

Grid Resilience Technical Assistance

Using Data to Explore Historical Grid Outages

and Inform Grid Resilience Investments

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NASEO Energy Security Bootcamp

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Today's Agenda

> Grid Resilience Technical Assistance Overview

TASTI-GRID Platform Purpose Data Limitations Rollout plan Overview of Features







Grid Resilience Technical Assistance Overview

DOE Energy Security and Grid Resilience

Copersonnel across 49 states & 5 territories are participating in the cohorts. Thank you for your engagement!

Cohort Topic	Status
Risk Assessment Approaches	In-person meeting 6/12; 5th meeting on 7/30
Risk Mitigation Strategies	In-person meeting 6/12; 5th meeting on 7/25
Grid Resilience Grant Implementation	4th meeting on 7/12
Grid Resilience Metrics	3rd meeting on 6/27; in-person meeting scheduled for $7/31 - 8/1$
Regulatory Mechanisms to Support Grid Resilience	2nd meeting on 6/18; in-person meeting scheduled for $7/31 - 8/1$
Resilience Valuation Frameworks	3rd meeting on 6/5; in-person meeting scheduled for $7/31 - 8/1$
HI, AK, & U.S. Territories	8th meeting on 6/26

Collaboration among:













Clean Energy Innovator Fellowship (CEIF)

- DOE Clean Energy Innovator Fellows are early- and midcareer professionals who are placed at Host Institutions to support their grid resilience or clean energy efforts for up to two years
- Fellows receive a stipend funded by DOE and a professional development allowance
- State Energy Offices are now eligible to apply to become Host Institutions. Others eligible to apply include public utility commissions, Tribal entities, electric cooperatives, grid operators, and municipal utilities
- > DOE is funding up to 77 Fellows for 2024 cycle

Host Institution-candidate interviews and selections for the 2024 cycle are happening now.

Fellows will join Host Institutions in June-August 2024.



Case Studies and Guides



Microgrid Overview Guide



Since microgriduae not the only way to enhance energy realience, communities may ward to consider alternate realiserce investment options, including hardwing existing transmission and distribution systems, weshelving power generations to surce, and haldulary additional distribution systems to provide energy supply-industrianty. To learn more about other solutions that have lower capital costs and are leas technically complexite minicipative, see the folloceptiment (Distributions that have lower capital costs and are leas technically complexite minicipative, see the folloceptiment (Distributions that have lower capital costs and are leas technically complexite minicipative, see the folloceptiment (Distributions that have lower capital costs and are leas technically complexite minicipative, see the folloceptiment (Distributions that have lower capital costs and are leas technically complexite minicipative, see the folloceptiment (Distributions that have lower capital costs and are leas technically complexite minicipative, see the folloceptiment (Distributions that have lower technically complexite minicipative, see the folloceptiment (Distributions that have lower technically complexite end technical sections that have been technical sections that are lease technically complexite end technical sections that have been technical sections that the lower technical sections technical sections technical sections that the lower technical sections technical sections



Grid Resilience Assistance Portal



Technical Analysis examples:

- What outage threats does my state face now and how might that change under future climate scenarios?
- What are expectations about future performance of the electric system based on asset condition and climate projections?
- What are the tradeoffs between different resilience investments my state is considering?

Submit a Request Here: <u>Request Grid Resilience</u> <u>Assistance | Department of Energy</u>



Increasing Capacity to Provide Grid Resilience Technical

Assistance GDO is actively engaging National Lab, university, and industry partners with the right expertise to assist states with grid resilience planning in the following areas:

Risk assessment

- What outage threats are being faced now?
- What are key trends across the state for different climate hazards?
- Current and future state of the grid assessment
 - Which grid infrastructure components are most vulnerable to extreme weather and climate hazards?
 - What types of investments are utilities in the region making to prepare for future risk? What investments should they be considering?
- Resilience strategy tradeoffs
 - For the vulnerabilities identified, what options are recommended to enhance grid performance and resilience?
- Prioritization and valuation
 - What qualitative and quantitative aspects should be considered in grid resilience investment decision-making?
 - GDO will contact states matched to TA performers beginning in July 2024.





TASTI-GRID Platform

TASTI-GRID Purpose

Technical Assistance for States and Tribes Initiative: Grid Resilience Investment Decisionmaking

What it can be used for:

- Explore locations, frequencies, and durations of historical electric grid outages
- Understand which weather events are correlated with electric grid outages
- Analyze the extent to which disadvantaged communities may be affected by electric grid outages
- Better understand the state of the grid and inform grid resilience investments
- Highlight data gaps that may be hampering SEO's ability to use data to make decisions
- Understand what data the SEO may wish to request from industry (e.g., shape files for utility service territories) or assistance the state or federal government may wish to provide utilities
 - E.g., request shape files for utility service territories, assist smaller utilities with digitalization of outage data

What it is not meant for:

- Not a situational awareness or real-time monitoring tool
- Does not support the ESF #12 emergency response function
- Not meant to predict outage restoration times for future weather events

Due to the potentially sensitive information contained within TASTI-GRID, DOE must approve all user accounts. States should exercise caution about who gains access to the platform and for what purpose.



Important Data Caveats

Understanding the platform's limitations will help you use it wisely.

- Missing data outages within small or rural electric utilities are not as reliably captured as outages within larger utilities.
- Estimates of utility customers cannot be directly translated to population.
- Outage data has collection errors (for details, see <u>A dataset of recorded electricity outages by United States</u> <u>county 2014–2022</u> | <u>Scientific Data (nature.com</u>)
- Data quality varies by year and region of the country.
- > Data does not distinguish between transmission- and distribution-level outages.
- We make assumptions to infer what weather event may have coincided with and possibly contributed to the electric outage. DOE is conducting ongoing research to validate and verify the metrics and methodology used in the platform.

You are the expert on your state's data. If outputs on the platform seem unintuitive or surprising, please contact GDO.



TASTI-GRID Rollout Plan

The platform will continue to be improved through user feedback in Summer 2024 and beyond. TASTI-GRID will be beta tested in June-July by several state users who will provide feedback on the interface.

- ▶ If you or a colleague would like to volunteer (~1-2 hours of time) to test TASTI-GRID or if gaining access to TASTI-GRID soon would be helpful for your immediate grid planning needs, please reach out to Michele (michele.zemplenyi@hq.doe.gov).
- > We anticipate providing wider access and training to TASTI-GRID for state officials involved in grid resilience planning in August-October 2024. We will work with NASEO, NARUC, and NETL Federal Project Officers to publicize how to sign-up for an account.
- DOE will continue to improve TASTI-GRID by:
 - Responding to feedback for user interface improvement & requested features
 - Surfacing data gaps or disparities to help users make sound conclusions
 - Validating underlying methodology
 - Making it easier to overlay layers
 - Developing new data summaries to facilitate learnings
 - Improving documentation and tutorials



Thank you to our partners at Oak Ridge National Laboratory

- Supriya Chinthavali
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Feature Demo

Note: TASTI-GRID is in a beta phase of development

Use Global Filters to Select Regions and Time Frames of Interest



County Coverage - Map

Explore which counties have the highest and lowest outage reporting data coverage.



Customer Coverage – Table

Explore which counties have the highest and lowest outage reporting data coverage.

TASTI-GRID									
Covera	ge Report		Search	Q Sta	ate 🗸 County				
State	County	Year	Covered Customers	Total Customers	Percentage \downarrow				
Minnesota	Benton	2024	19,815	19,815	100%				
Minnesota	Chisago	2024	23,829	23,829	100%				
Minnesota	Houston	2024	6,686	6,686	100%				
Minnesota	Isanti	2024	20,941	20,941	100%				
Minnesota	Winona	2024	21,832	21,832	100%				
Minnesota	Dakota	2024	196,493	196,561	99%				

TASTI-GRID									
Covera	ge Report	Sear	ch	Q	State	🗸 County			
State	County	Year	Covered Customers		Total Customers	Percentage ↑			
Minnesota	Brown	2024	81		12,969	0%			
Minnesota	Cook	2024	0		4,475	0%			
Minnesota	Cottonwood	2024	0		5,413	0%			
Minnesota	Jackson	2024	0		5,166	0%			
Minnesota	Lake of the Woods	2024	0		2,744	0%			
Minnesota	Martin	2024	0		10,546	0%			



Outage Event Count

View the number of outages that took longer than 12 hours for 80% of customers to have power restored. The outage duration and restoration percentage can be adjusted as



Restoration Metrics – Impact Level

Impact Level: maximum number of customers impacted due to an extreme event



Restoration Metrics – Recovery Duration

Recovery Duration: time between when an event impacts the maximum number of customers and the end of the event



Outages Linked to Weather Phenomena

Severe thunderstorm warnings were temporally and spatially co-located with outages in the following Pennsylvanian counties.



Click on specific counties to explore the impact of individual outage



Disadvantaged Communities – Census Tracts





Contact



GDO Grid Resilience State and Tribal Formula Grants



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Thank You

