



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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TODAY'S DISCUSSION

- 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?



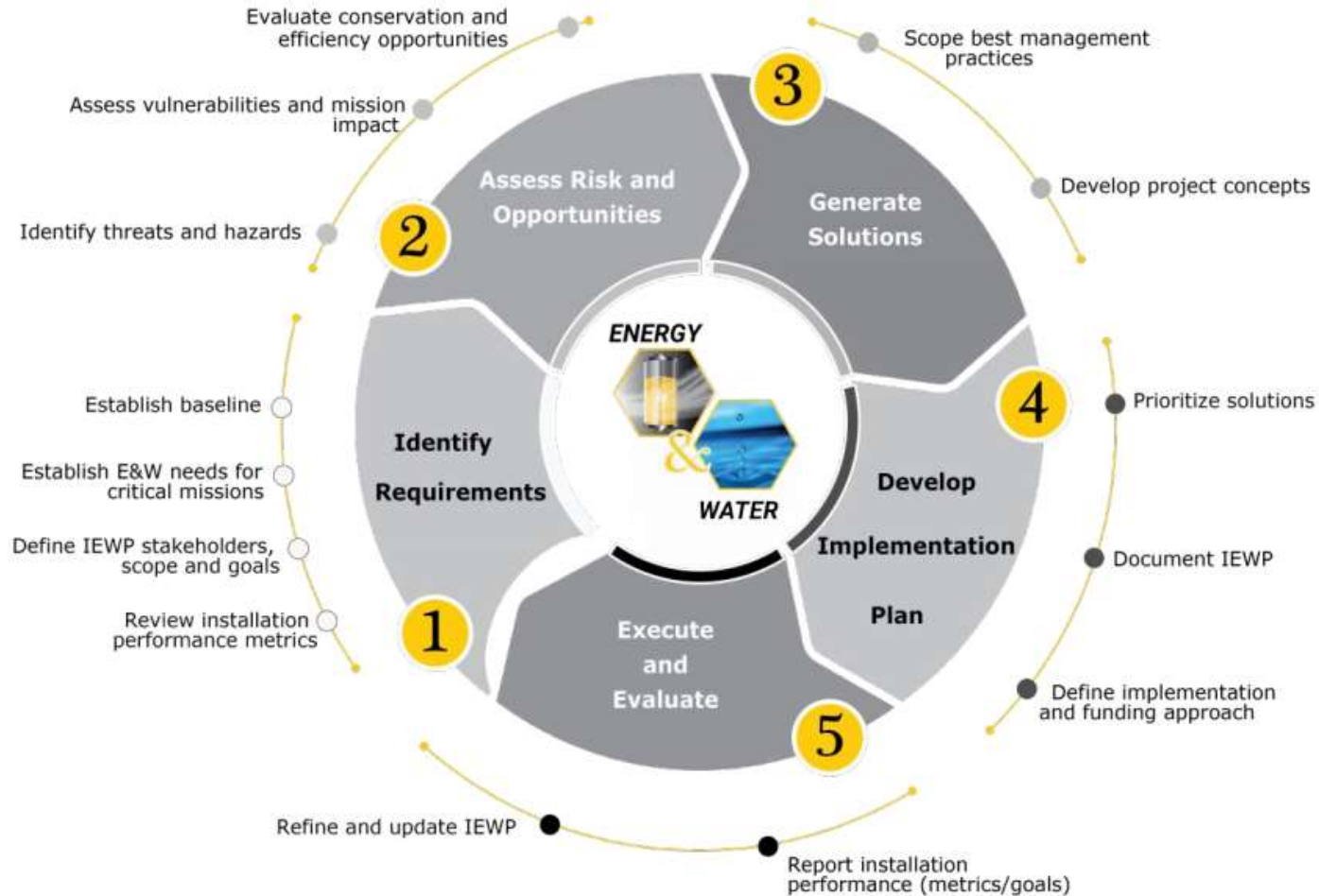
IEWPs DRIVE A SHIFT IN THINKING

- 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

IEWP PROCESS



ARMY IEWP GUIDANCE – THE PLAN PROCESS



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 w/ 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

THE PLAN PROCESS – GENERATE SOLUTIONS



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

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



Diesel Generator



Battery Storage

EXAMPLE ENERGY PROJECT – PROPANE INJECTION

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



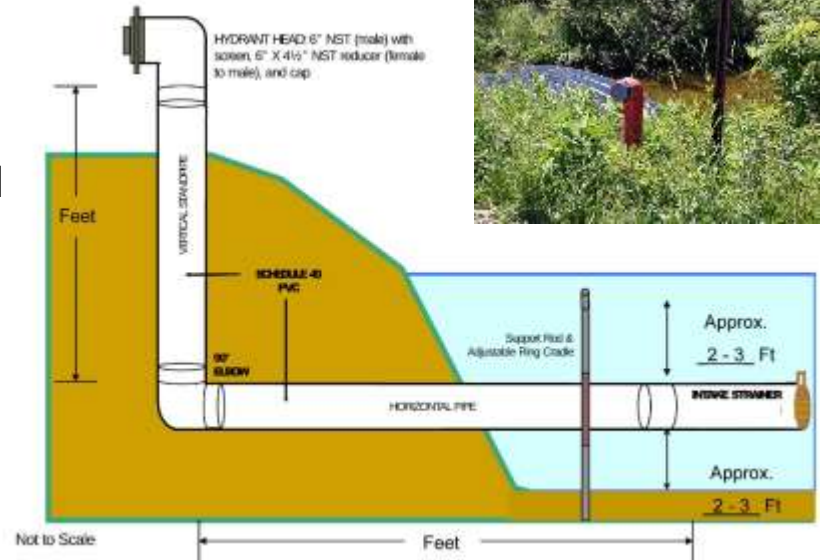
- Water resiliency for key facilities, ex: dorms and kennels
- Add water wells or add redundant water system inter-connections
- Expand reclaimed water system
- Reduce/eliminate water losses
- **Dry hydrants**
- Meter and bill for water costs

EXAMPLE WATER PROJECTS – DRY HYDRANT

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
 - Session 16-19 March 2021
 - <https://ulc.usace.army.mil/CourseListDetail.aspx?CtrlNbr=258>