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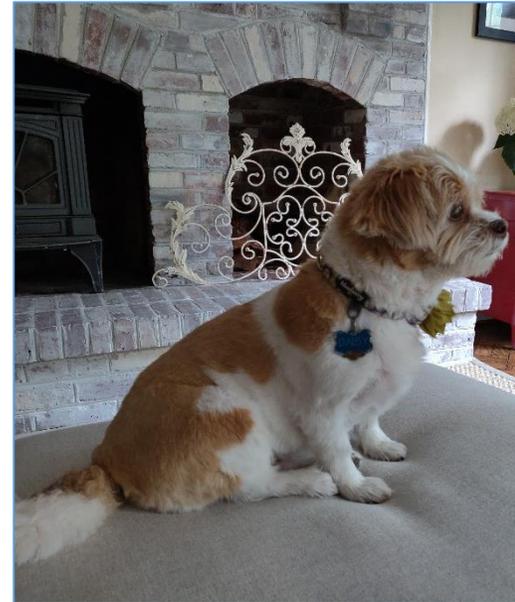
Defense Energy Resilience Program

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Installation Energy Resilience



DoD Energy Resilience (ER)

• Policy Drivers

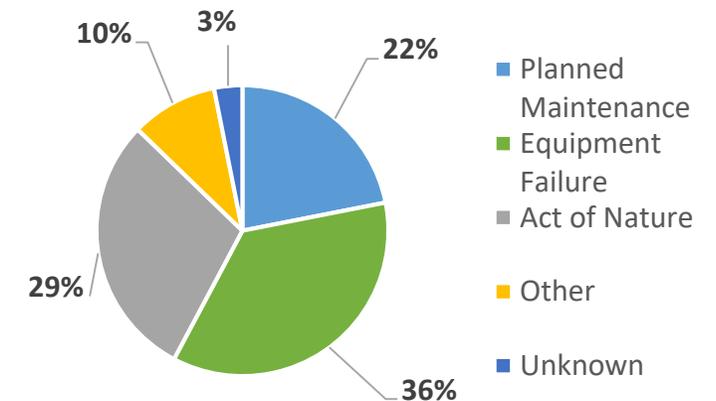
- Title 10, United States Code
- National Defense Authorization Act (NDAA)
- Department of Defense Appropriations Act
- DoD Instruction 4170.11(updated 16 Mar 2016), Installation Energy Management, Energy Resilience

• Policy Initiatives

- Operations, maintenance, and testing (OM&T) guidance
- Energy Resilience and Conservation Investment Program (ERCIP) guidance
- Installation energy plans and alternative finance guidance
- Capabilities to inform energy resilience decisions and investments:
 - Mission requirements and all-hazards analyses (INL)
 - Energy resilience analysis tools/exercises (MIT-LL) to prioritize budget resources or alternative financing projects
 - Assessing risks of alternative financing projects – Defense Energy Resilience Bank (Deloitte)
 - Services and Defense Agencies tools, processes, and activities (e.g., ISR-MC, EMIG, MTA, etc.)



FY 2018 Utility Outages



Energy resilience policies and capabilities are in clear alignment to national security and mission requirements.

Important Public Websites:
Details on ODASD(Energy) Energy Resilience Initiatives: http://www.acq.osd.mil/eie/IE/FEP_Energy_Resilience.html
Details on ODASD(Energy) Energy Reports: https://www.acq.osd.mil/eie/IE/FEP_Energy_Reports.html



FY18-19 NDAA Changes (snapshot)

- **FY18 NDAA**

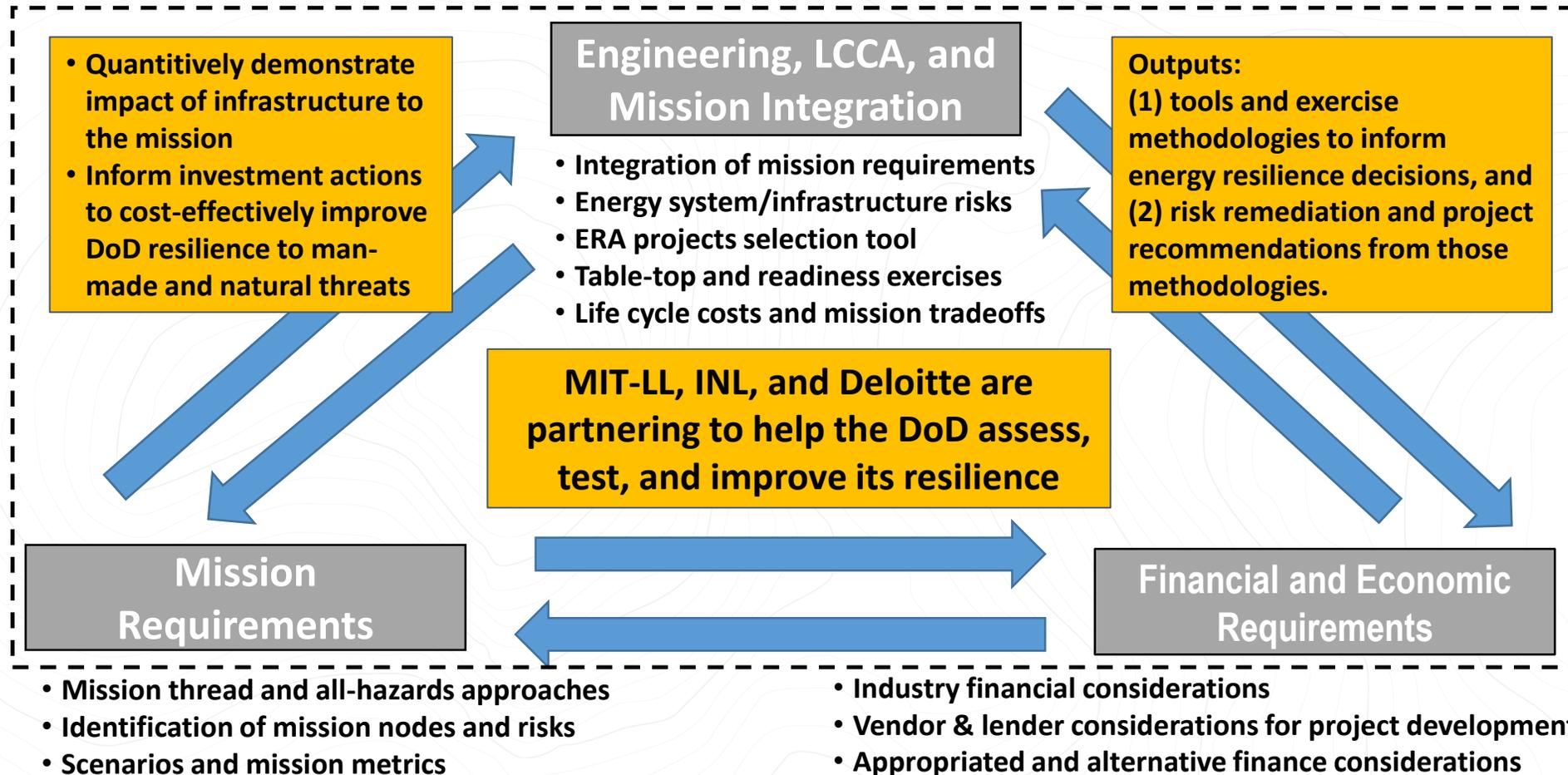
- 10 USC Section 101(d) – Energy Resilience Definition
- 10 USC Section 2688 – Utilities Privatization: UP contracts include ER requirements and metrics; ER performance reporting in the annual energy report for UP contracts
- 10 USC Section 2911 – Energy: codifies Energy Resilience in policy to ensure the readiness of the armed forces

- **FY19 NDAA**

- 10 USC 2911(c) is amended with: “The Secretary of Defense shall include the energy security and resilience goals of the Department of Defense in the installation energy report submitted under section 2925(a) of this title for fiscal year 2018 and every fiscal year thereafter.”
- 10 USC 2925(a) – is amended—(1) by inserting “including progress on energy resilience at military installations according to metrics developed by the Secretary” after “under section 2911 of this title”;
- 10 USC 2925(a) summary of amended reporting requirements in annual energy report:
 - Details on the downtimes (in minutes or hours) missions can afford based on their mission requirements and risk tolerances
 - Details on critical energy loads in megawatts and the associated downtime tolerances for critical energy loads
 - Details on the current energy resilience and emergency backup systems, including power requirements, critical missions and facilities serviced, system service life, OM&T costs (FY18 NDAA)
 - A list of planned and awarded energy resilience projects by the DoD by military department and military installation
- 10 USC Section 2922(a)(d) – “The Secretary concerned shall ensure energy security and resilience are prioritized and included in the provision and operation of energy production facilities under this section.”



Energy Resilience Capabilities



Integrate and align OSD and Services activities to develop integrated energy resilience capability to advance readiness exercises and project development



DoD Energy Resilience

Tools, assessments, and exercises

- Tools and assessments allow sites to understand risks to critical systems and inform project development
- Tabletop exercises investigate responses and capabilities during an extended simulated outage
- “Pull-the-plug” exercises provide awareness of actual system capabilities during a real outage



- Adverse weather events are damaging our electrical infrastructure
- Downstream effects may cause outages on DoD installations
- Real-world testing ensures preparedness for an outage scenario

30 energy resilience base assessments and exercises completed

- 1/5 of the Department's electricity consumption
- > \$450 million in electricity costs



Energy Resilience Readiness Exercises (ERRE)

- DoD exercises and tools are driven by user / base requirements
- Tests existing energy resilience and backup systems on full operational load (i.e., microgrids, generators, UPS, fuel, etc.)
- ERREs assess performance of electric power infrastructure
- Benefits of the energy resilience readiness exercises
 - Drives towards requirements of the military installation (user acceptance)
 - Finds actual gaps in infrastructure-related risks (e.g., backup power, UPS, etc.)
 - Assists in monetizing those gaps for targeted projects on military installations
- Project opportunities and actions from exercises to ensure resilience
 - Life cycle sustainment of energy systems and infrastructure is necessary to maintain reliability
 - Backup power systems must be right-sized with accurate, prioritized loads to ensure effectiveness
 - Uninterruptible power supplies (UPS/batteries) shortfalls, and maintenance improvements needed
 - Pilot projects, advocating for resources, and larger/integrated base-wide projects

ERREs are driven by national security and mission requirements

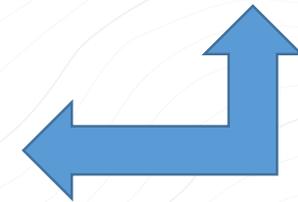
Similar to findings from ERA tool and assessments



Sample Integrated ER Projects

Energy Resilience Analysis (ERA) Tool and Assessments

All ERA tool, assessments, and project recommendations driven by national security and mission requirements



- Consolidated generation at the substation / critical feeder level
 - Large emergency diesel generators or natural gas cogeneration with dual fuel capability
 - Improvements in infrastructure for a reliable distribution system on the base requires consideration
 - Reduces the maintenance burden on base personnel -> could improve the reliability to operate during an outage
 - Inverter and transfer switching at other building loads with portable generation options could offer cost effective solution
- Solar PV through alternative financing could (in the appropriate region) provide electricity to the installation at below market rates
 - For islanded operation the appropriate inverter functionality and costs would need to be considered in requirements
 - Potential to offset fuel requirements during grid outages (technical and cost tradeoffs must also be considered)
- Installation of targeted microgrids at identified critical loads could improve resilience
 - Must consider technical and economics of incorporating additional infrastructure:
 - Upgraded distribution system including additional switching capability
 - Installation wide communication and control of the energy system
 - Automated meters and systems to capture consumption and reliability performance

ERA tool required for ERCIP investment decisions



Summary

- Policy and requirements
 - Sustained focus over the course of many years
 - Shift focus to execution of policy and requirements
- Implementing installation energy resilience
 - Identifying and funding energy resilience gaps and requirements
 - Remediation of sustainment risks found during assessments and readiness exercises
 - Implementation of longer-term, integrated energy resilience projects (ERAT, IEPs, etc.)
 - Constrained O&M, MILCON, and ERCIP appropriations
 - Leveraging alternative financing to fund energy resilience and close gaps
 - Clearly defined energy resilience requirements in contracts
 - Enabling energy resilience personnel/technical capabilities to implement readiness exercises and for sustained energy resilience project development



ODASD(Energy) Energy Resilience Timeline

Numerous policies, guidance, procedures, tools, and exercises are complete.
So what's next?

