouth Naval Shipyard to **improve energy reliability and reduce costs at the installation** – optimizing shipyard operations and **enabling Portsmouth's mission to maintain, repair, and modernize the Navy's fast-attack nuclear-powered submarines**

Portsmouth ESPC:

- Portsmouth is a pilot project to utilize technology in the Department of Energy contract to demonstrate opportunities to reduce industrial or process energy consumption and to investigate opportunities to leverage energy savings to increase energy resiliency
- The project includes expanded energy related process improvements, distributed generation, boiler/chiller plant improvements, Direct Digital Controls, and renewable energy
- The project upgrades improve system reliability while reducing energy and maintenance costs

Naval Weapons Station Seal Beach (NWSSB) Detachment Norco

DoN leased ~8.3 acres to a developer to construct and operate a combined utility-scale **2.5-MW solar photovoltaic array with 2.5 MW battery storage** capacity tied to Norco's main distribution infrastructure – **protecting against outages and securing Norco's provision of critical missile testing and weapons storage to support the warfighter**

NWSSB Det. Norco EUL:

- IKC includes an integrated microgrid solution consisting of 2.5 MW Solar PV, 2.5 MW battery storage capacity with ride-through duration and 2.16 MW new back-up diesel generators
- IKC also includes operation, maintenance and testing for the microgrid and existing Navy-owned 1.25 MW diesel generator with onsite diesel storage for 14-day outage for the life of the lease term
- Microgrid configuration protects the electrical distribution against grid outages and reduces power quality events at no additional cost to the installation

Business Opportunities

Installation	Location	Project
Joint Base Pearl Harbor-Hickam (JBPHH)	HI	*Enhanced Use Lease (EUL)*: Energy generation system (on three parcels of underutilized installation land totaling approx. 160 acres) to provide the installation with reliable, quality power
Naval Air Station (NAS) Whidbey Island	WA	*Energy Savings Performance Contract (ESPC)*: Combined Heat and Power Plant (CHP) to supplement existing steam production facility / provide installation resilience, plus electrical infrastructure upgrades (e.g. Central Switch replacement, Porter substation upgrades) to improve power reliability
Naval Base (NAVBASE) Coronado	CA	*Energy Savings Performance Contract (ESPC)*: Resilience upgrades potentially to include photovoltaic (PV) generation, battery energy storage system (BESS), and microgrid equipment, leveraging efficiency measures
Naval Submarine Base (NSB) Kings Bay	GA	*Energy Savings Performance Contract (ESPC)*: Install dual-fuel reciprocating engine 5MW+ generators to back up Central Thermal Plant, bundled with available energy conservation measures (lighting, plant optimization, water efficiency, peak shaving, etc.) and additional electrical upgrades
Naval Support Activity (NSA) Monterey	CA	*Energy Resilience and Conservation Investment Program (ERCIP) project*: Install Combined Heat and Power Plant (CHP) to improve installation energy efficiency and resilience that may be paid for through appropriated funds *Energy Savings Performance Contract (ESPC)*: Combine the CHP efficiency with other Energy Conservation Measures (ECMs), most notably microgrid control systems and a new absorption chiller, that will increase the overall resilience of DON operations

Points of Contact

- **Ms. Sandy Kline – DoN Director Installation Resilience**
  - (703) 692-2596; Sandra.kline@navy.mil
- **Mr. Matt Haupt – NAVFAC HQ Energy Director**
  - (202) 685-9362; Matthew.haupt1@navy.mil
- **Mr. Jay Lutz – Director, Energy and BOS Division (N42)**
  - (202) 433-2699; Jay.d.lutz2@navy.mil
- **Mr. Keith Benson – CNIC Director, Energy (Energy HPD)**
  - (202) 433-4513; Keith.benson@navy.mil