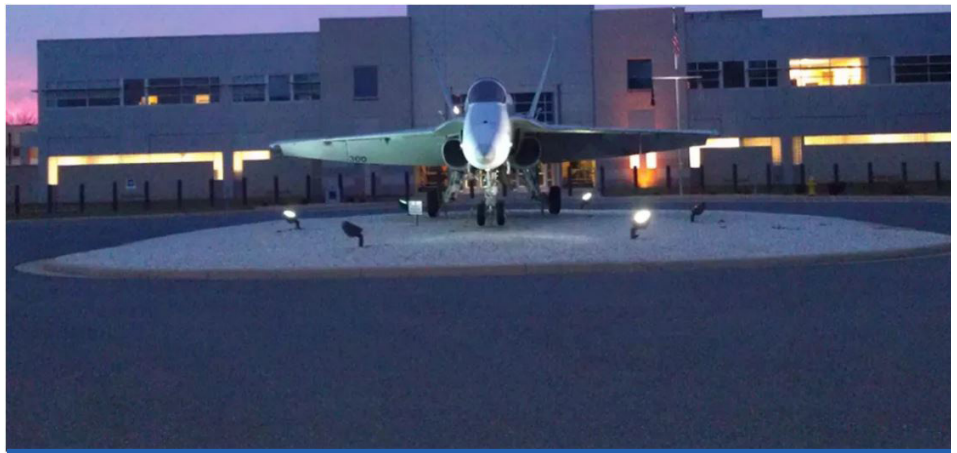


Assessing Energy and Water Resilience at the Joint Warfare Analysis Center

The Department of Defense's (DoD's) Joint Warfare Analysis Center (JWAC) completed a resilience assessment using the Federal Energy Management Program's (FEMP) Technical Resilience Navigator (TRN) in Summer 2023. This factsheet provides an overview of the process and a summary of lessons learned that may be helpful to other federal facilities interested in using the TRN or TRN Lite for a resilience assessment at their site.

Joint Warfare Analysis Center Overview

The Joint Warfare Analysis Center's mission is to provide combatant commands, Joint Staff, and other customers with effects-based analysis and precision targeting options for selected networks and nodes in order to carry out the national security and military strategies of the United States during peace, crisis, and war. JWAC has been a functional component of the U.S. Strategic Command (USSTRATCOM) since 2011 and uses information provided by the intelligence community to analyze and recommend solutions to some of the most complex solutions faced by military and civilian leaders. JWAC supports both crisis operations and contingency planning and is a tenant United States Air Force (USAF) command of Naval Support Facility (NSF) Dahlgren, Virginia.



Since its inception in 1994, the Joint Warfare Analysis Center (JWAC) has provided timely and accurate engineering and scientific analysis to military commanders and government officials to advance the national security strategy of the United States.

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The site was interested in using the Technical Resilience Navigator (TRN) after attending Energy Exchange 2022 and hearing about how it might support on-going efforts to address disruptions to site operations. The team had previously engaged with national laboratories to look at data center energy efficiency best practices and was interested to see how the TRN might inform future energy strategies. Also as a result of the conference, they wanted to know how to leverage performance contracts and other options to expand and fund on-going resilience initiatives.

Timeline

The team kicked off with an in-person meeting in January 2023 and met regularly via Teams calls through August of the same year. The JWAC team included staff who had responsibilities across facility management, cyber assurance, computer infrastructure, and operations. They took an iterative approach to completing the full Technical Resilience Navigator (TRN), working to fill out the data requirements for each module and action jointly, then reviewing input and identifying any needed updates to current or previous data. This often meant they were working on one module and then

revisiting the previous module in light of new findings or insights into their resilience posture. This process helped them to make continual progress within the TRN assessment while ensuring previously entered data reflected their most current understanding of the site and its critical loads.

Due to the sensitivity of JWAC data, as a part of the technical assistance engagement, the Pacific Northwest National Laboratory (PNNL) staff did not directly collect any site data and instead worked to provide feedback on non-classified information that was shared with them (via appropriately secured DoD communication platforms).

The team was led by Chris Chalkley, a computer scientist in the Data Platforms Directorate. "I was attracted to the TRN due to its methodological rigor and how its process could help our site better understand our resilience posture. As an analysis-based organization, we appreciated the TRN's risk modeling and sensitivity analysis capabilities to help us better understand where outstanding risk may lie. The science-based answers to "what if" scenarios really resonated with our team."

The team identified 12 resilience solutions to address technological, operational, and institutional resilience gaps. Solutions ranged from smaller procurement projects to new site policies to large-scale infrastructure projects. The solutions reaffirmed three proposed projects, helping to prioritize funding, inform execution, and positively impact energy resilience. The team had started efforts to implement several solutions at the end of the technical assistance engagement and was investigating funding mechanisms for others.

TRN Lessons Learned

The JWAC team benefitted from a strong resilience planning team lead and an engaged resilience planning team. The JWAC team met regularly during the assessment period, both internally (bi-weekly) and with FEMP technical assistance team (approximately monthly). The team found that the Baseline Development module took the longest for them to complete (approximately two months), primarily due to the scheduling of interviews with subject matter experts and then going back through Site Level Planning to make updates to their data structure and mapping to address new findings.

The team often warned itself of “analysis paralysis”, wanting every input to be perfect. In some cases, data gaps required the team to make informed judgements on inputs while noting that the lack of data itself was a type of resilience gap that could be addressed by a resilience solution. In other cases, however, chasing down an answer to the data revealed

previously unknown shortcomings with a facility or critical load. Trying to identify when the team reached a “good enough to proceed” approach required relying on informed judgement, time availability, and group agreement.

The JWAC team also leveraged the sensitivity analysis capabilities of the full TRN to explore different scenarios, such as climate change, criticality, or redundant system inputs. The team’s iterative approach to completing the TRN again informed its approach to developing solutions, as they used the sensitivity analysis results to go back and modify some of their previous TRN inputs. Additionally, the findings in the sensitivity analysis helped them to better understand which hazards drove risk across all scenarios – and would benefit from dedicated resilience solutions.

After the team identified and prioritized solutions, one challenge they noted in the Roadmap to Action module was that as a tenant site they not only faced internal constraints but also those of its host installation. They noted that cross-service (i.e., Air Force and Navy) coordination would likely add significant complexity. If they wanted to move forward with any large-scale resilience solutions, it would not only require larger funding sources, but also more significant partnership discussions with the host site as well as utility and community partners.

The JWAC team also provided valuable feedback on the TRN itself to the FEMP team, which resulted in several new features that were launched in 2024 or are in progress for 2025.

Next Steps

The result of the assessment are being used to inform future infrastructure and project investment at JWAC. The team is investigating funding options, including performance contracting as well as regular appropriated funding, to address prioritized solutions based on leadership feedback. The team is also planning on engaging with their host site to determine if any of the larger scale solutions are feasible and reflect host-site resilience priorities. Finally, the team is working to address institutional and operational gaps as funding and job responsibilities allow.

The Department of Energy’s Federal Energy Management Program would like to thank the Joint Warfare Analysis Center for their participation in the development of this Technical Resilience Navigator case study. In particular, we would like to acknowledge CAPT Taft, Mr. Chris Reinhardt, Mr. Chris Chalkley, Mr. Phil Summerson, Mr. Mike Meadows, and Mr. Jason Gordon for their support and excellent leadership in conducting the study.



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