

Environmental Security Technology Certification Program (ESTCP)

**AFFORDABLE ENERGY ASSURANCE AT NATIONAL GUARD
INSTALLATIONS**

OBJECTIVE

The U.S. Department of Defense (DoD) Installation Energy Test Bed seeks innovative approaches to provide affordable energy assurance and resiliency at small installations typical of National Guard, reserve, and small active bases. ESTCP intends to fund multiple projects to design, assess, demonstrate, and validate a variety of approaches. All work will be conducted at modest sized National Guard installations, which will serve as the test bed for these efforts.

Traditional approaches of building-tied emergency generators lack the ability to provide the needed energy resiliency for outages as long as two weeks, even for small bases¹. Microgrids offer a potential solution, but their life cycle costs are a significant barrier for small installations. Microgrids that provide less than 1MW of power face relatively large capital costs for their size due to design, engineering, integration, controller, generation, storage, and distribution upgrades costs. But of even greater concern are the operations and maintenance costs associated with the distributed energy resources and the operation of the microgrid, relative to the potential revenue streams and cost saving opportunities.

Projects will be executed in two phases.

- Phase I – conceptual design and modeling: Organizations must develop a conceptual design and a capital and operational cost model for multiple National Guard installations. Proposers may identify a National Guard installation if they so desire but are not required. For the purposes of estimating the level of effort, proposers should plan to model three National Guard installations. Assume the critical load is equal to or even slightly higher than the base’s load during normal operations and its peak value is less than 1 MW. The installations will be of modest size containing between 5 and 30 buildings with some but limited existing backup power. For those installations identified by ESTCP, a detailed data package and energy assurance requirements will be provided to funded projects.
- Phase II – technology demonstration and validation: Based on the results of Phase I, projects will be selected to fully design, build, and operate for one year an energy assurance system at a single Nation Guard installation. The projects will be required to validate the system’s performance both while grid tied and for an extended outage and the capital and operational cost models.

¹ Jeffrey Marqusee, Sean Ericson, and Donald Jenket, “Emergency Diesel Generator Reliability and Installation Energy Security”, NREL/TP-5C00-76553, April 2020

Pre-proposals are requested for Phase I only. The pre-proposals shall follow the general instructions provided on the [ESTCP website](#) and should consider the following information:

- In the Technology Description section, proposers should provide information on their design and O&M approach. Information on design and engineering tools and processes, potential distributed energy resources, control strategies, revenue streams and cost savings, as well as an operations and maintenance approach should be discussed.
- In the Technical Approach section, the proposed approach for designing and modeling the system's cost and performance should be described. No demonstration plan will be required for Phase I efforts. Discussion on technical risks and maturity should refer to issues associated with a potential future Phase II demonstration at a National Guard installation.
- In the Expected Benefits section, a qualitative and semi-quantitative description of the advantages in terms of all the key attributes should be provided as compared to current design, build, and O&M practices.
- Project costs should be estimated for three National Guard installations to be studied in Phase I.
- The Technology Transfer plan should briefly discuss actions that would be taken during Phase II. These activities should not be costed in the Phase I proposal.

Those proposers who are requested to submit full proposals will be provided sufficient information to develop a detailed cost proposal for the Phase I design and modeling portion of the project

BACKGROUND

There is growing concern whether military installations can maintain critical functions during outages that last for days or weeks, as opposed to hours. Recent microgrid investments have been focused on larger installations. Smaller installations are known to have much larger uncertainty in the capital costs of designing and building a microgrid² and these costs do not scale as the size of the system gets smaller. All microgrids, independent of size, have concerns regarding the long-term operations and maintenance costs. These costs are a critical issue for small installations.

National Guard, reserve and small active installation represent a sizable portion of the DoD's portfolio. In addition, National Guard installations play a critical role during emergencies when the commercial grid is down for an extended period. As a homeland defense force, the National Guard provides support at the local and State level in response to natural and man-made disasters. With proximity that enables prompt response, knowledge of local conditions, tactical flexibility, and close association with State and local officials, the National Guard is generally the first military uniformed responder on the ground in the event of a disaster. Resilient energy assurance gives National Guard sites autonomy from the commercial grid and allows operations to continue in times of disaster.

² Julieta Giraldez, Francisco Flores-Espino, Sara MacAlpine, and Peter Asmus, "Phase I Microgrid Cost Study: Data Collection and Analysis of Microgrid Costs in the United States," NREL/TP-5D00-67821 October 2018

POINT OF CONTACT

Mr. Tim Tetreault

Program Manager, Installation Energy & Water (EW)

Environmental Security Technology Certification Program (ESTCP)

4800 Mark Center Drive, Suite 16F16

Alexandria, VA 22350-3605

Phone: 571-372-6397

E-Mail: timothy.j.tetreault.civ@mail.mil

For pre-proposal submission due dates, instructions, and additional solicitation information, visit the [ESTCP website](#).