Army Energy Resilience Update

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Army Energy and Water Universe

Energy and water security/resilience ensure available, reliable, and quality power and water to continuously sustain critical missions.

Army Installations Universe

Installation Population:	3,002,873
Total Army Installations:	156
National Guard & Reserve Centers:	>2,200
Total Land (acres):	13,591,251
Buildings (ft^2):	982,668,264

5.7% Energy Use Intensity since FY15

34.6% Water Use Intensity since FY07

Combined Heat & Power (CHP)
14 Projects / 109 MW

Sustainable Buildings: ≥ LEED Silver (FY05-18)
961 Buildings

Demand Response: 16 Installations Participating

Enterprise Metering System
> 21,000 Electric, Gas & Water Meters

Facility Related Control Systems
Inventory Underway

Army Directive 2017-07
Installation Energy & Water Security Policy

Army Energy & Water Cost / Consumption

$1.1B Energy / 75.1T BTUs / year
$86.9M Potable Water / 31.2B GALs / year

Energy Managers / Resource Efficiency Managers: 168

FY18 Energy Sources:

- Electricity: 43.4%
- Natural Gas: 38.2%
- Fuel Oil 4.1%
- Renewable Energy 5.0%
- Other 9.3%

Installation Energy & Water Plans:
Due Sep 2019, 2020, 2021

Office of Energy Initiatives (OEI)

11 Energy Projects in Operation
325 MW Onsite Generation Capacity
81% Islandable Projects (onsite generation, storage & controls)
$627M Estimated Private Capital Investment

Utilities Privatization: 151 Privatized Systems

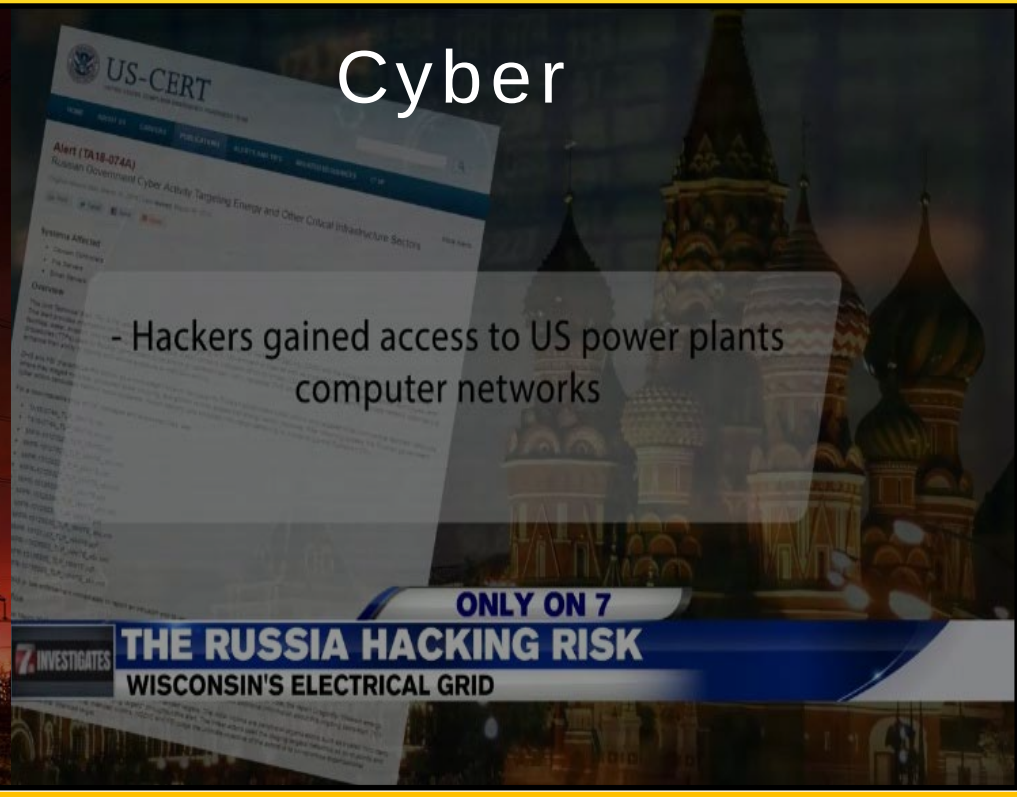
Water	35
Wastewater	34
Electric	45
Gas	35
Heat/Power	2

FY 19 ERCIP: 8 Projects / $40.5M

Energy Savings Performance Contracts (ESPCs) / Utility Energy Service Contracts (UESCs)
$2.9B Total Third-Party Investment
637 Total Task-Orders and Mods
FY18: $114M Investment

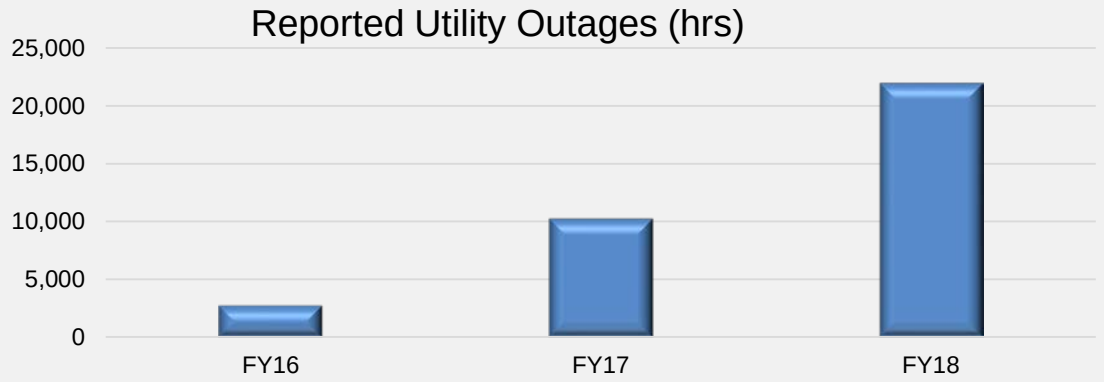
April 2019

Energy & Water Resilience Risks



Historic Army Utility Outages

- Utility outages include electricity, natural gas, steam, water, wastewater, and hot or chilled water
- Outages have increased in the last two years
- In FY18, the largest causes of outages were acts of nature and equipment failure



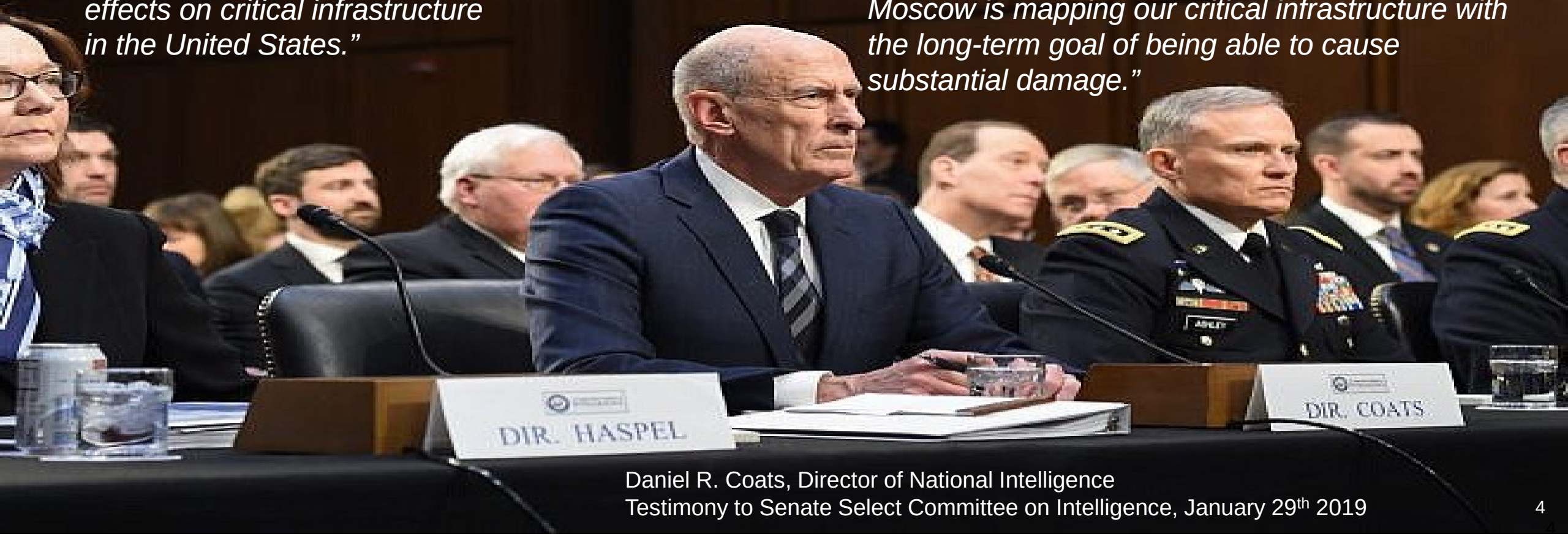
Notes: FY16 and FY17 reporting only captured outages > 8 hrs
FY18 reporting includes all outages, with 96% > 8 hrs
FY18 reported outages without impacts from acts of nature in Puerto Rico are 11,810 hrs

Energy & Water Resilience Risks

"Our adversaries and strategic competitors will increasingly use cyber capabilities to seek political, economic, and military advantage over the United States and its allies and partners."

*"**China has the ability** to launch cyber attacks that cause localized, temporary disruptive effects on critical infrastructure in the United States."*

*"**Russia has the ability** to execute cyber attacks in the United States that generate localized, temporary disruptive effects on critical infrastructure… Moscow is mapping our critical infrastructure with the long-term goal of being able to cause substantial damage."*



Daniel R. Coats, Director of National Intelligence
Testimony to Senate Select Committee on Intelligence, January 29th 2019

Enhancing Army Readiness

1. Focus must be on **resilience**, using efficiency where it makes sense
2. Focus efforts on critical facilities and **resilience** at the **critical facilities**
3. Propose deals where **savings are shared** with the Army **along the way**
4. **Reduce risk** and concern associated with the long periods of payback
5. **Reduce** energy **consumption** at critical facilities, to reduce needed backup power
6. Focus on **replacing and upgrading critical infrastructure** components that serve, or could serve, an energy resilience role

Enhancing Army Readiness

7. Focus on **microgrids** to provide **back-up power,** as well as **peak demand reduction**
8. Prioritize **installation generation,** such as solar PV and natural gas, that could serve as a microgrid component
9. **Prioritize building control systems** that are tied or ready to be tied into campus or enterprise control schemes
10. Consider **"hardening" facilities** to better withstand physical attack to **contribute to resilience**
11. Help Army installations participate in **electricity demand reduction** programs
12. Consider **adding ISO 50001** (Energy Management) to guarantee savings
13. Consider implementing a **program similar to the Portland GE backup** generator program at Army installations

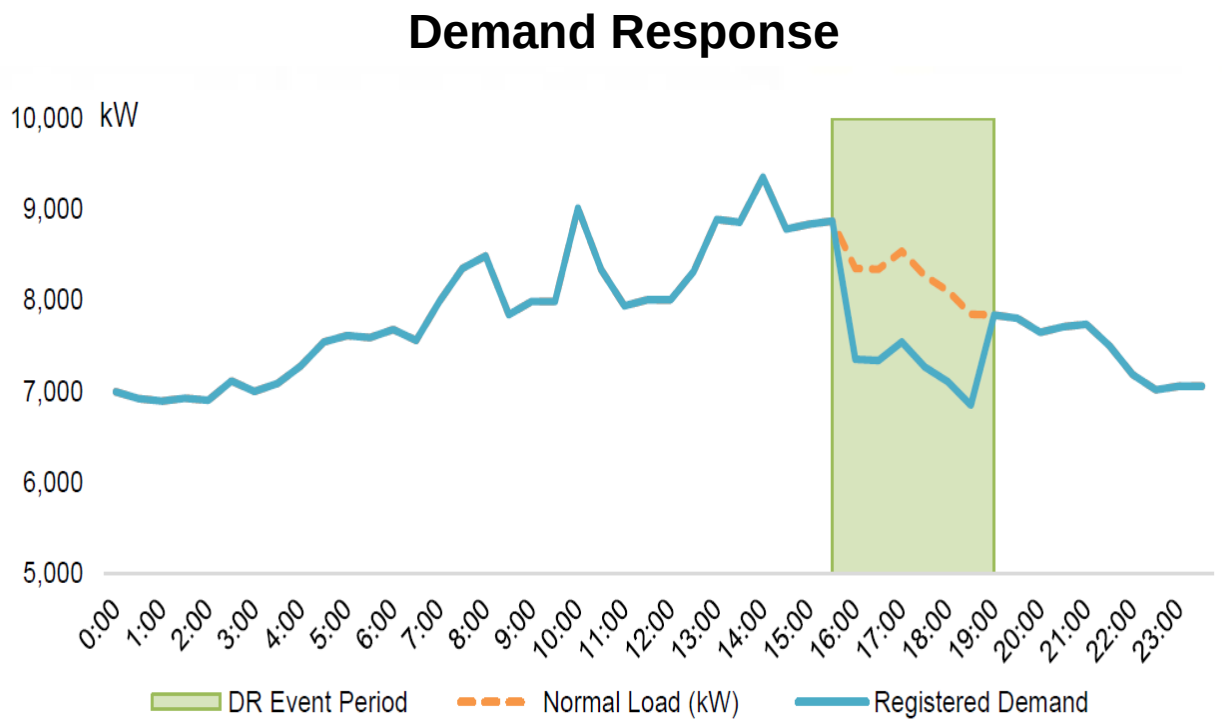
Demand Response

Demand Response

Army Demand Response Implementing Guidance December 2018

Collaborate with Army Installations

Cooling Tower at Aberdeen Proving Ground, MD



Demand Response is a program offered by electric utilities or service providers that provides customers a financial incentive to reduce electricity usage during a given time period.

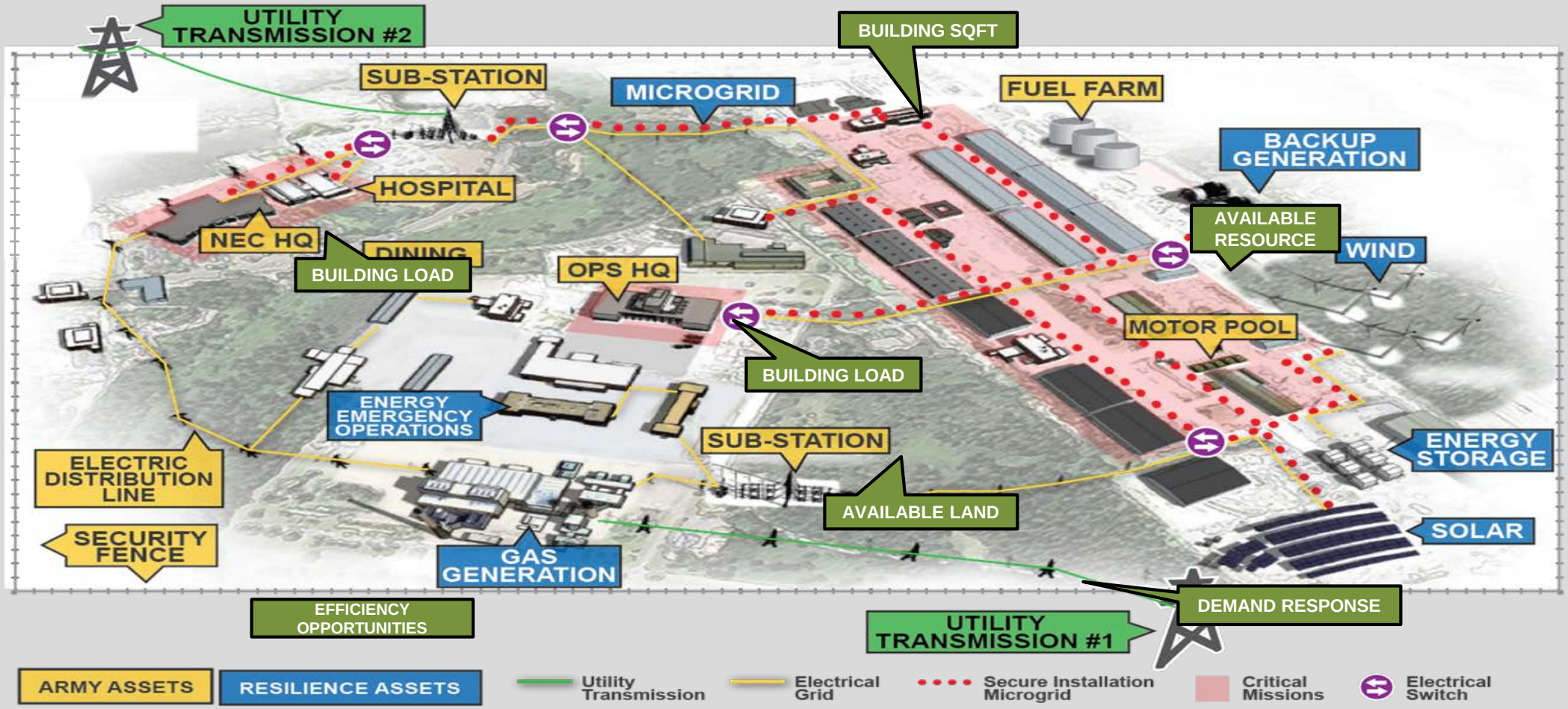
Enhancing Resilience through Innovation

Win-Win Solutions with Dispatchable Standby Generation:

Provides utilities with generation to meet non-spinning reserve requirements.

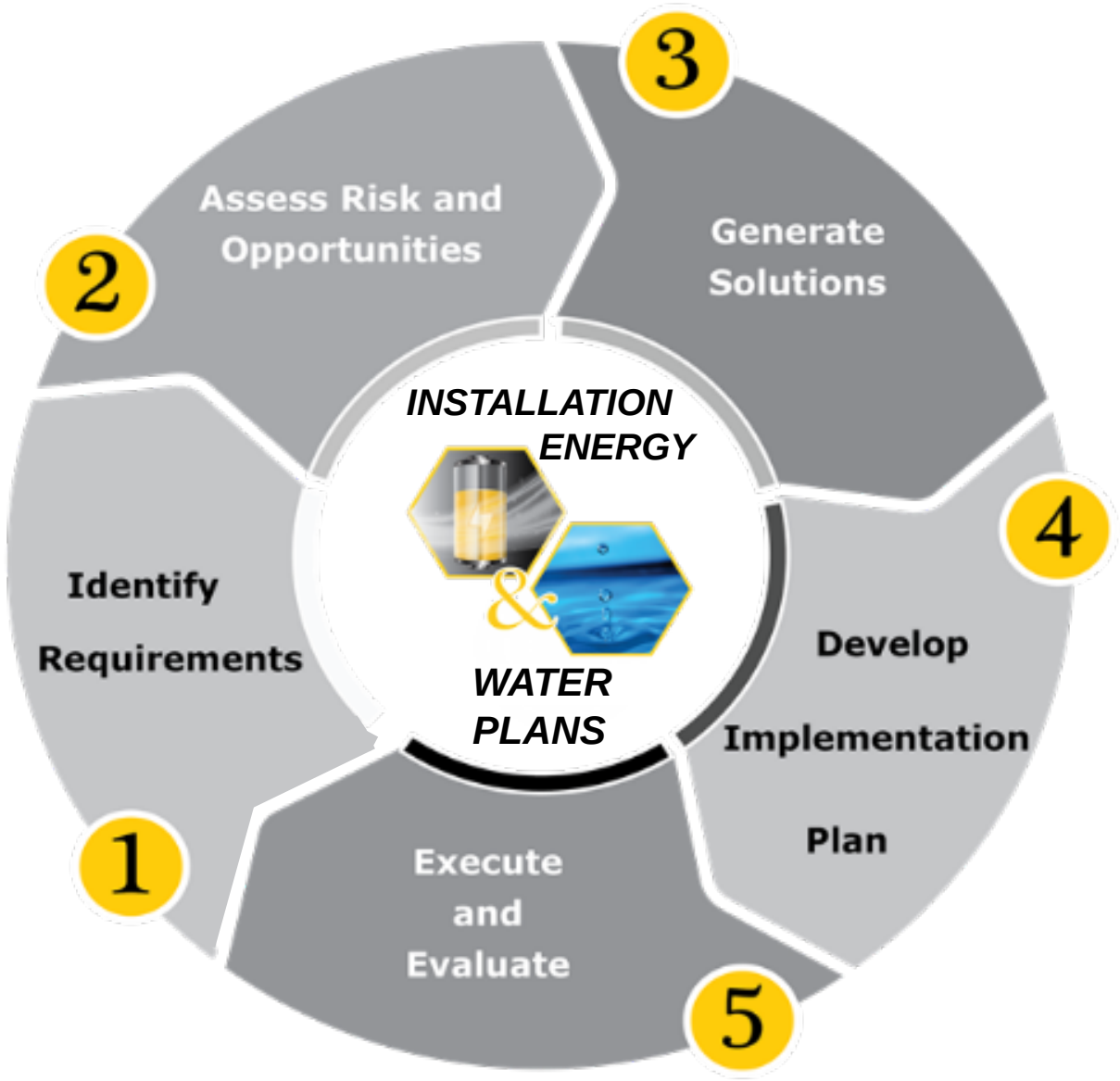
Increases resilience and simplifies Army logistics of testing, fueling and maintaining generation assets.

Energy Resilience through Microgrids



Driver	Critical mission requirements
Assessment Footprints	Uninterruptable and critical footprints, interdependencies, and emergency response
Risk Considerations	Threat/hazards with associated impact
Solutions	Load management PLUS O&M, infrastructure, and onsite generation and storage
Project Prioritization	Meeting mission need, reducing risk, cost effective alternatives analysis

Funding Energy Resilience



Implementation Methods

Appropriated

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

Third-Party

- Utility Energy Service Contracts / Energy Savings Performance 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

Thank You

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