FEMP
Federal Energy Management Program

Assessing Resilience at Argonne National Laboratory

Aerial photo of Argonne National Laboratory. *Photo credit Argonne National Laboratory*

The U.S. Department of Energy's Argonne National Laboratory (ANL) conducted a pilot study of the Federal Energy Management Program's Technical Resilience Navigator (TRN) in Lemont, IL from 2021-2022. The TRN is a step-by-step risk-informed web-based tool for energy and water resilience planning. It helps organizations identify vulnerabilities and inefficiencies in their critical energy and water systems and prioritize solutions to help mitigate outage impacts and support continuous mission operations. This factsheet provides a summary of ANL's TRN pilot study and lessons learned which may be helpful to others who are interested in leveraging the TRN's resilience planning process for their own facilities, installations, or campuses.

ANL TRN Pilot Overview

ANL is one of ten U.S. Department of Energy Office of Science laboratories and the largest national lab by size and scope in the Midwest. Argonne's Lemont campus covers over 1,500 acres in Chicago's southwest suburbs and has over 3,500 full-time employees. The lab's work encompasses: (1) conducting basic scientific research; (2) advancing computation and analysis; and (3) engineering advanced technologies. ANL operates six national user facilities that enable over 8,000 annual scientific users from universities, national laboratories, industry, and federal agencies to carry out experiments and studies not otherwise possible at their home facilities.

ANL was interested in leveraging the TRN tool and its technical resources to update its Site Resiliency Plan, a part of the lab's infrastructure resiliency mitigation strategy under the Enterprise Risk Management model for the lab. More broadly, ANL was interested in using the TRN to more closely integrate resiliency into its daily operational decision-making and become better prepared for hazard events. Results from the energy and water resilience planning at ANL will be incorporated into the project prioritization process and help inform risk-based decision making when compiling annual budgets and work plans for laboratory-wide facilities operations.

ANL contracted with a consultant to support the TRN pilot, specifically supporting data collection and analysis activities within TRN modules. The ANL assessment included ANL user facilities, health and safety functions, site operations, and research program functions at their main campus; while ANL has additional facilities outside of the main campus, these were not included in the assessment. For this pilot, ANL used the TRN to examine its energy loads, but it plans to use the TRN process to address water and wastewater loads as well in the future.

TRN Assessment Lessons Learned

The ANL team found that the TRN provided a systematic way of evaluating their resilience posture and identifying and prioritizing resilience solutions. The ANL team found that all of the modules in the TRN are well connected, and the TRN provided a reliable, repeatable and transparent methodology. The TRN also helped inform other site planning goals and requirements at ANL and helped facilitate communication of resiliency priorities across the lab. The following are two specific examples that highlight how the TRN helped the ANL team with their resilience planning:

Building a community of resilience. The ANL team conducted several community-wide briefings, including a "lunch and learn" series, to help their co-workers understand the importance of this TRN assessment. By educating their peers, the TRN team leads worked to ensure that there would be buy-in and a general understanding of the purpose of this assessment when collecting information in early TRN modules or brainstorming on potential resilience solutions.

According to Jill Ptak, Argonne Interim Strategic Planning Program Manager, "as we progressed through the TRN assessment, we recognized more and more the importance of building a resilience team that is not only made up of risk-minded subject matter experts, but also facilities/buildings-minded staff that are more intimately familiar with the facilities' condition and history." ANL also found that engaging with leadership regularly is critical. For example, having the Deputy Chief Operations Officer on their core resilience team was helpful in obtaining

Advanced Photon Source at twilight. *Photo credit Argonne National Laboratory*

buy-in during each stage of the TRN assessment and gaining wider input on the resilience solutions and prioritization.

Wide applicability of TRN outputs. Identified within each TRN action are a list of Inputs and Outputs that outline data requirements and findings from the step in the overall TRN process. For example, under the Solution Development module and Identify Solutions action, one input is a list of resilience gaps, and an output is "mapped resilience solutions to specific critical loads." When appropriate, the user is also prompted to review previously completed actions to overlay outcomes identified earlier in the TRN against the action that they are currently working on. This iterative process allows the organization to have a broader perspective towards achieving its desired resilience goals and ensures relevance of the TRN outcomes with the organization's wider objectives and priorities.

For this reason, ANL was able to apply the outputs from the TRN into the infrastructure section of the lab's Risk Management Plan. ANL was also able to use some of the risk and solutions development analysis from the TRN to inform ANL's Vulnerability Assessment and Resilience Plan (VARP) required by DOE under its Climate Adaptation and Resilience Plan (CARP), developed in response to Executive Order 14008. ANL sees other applications for the TRN outputs as well. As Jill Ptak, ANL's Interim Strategic Planning Program Manager, points out, "energy and water resilience does not just reside in the infrastructure area; it is something that can inform Argonne's Lab Plan more generally, which is a requirement for all labs." ANL plans to use the TRN outputs to inform other reporting requirements, including its enterprise risk management procedures and Continuity of Operations Plan.

Future TRN Developments Based on Pilot Findings

The TRN results in the development of a list of risk-informed resilience-enhancing solutions that are prioritized based on the reduction of risk to a site's critical loads in addition to other organizational and site priorities. The TRN team plans to enhance the ways in which users can download and share these results with relevant stakeholders and inform various reporting priorities by developing interactive data checklists and producing automated summaries of TRN findings.

The Department of Energy's Federal Energy Management Program would like to thank Argonne National Laboratory for their participation in piloting the Technical Resilience Navigator. In particular, we would like to acknowledge Catherine Hurley and Jill Ptak for their support and excellent leadership in conducting the pilot study.

Learn More Today

The TRN is a free online tool that provides agency-neutral approaches to strengthening energy and water resilience planning. Explore the TRN, its associated toolkit, and training resources at https://trn.pnl.gov

FEMP Federal Energy Management Program

For more information, visit:
energy.gov/femp

DOE/FEMP=0003 • May 2023