[GMLC] Energy Resilience for Mission Assurance

Los Alamos Team: Mary Ewers, Anatoly Zlotnik, Shriram Srinivasan, and Sai Hari
Timeline: FY2022 – present

Challenge:
Defense Critical Infrastructure (DCI) is integral to United States national security, especially during major catastrophes both natural and manmade. Furthermore, DCI is dependent on energy to ensure effective mission performance, so a resilient gas and power grid is essential for national security. Currently, there are no widely accepted quantifiable metrics that adequately reflect the consequence to DCI missions from disruptions to the gas and power grids. This project answers the question: to what degree does weak resilience of the gas and power grids impact DCI mission space and what are realistic opportunities to improve that resilience both inside and outside of Department of Defense (DoD)-owned facilities?

Technical Approach:
Los Alamos extended the **GasModels** software, a network contingency analysis capability for calculating expected gas outages, to include coupled steam and hot water distribution systems. Los Alamos created a **ThermalModels** model based upon the **GasModels** and **WaterModels** formulations, and includes the interdependency between power, gas, and thermal systems. Los Alamos supported a use case to model the resilience of the coast guard facility on Kodiak Island, Alaska.

Impact:
The near-term impact of this project is a demonstrable improvement in a DCI facility's ability to understand how grid resilience can improve their resilience. By advising NAERM in using these metric formulations within their models, an additional impact has improved consideration of DCI needs within investment planning and real-time awareness at the transmission level.
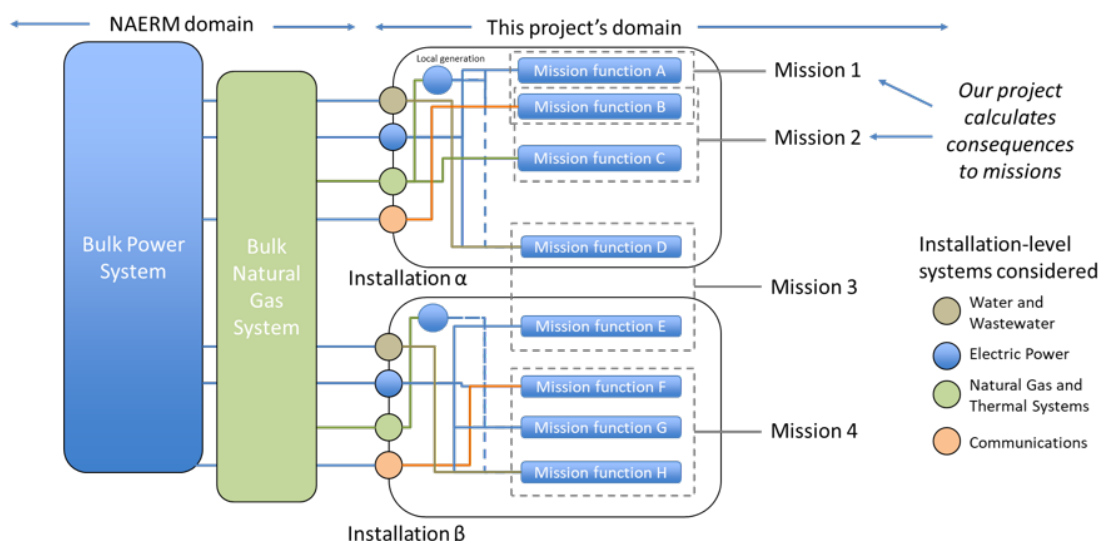

Figure 5-8: Relationship of bulk system performance to the performance of missions and DCI. This figure shows the clean handoff between the NAERM focus and this project's focus.

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