The Time is Now: Planning for Energy and Water Resilience

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INTRODUCTIONS

U.S. Army Engineer Research and Development Center (ERDC) - Applied Research Planning Support Center (ARPSC)

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What is Different about IEWPs?
Overcoming Challenges
What to Expect from an IEWP
Example Projects and BMPs
How to Use and Maintain it
What’s Different in an IEWP?
IEWPs Drive a Shift in Thinking

- Shift in thinking toward Resilience and Mission Assurance
  - Energy efficiency (pay-back and savings-to-investment ratio) projects remain but primarily focused on resiliency projects driving ISR-MC improvement

- Water is as important as Energy (if not more)
  - Energy-Water nexus to survivability

- Often Involves Privatized Systems
  - Although a system is privatized it’s still essential to many ISR-MC criteria
  - DPWs may have lost personnel and knowledge; need to maintain strong relationships
Army IEWP Guidance – The Plan Process

1. Identify Requirements
   - Establish baseline
   - Establish E&W needs for critical missions
   - Define IEWP stakeholders, scope and goals
   - Review installation performance metrics

2. Identify Threats and Opportunities
   - Assess vulnerabilities and mission impact

3. Assess Risk and Opportunities
   - Evaluate conservation and efficiency opportunities

4. Develop Solutions
   - Generate solutions
   - Develop project concepts
   - Prioritize solutions

5. Execute and Evaluate
   - Plan implementation
   - Define implementation and funding approach
   - Document IEWP
   - Report installation performance (metrics/goals)
   - Refine and update IEWP
## The Plan Process – Identify Requirements

### Goals and Scoping
- Identify stakeholders
- Review existing plans
- **Identify critical missions/facilities**
- Establish resilience planning goals

### Baselining
- Collect baseline condition and resource use
- Understand current ISR-MC
- Validate facilities and infrastructure supporting critical missions
- Determine energy and water needs
**The Plan Process – Risks and Opportunities**

**Assess Risk**
- Identify hazards & threats and relative probabilities
- Identify E&W system vulnerabilities associated with hazards & threats
- Establish impact from E&W disruption
- Establish overall risk

**Identify Opportunities**
- Climate conditions
- Energy and water infrastructure
- Past practices and experiences (lessons learned)
- Energy and water efficiency / retrofits
- Operational practices
- Institutional policies, plans, or procedures
Possible resiliency solutions

- Efficiency Strategies
- Assured Access Projects
- Infrastructure Condition Projects
- Critical Mission Sustainment Projects
- Supply Strategies
IEWP Planning Tools
### IEWP Results in a Prioritized Project Implementation Plan

<table>
<thead>
<tr>
<th>Project #</th>
<th>Project Name/Description</th>
<th>Key Area Addressed</th>
<th>ROI</th>
<th>Funding Body</th>
<th>Project Champion</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Backup generator for 2331</td>
<td>Critical Missions</td>
<td>NA</td>
<td>ERCIP</td>
<td>Jack Sheppard</td>
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<tr>
<td>2</td>
<td>Connect central power plant to 1643, 1644 and 1900</td>
<td>Critical Missions</td>
<td>1.1</td>
<td>TBD</td>
<td>Eleanor Shellstrop</td>
</tr>
<tr>
<td>3</td>
<td>Upgrade substation D capacity</td>
<td>Assured Access</td>
<td>NA</td>
<td>*Contract with utility</td>
<td>Walter White</td>
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<tr>
<td>4</td>
<td>Add cogeneration engine to central energy plant (1427)</td>
<td>Energy usage and cost</td>
<td>2.4</td>
<td>UESC</td>
<td>Gob Bluth</td>
</tr>
</tbody>
</table>

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Example Energy Projects

- Propane injection plant for natural gas back-up; peak shaving
- Add on-installation power generation (RICE, PV, Trailer-mounted Generators, Batteries)
- Microgrid
- Metering & smart building controls upgrades
  - Interconnecting substations; hardening of substations
  - Add diesel storage
  - Bury critical electrical lines
LPG-air systems provide supply security under extreme circumstances, ensuring gas-energy keeps flowing to serve critical needs. Like an electrical back-up generator, these systems are used to fully replace natural gas supply should supply be curtailed due to planned or unplanned events.

Many natural gas suppliers offer lower-cost supply when the purchaser agrees to curtail gas use upon request, LPG-air technology allows natural gas purchasers to reduce the delivered cost of natural gas while ensuring clean-burning gas energy is always available.

This technology supports the ISR-MC category of Assured Access to resource supply (specifically natural gas) and can also support Critical Mission Sustainment.
**Example Water Projects**

- Water resiliency for key facilities, ex: dorms and kennels
- Add water wells or add redundant water system inter-connections
- Expand reclaimed water system
- Reduce/eliminate water losses
- **Dry hydrants**
- Meter and bill for water costs
A dry hydrant consists of an arrangement of piping with one end in the water and the other end extending to dry land and available for connection to a pumper.

Dry hydrants have the following features:

- A non-pressurized pipe system.
- Use relatively inexpensive piping material and other supplies.
- Are permanently installed in existing lakes, ponds, streams and cisterns.
- Provide a means of access whenever needed, regardless of weather.
- Allow years of simple operation with a minimum of maintenance.
- The time savings are many.
EXAMPLES: BEST MANAGEMENT PRACTICES (BMPs)

- Generator Management Plan
- Readiness Improvements
  - Exercise utility outage scenarios
  - Generator
- Data-driven Energy Conservation
- **Design New Critical Facilities for Passive Survivability**
- Expand Water Rights
- Create Water Shortage Plans
- Infrastructure Cybersecurity Task Force
- Codifying processes; documenting institutional knowledge
PASSIVE SURVIVABILITY

PASSIVE SURVIVABILITY refers to building’s ability to maintain critical life-support functions and conditions for its occupants during extended periods of absence of power, heating fuel, and/or water.
IEWPs Provide a Variety of Benefits

- A shift in thinking toward resilience and mission assurance
- Installation-specific energy and water visions and goals
- Risk assessments based on current and future climate conditions
- Freshly vetted critical facilities lists
- Capabilities assessments and gap analyses
- Lists of new projects and best management practices for installations to pursue and implement
LESSONS LEARNED: USE AND MAINTAIN THE IEWP

- The G9 sharepoint site has all the reports and template (government only)
- G9 is reviewing Army’s IEWP against standardized metrics
- Each installation has been very different; installations typically don’t know ahead the scope and the information we’re asking for
  - This is not another energy efficiency study
  - Need to target critical missions – what they are is scenario dependent
  - Tie IEWP projects to the ISR; improving the ISR is tied to Army funding the projects
  - Simulate ISR where it is not reported provides insights to energy posture

$X in projects will improve your ISR score to XX
OVERCOMING CHALLENGES DURING PLAN PREPARATION

- Data collection
- Critical facility list
- Setting goals – ISR-MC, existing policy and installation specific
- ISR-MC data and simulations
- COVID travel restrictions
- MCDA, plan evaluation and project prioritization
**Additional Training Resources**

- Army Energy and Water Resilience (EWR) Assessment Guide training,
  - Assessment Guide 101 – Session 1 (Friday October 16 – 0900 EDT/1300 UTC)
  - Assessment Guide 101 – Session 2 (Thursday October 22 – 1400 EDT/1800 UTC)
  - Assessment Guide 101 – Session 3 (Tuesday October 27 – 1900 ET/2300 UTC)

- Prospect Courses designed around IEWP requirements
  - Prospect Course #258, Master Planning Energy and Sustainability
    - Session16-19 March 2021