FAQs – Energy Resilience Design Evaluation & Modeling Tools

Last updated May 14, 2025

Inverters on a micro-grid can operate without any control interconnection—meaning you just connect the power lead up and it knows how feed power and maintain stability. No serial data bus, no network cables. To do this, the frequency must be allowed to change slightly +/-1hz perhaps. Would a submission based on such a system be accepted?
System frequency deviation of +/- 1 Hz is well beyond typical power quality tolerance levels and would likely damage equipment and cause other systems to trip offline. This doesn't sound like a suitable solution for DoD microgrid systems where high-quality power is required. This solicitation is looking at tool and methods to evaluate and optimize proposed microgrid designs performance against DoD resilience criteria, which also doesn't seem consistent with this high level summary.

Are there specific research areas currently of interest?
Of interest are tools/methods to evaluate microgrid performance and optimization against DoD resilience criteria. Also of interest are control methods using sensor data, AI/ML, and observed system response.

Are there particular problem areas or challenges you are seeking to address?
The Department of Defense (DOD) faces challenges in ensuring reliable electric power for critical missions in supply-contested logistics environments. Current methods may lack the necessary speed and adaptability to enhance energy security effectively, underscoring the urgent need for innovative solutions.

Are there anticipated funding opportunities beyond FY25 to support this effort?
This is unknown. This solicitation is for FY25.

Are there any limitations or constraints we should be aware of when shaping our approach?
Microgrid design cycle has a very short time horizon and limited data availability. Limited data is available for AI training, so simulated data will be necessary. Control methods cannot require external connectivity (i.e. internet access).

Is there an opportunity to meet with representatives from CERL to discuss this opportunity in more detail?
To maintain fair and open competition, researchers are not able to meet with submitters in this stage of the process. Questions may be submitted using this form until May 26, 2025. The technical team will respond to the best of its ability.

Specifically, are you seeking solutions that use AI/ML to replace or approximate traditional physics-based microgrid solvers (e.g., for power flow or system modeling) as part of a tertiary controller? Or, are you also open to solutions that leverage AI/ML to make tertiary-level decisions, while still relying on conventional modeling or hybrid methods? Understanding your intent here will help us better align our technical approach with the goals of the solicitation. ERDC is interested in how/where AI/ML can augment traditional microgrid control systems, and how AI/ML could be used in modeling and simulation to evaluate microgrid performance and system response. ERDC's goal is to examine where the different methods are best applied. Where does AI/ML have advantages in control and/or simulation? Where is traditional dispatch/physics-based modeling required and why? Hybrid solutions are welcome.