

Energy Resilience Study White Paper

STUDY GOALS: Conduct an energy resilience study to investigate business case analysis (BCA) approaches to deliver resilience solutions on military installations. The study will consider broader resilience solutions beyond the historical “generator-by-generator” purchases that back-up a specified critical mission or asset. It will look to *reduce costs and improve mission capability* by studying more holistic solutions such as reconstituting missions, centralized power plants, distributed energy systems, and other resilience solutions.

NATIONAL SECURITY IMPACT: The development of BCA approaches will help identify cost-effective energy solutions for the Department of Defense (DoD) to provide available, reliable, and quality power to improve mission continuity. These resilience solutions will allow the DoD to prepare for and have the ability to recover from energy disruptions that impact mission assurance on military installations, and save the taxpayer money. This study aligns to the following legislative, executive and AT&L initiatives:

- (1) Executive Order 13653, *Preparing the United States for the Impacts of Climate Change*;
- (2) Quadrennial Defense Review 2014, Executive Summary, page VI, *Impacts of Climate Change on Military Installations*;
- (3) DoD Appropriations Bill, 2015 Senate Report 113-211, page 52, *Electricity Reliability at Military Installations*;
- (4) GAO Engagement 351943, *Utility Resilience at DoD Facilities* authorized in House Report 113-446, which accompanied the FY 2015 National Defense Authorization Act (NDAA); and,
- (5) *Better Buying Power* initiatives supported: achieving affordable programs, achieving dominant capabilities while controlling lifecycle costs, and eliminating unproductive processes or bureaucracy.

FULL STUDY FEATURES: The key technical areas in the study will include:

- (1) Literature review of:
 - BCA and cost benefit tools and methods for energy resilience, including a review of industry levelized cost of electricity approaches and DoD life cycle cost methods
- (2) Review and document:
 - The Services and installation’s critical missions and installation functions that align to critical energy and resilience requirements
 - Historical DoD outages, including the cause, costs, duration, and risk categorization of the outages
- (3) BCA and cost benefit analysis for a sampling of DoD bases that includes:
 - Interruption costs associated with historical outages such as repair of equipment, purchase of emergency generation, and unscheduled maintenance
 - Benefits such as financial incentives: peak shaving, demand response, ancillary markets opportunities, and other regional financial incentives
 - Avoided costs of the traditional or baseline approaches (e.g., back-up generator) when pursuing the new approaches (e.g., centralized or distributed generation and integration)
- (4) Develop and document standard BCA and cost benefit analysis tools and methods for energy resilience

PERFORMERS/EXECUTION PLAN: The proposed study will be executed by Massachusetts Institute of Technology – Lincoln Laboratory.

PERIOD OF PERFORMANCE: Out-brief end of calendar year 2015.