Energy Exchange

Federal Sustainability for the Next Decade

U.S. Department of Energy

DoD Energy Resilience

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DoD-Wide Recommendations

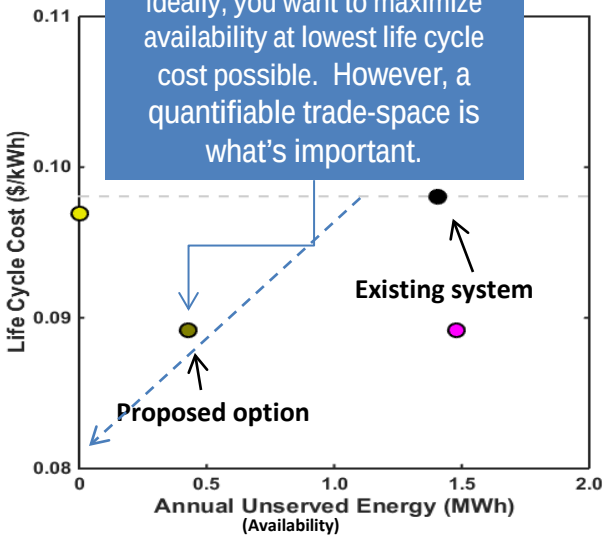
Sampling of Findings

- Communication
  - Encourage routine meetings between installation energy leads and mission operators to determine and prioritize 'critical' mission operations and energy requirements across the entire base
    - Improve guidance to determine prioritized energy load calculation for critical mission operations
  - Coordinate with the community (inside and outside of the base) to ensure critical interdependent mission requirements are met during energy outages
- Technical
  - Understand your current energy systems and infrastructure; do not site energy systems on unreliable grid
  - Prioritize/ensure energy resilience systems are only placed on critical energy loads and not oversized
  - Standardize a process to ensure O&M of energy systems (e.g., generators, UPS, etc.) for full reliability picture
- Cost and Performance Data
  - Encourage tracking of the appropriate cost data (capital, operation, maintenance, and testing) of energy generation and infrastructure to replicate and justify the business case for future energy resilience solutions
  - Encourage tracking of performance data that aligns to mission and availability/reliability of energy systems and infrastructure (outage data, failure rates, etc.) to assist in tradeoff decisions between cost/mission
    - Helps to identify cost-effective and prioritized remediation of reliability risks that align to mission requirements

Collaborating with Services and Defense Agencies to raise awareness through future guidance across the DoD.

Bottom-Line Up Front (BLUF) Study Results Overview

Cost attribute: life-cycle costs ($/kwh)
Mission attribute (availability): annual unserved energy (MWh)



Findings/Results (generalized)

- Critical Energy Loads: 6 MW to 21 MW
- Generators: 50 to 350 generators
- Reductions in costs: 0.2¢/kWh to 2.2¢/kWh,
- Availability improvements: 0.3 MWh to 1.2 MWh
- Base characteristics: Isolated location with frequent outages, integrated/urban base with reliable power, etc.

	Generator	Microgrid	UPS	PV	CHP	FC
●	X					
●	X	X	X			
●	X	X	X	X		
●	X		X	X		
●	X			X		
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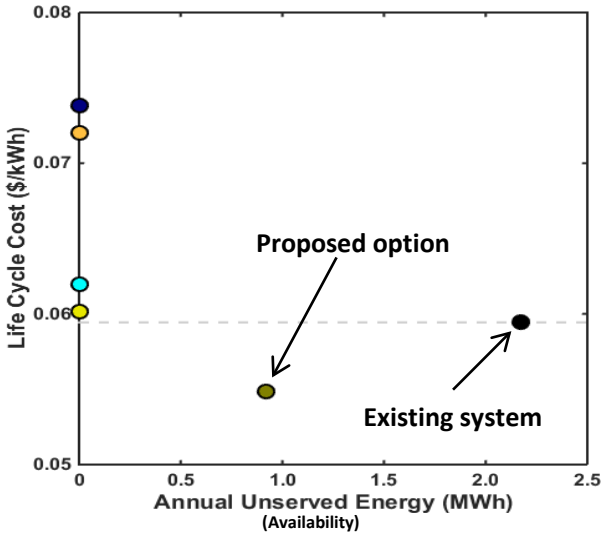
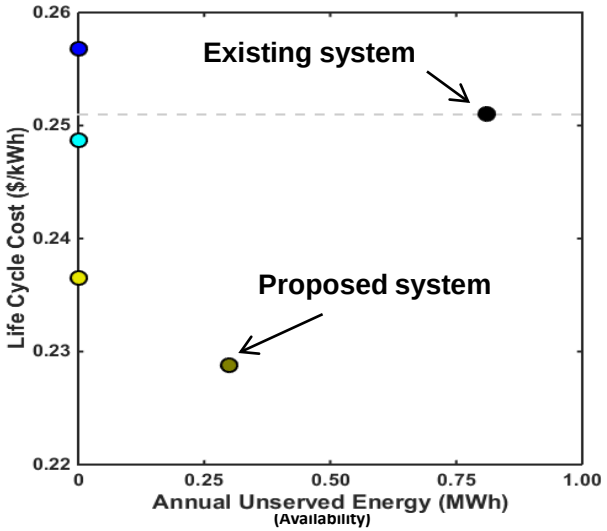
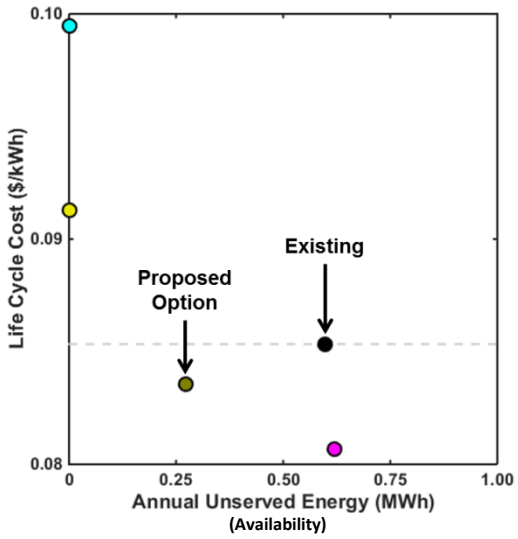




Framework allows for quantifiable tradeoffs between cost and mission assurance attributes.

Results across diverse bases indicate that more cost-effective and reliable energy resilience solutions exist to support critical mission operations on our military installations.



Energy Resilience Solution Analysis of Alternatives
Tradeoffs Between Cost and Mission