Army’s Pivot to Resilience

The Federal Utility Partnership Working Group

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

### Army Universe

<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation Population</td>
<td>3,002,873</td>
</tr>
<tr>
<td>Total Army Installations</td>
<td>156</td>
</tr>
<tr>
<td>National Guard &amp; Reserve Centers</td>
<td>&gt;2,800</td>
</tr>
<tr>
<td>Total Land (acres)</td>
<td>13,591,251</td>
</tr>
<tr>
<td>Buildings (ft²)</td>
<td>982,668,264</td>
</tr>
</tbody>
</table>

### Office of Energy Initiatives (OEI)

- **Awarded Energy Projects**: 11
- **325 MW Onsite Generation Capacity**: 42% Islandable Projects
- **Utilities Privatization**: 145 Privatized Systems
  - Water: 34
  - Wastewater: 33
  - Electric: 42
  - Gas: 34
  - Heat/Power: 2

### Combined Heat & Power (CHP) Strategy

- **14 Projects / 109.2 MW**

### Sustainable Buildings: ≥ LEED Silver (FY05-17)

- **919 Buildings**

### Demand Response

- **16 Installations Participating**

### Enterprise Metering System

- **> 21,000 Electric, Gas & Water Meters**

### Facility Related Control Systems

### FY 2017 Army Energy & Water Cost / Consumption

- **$1.1B Energy 71.8T BTUs/year**
- **$86.9M Potable Water 31.2B GALs/year**

### FY 2017 Energy Sources:

- **Electricity**: 45.2%
- **Natural Gas**: 34.6%
- **Fuel Oil**: 4.4%
- **Other**: 15.8%

### Energy / Resource Energy Managers:

- **179**

### FY 2017 Energy and Water Plans:

- **Installation Energy & Water Plans**: In Progress


### Energy Resilience & Conservation Investment Program (ERCIP):

- FY 2019: 6 Projects / $31.2 M

### Energy Savings Performance Contracts (ESPCs) / Utility Energy Service Contracts (UESCs)

- **$2.8 B Total Third-Party Investment**
- **637 Total Task-Orders and Mods**
- FY 2017: $289.3M Investment

### Energy Use Intensity:

- **9.6% since FY15 vs 5% FY17 Goal**
- **32% Water Use Intensity since FY07 vs 20% FY17 Goal**
Addressing Vulnerabilities:

Pivot from focus on efficiency and compliance to ENERGY AND WATER RESILIENCE

SecArmy Directive 2017-07 (Installation Energy and Water Security Policy)

- CRITICAL MISSION SUSTAINMENT (CMS): Critical mission continuity of operations for a minimum of 14 days
- ASSURED ACCESS (AA): Dependable supply of energy and water needed to meet evolving mission requirements during normal and emergency response operations
- INFRASTRUCTURE CONDITION (IC): Infrastructure capable of on-site storage and flexible and redundant distribution networks to reliably meet mission requirements
- SYSTEM OPERATION (SO): Trained personnel conduct required energy and water security system planning, operations and sustainment activities

“It is now undeniable that the homeland is no longer a sanctuary. … attacks against our critical defense, government, and economic infrastructure must be anticipated”

National Defense Strategy 2018

“The Secretary of Defense shall ensure the readiness of the armed forces for their military missions by pursuing energy security and energy resilience”

10 USC 2911 (2018 NDAA)
Imagine ....

**Army installations – A whole flock of pink flamingos?**

**The year is 2030:** Army has invested in training and equipment but took risk in installation infrastructure

- Cyber attack disrupted power supplies, including communications
- Systems below the threshold of “critical,” disrupted
- Key external utility, water, and energy control systems under attack
- Authorized mobilization and deployment to counter the invasion in allied nation
- The Army is unable to deploy

**Black Swans = unknown, unknowns**
**Pink Flamingos = known, knowns**

Energy and Water Resilience for Warfighter Readiness

"Secure and reliable access to energy, water, & resources is vital for the Army to perform its mission & support global ops" - Chief of Staff of the Army Gen. Mark A. Milley

Critical Mission Sustainment

CONUS assets support operational capabilities – Fort Polk, Louisiana

Rail Deployment – Fort Hood, Texas

Infrastructure Condition

Water main break at Fort Bragg, North Carolina

Texas ARNG clears downed power lines after Hurricane Harvey, Texas

Assure Access

Annual increase in frequency and duration of outages

Lines for fuel after Hurricane Maria, Puerto Rico

System Operation

Example SCADA System

Backup generator maintenance
Energy Resilience Readiness Exercises – The simultaneous loss of utility power to a subset or to the entire installation, where backup generation must run at full operational load for an extended period of time

Themes:
• Critical loads not consistently identified
• Critical loads not correctly configured to backup generation
• Uninterruptable power supplies and generator failures related to sizing, maintenance, and testing
• Emergency response plans need to better address communications
• Improved coordination needed between mission owners, DPTMS, DPW, and private support contractors on protocols and priority restoration sequences
• Tabletop exercise do not always uncover concerns or test emergency communications. Only actual testing uncovers interdependencies

Next Steps: Army considering additional exercises
<table>
<thead>
<tr>
<th>Driver</th>
<th>Federal Mandates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment Footprints</td>
<td>Square-footage and load</td>
</tr>
<tr>
<td>Risk Considerations</td>
<td>N/A</td>
</tr>
<tr>
<td>Solutions</td>
<td>Building load management strategies and onsite generation</td>
</tr>
<tr>
<td>Project Prioritization</td>
<td>Cost effectiveness</td>
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**Security and Resilience**

<table>
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<tr>
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<th>Critical mission requirements</th>
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<tr>
<td>Assessment Footprints</td>
<td>Uninterruptable and critical footprints, interdependencies, and emergency response</td>
</tr>
<tr>
<td>Risk Considerations</td>
<td>Threat/hazards with associated impact</td>
</tr>
<tr>
<td>Solutions</td>
<td>Load management PLUS O&amp;M, infrastructure, and onsite generation and storage</td>
</tr>
<tr>
<td>Project Prioritization</td>
<td>Meeting mission need, reducing risk, cost effective alternatives analysis</td>
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Low Cost/ No Cost Management
• Installation Planning
• Best Management Practices
• Energy Resilience Exercises

Appropriated Project Funding
• Military Construction (MILCON)
• Energy Resilience and Conservation Investment Program (ERCIP)
• Operations and Maintenance (O&M)

Third Party Financing
• Energy Savings Performance Contracts (ESPCs)
• Utility Energy Service Contracts (UESCs)
• Utilities Privatization (UP)

Private Financing
• Power Purchase Agreements
• Enhanced Use Leases