WELCOME TO THE

Joint Assessment of Resilience in Vulnerable Infrastructure Systems (JARVIS) Opportunity Informational Webinar/ Objective Strategic Session (IW/OSS)

U.S. Department of ENERGY

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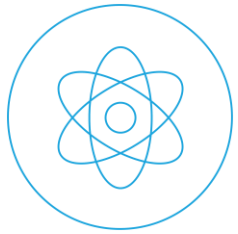
U.S. Department of ENERGY | Grid Deployment Office

Joint Assessment of Resilience in Vulnerable Infrastructure Systems (JARVIS) in the Grid

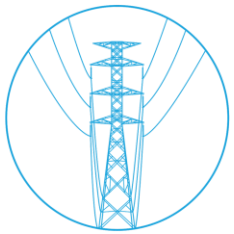
Informational Webinar/Objective Strategic Session

January 8, 2024

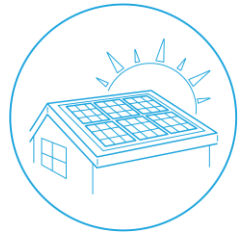
GDO MISSION AND GOALS



Ensure **resource adequacy** by supporting **critical generation sources** and expanding and enhancing **electricity markets**.



Catalyze the development of new and upgraded **high-capacity electric transmission lines** and an improved **distribution system** nationwide.



Prevent **outages** and enhance the **resilience** of the electric grid.

OVERVIEW

A Consequence-Based Approach to Climate-Proofing a Reliable and Resilient Grid

The JARVIS initiative is aimed at bolstering grid resilience and reliability. JARVIS will provide funding to utilities to enhance grid resilience against extreme weather, improve flexibility through data analytics and smart grid technologies, and facilitate the integration of distributed energy resources. A strategic approach, incorporating cost-benefit analyses and real-world testing, will ensure efficient deployment and address growing energy demands.

Objective: To provide Technical Assistance (TA) to utilities across three themes:

1. Understanding and Predicting Grid Performance – Data Analysis and Modeling
2. Identifying and Mitigating Grid Vulnerabilities – Risk Assessment and Vulnerability Evaluation
3. Strategic Planning and Execution for Grid Resiliency - Planning, Implementation and Compliance

OPPORTUNITY HIGHLIGHTS

APPLICANTS:

Teams that consist of a:

Utility (Applicant)

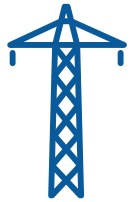
Technical Assistance Provider

FUNDING:

$35 million available

Up to ~ $1 million/each

20% cost share requirement for application components that include R&D



Timeline:

6 - 24 months

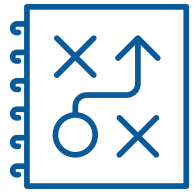
JARVIS COVERS TA ACROSS 3 THEMES

Theme 1

Understanding and Predicting Grid Performance – Data Analysis and Modeling

Theme 2

Identifying and Mitigating Grid Vulnerabilities – Risk Assessment and Vulnerability Evaluation



Theme 3

Strategic Planning and Execution for Grid Resilience – Planning, Implementation and Compliance

Applicants can apply to topics in Theme 1 *or* topics in Theme 2 and 3

TA THEMES AND TOPICS

THEME 1) UNDERSTANDING AND PREDICTING GRID PERFORMANCE – DATA ANALYSIS AND MODELING

This theme focuses on leveraging data-driven approaches to gain a deeper understanding of grid performance and predict its behavior under various operating conditions, including extreme weather scenarios. This involves sophisticated analytics, advanced modeling, and the incorporation of climate data to create highly accurate simulations. The technical assistance topics for Theme 1 are:

- **1.1 Advanced Data Analytics and Modeling**
- **1.2 Digital Twin Development**
- **1.3 Climate Data and Guidance**

Applicants can apply across topics in Theme 1

Theme 1

Understanding and Predicting Grid Performance – Data Analysis and Modeling

TA THEMES AND TOPICS

THEME 1) UNDERSTANDING AND PREDICTING GRID PERFORMANCE – DATA ANALYSIS AND MODELING

1.1 Advanced Data Analytics and Modeling

This topic centers on applying cutting-edge data analytics techniques to comprehensively analyze grid operational data. Projects will utilize advanced statistical methods, machine learning algorithms, and other innovative tools to identify patterns, predict failures, and optimize grid performance.

A key deliverable will be the development of predictive models that incorporate historical and projected weather data to accurately simulate grid behavior under various climate scenarios. This will help utilities anticipate potential problems and proactively mitigate risks.

Example milestones include:

- Data collection and model setup
- Initial simulations and preliminary analysis
- Validation of models and simulations
- Final report

TA THEMES AND TOPICS

THEME 1) UNDERSTANDING AND PREDICTING GRID PERFORMANCE – DATA ANALYSIS AND MODELING

1.2 Digital Twin Development

This involves creating highly detailed, virtual replicas ("digital twins") of specific grid infrastructure components or entire systems. By creating dynamic, interactive representations of the physical system, utilities can test various scenarios (e.g., extreme weather events, cyberattacks, equipment failures) without interrupting real-world operations. This allows for safer evaluation of resilience strategies and optimization of grid design and operations.

Deliverables would include a functional digital twin model, validated against physical data, and documentation demonstrating its use for scenario testing.

Example milestones include:

- Digital twin prototype
- Initial testing and validation
- Integration into grid planning and operations
- Final report

TA THEMES AND TOPICS

THEME 1) UNDERSTANDING AND PREDICTING GRID PERFORMANCE – DATA ANALYSIS AND MODELING

1.3 Climate Data and Guidance

This focuses on acquiring, evaluating, and utilizing climate data relevant to grid resilience planning. Projects will identify and assess the suitability of available climate data, including projected changes in temperature, precipitation, wind speed, and other relevant factors. They will address data gaps and uncertainties by integrating diverse data sources and employing advanced statistical techniques.

Deliverables will include a comprehensive assessment of climate hazards, recommendations for addressing data gaps, and guidance for incorporating climate projections into grid resilience planning.

Example milestones include:

- Climate data collection and gap analysis
- Climate guidance development
- Integration into resilience planning
- Final report

TA THEMES AND TOPICS

THEME 2) IDENTIFYING AND MITIGATING GRID VULNERABILITIES – RISK ASSESSMENT AND VULNERABILITY EVALUATION

This theme focuses on identifying and evaluating risks and vulnerabilities within the grid system to develop and implement effective resilience strategies. It emphasizes a proactive approach to risk management, enabling utilities to proactively strengthen grid infrastructure and mitigate potential failures. The technical assistance topics for Theme 2 are:

- **2.1 Risk Assessments and Resilient Strategies**
- **2.2 Failure-Mode Studies and Accelerated Lifetime Testing**
- **2.3 Asset Exposure and Vulnerability**

Applicants can apply across topics in Theme 2 and Theme 3

Theme 2

Identifying and Mitigating Grid Vulnerabilities – Risk Assessment and Vulnerability Evaluation

TA THEMES AND TOPICS

THEME 2) IDENTIFYING AND MITIGATING GRID VULNERABILITIES – RISK ASSESSMENT AND VULNERABILITY EVALUATION

2.1 Risk Assessments and Resilient Strategies

This topic centers on conducting comprehensive risk assessments for specific grid assets or systems. Projects will use localized data, including historical weather event data, to identify vulnerabilities and develop tailored resilience strategies. Back testing of past events will validate the effectiveness of proposed strategies.

Deliverables will include detailed risk assessments, specific resilience strategies, and a prioritization framework for implementing resilience measures.

Example milestones include:

- Risk assessment
- Initial resilience strategy development
- Backtesting and strategy optimization
- Full implementation of resilience strategies
- Final Report

TA THEMES AND TOPICS

THEME 2) IDENTIFYING AND MITIGATING GRID VULNERABILITIES – RISK ASSESSMENT AND VULNERABILITY EVALUATION

2.2 Failure-Mode Studies and Accelerated Lifetime Testing

This involves employing comprehensive failure-mode and effects analysis techniques to identify potential points of failure within grid components. Projects will combine analytical studies with accelerated lifetime testing to evaluate the durability and reliability of critical grid equipment under stress conditions. The aim is to improve the design, operation, and maintenance of grid equipment to enhance its resilience and extend its lifespan.

Deliverables will include an analysis of potential failure modes, recommendations for improving component design and maintenance practices, and results from accelerated lifetime tests.

Example milestones include:

- Failure-mode analysis
- Accelerated lifetime testing
- Implementation of durability improvements
- Final Report

TA THEMES AND TOPICS

THEME 2) IDENTIFYING AND MITIGATING GRID VULNERABILITIES – RISK ASSESSMENT AND VULNERABILITY EVALUATION

2.3 Asset Exposure and Vulnerability

This topic entails conducting in-depth evaluations of vulnerabilities at both the component and asset levels. Projects will assess the vulnerability of individual grid components (e.g., transformers, transmission lines, substations) to various threats (e.g., extreme weather, cyberattacks). This detailed assessment will inform the development of targeted mitigation strategies.

Deliverables will include a comprehensive inventory of critical assets, identification of their vulnerabilities, and a prioritization framework for resilience investments.

Example milestones include:

- Initial vulnerability assessment
- Initial mitigation strategies development
- Implementation of mitigation strategies
- Final Report

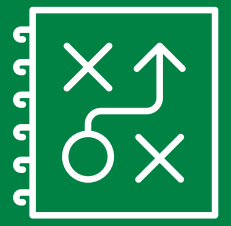
TA THEMES AND TOPICS

THEME 3) STRATEGIC PLANNING AND EXECUTION FOR GRID RESILIENCE – PLANNING, IMPLEMENTATION AND COMPLIANCE

This theme focuses on the strategic planning and practical implementation of resilience measures, ensuring compliance with all relevant environmental and sustainability standards . The technical assistance topics for Theme 3 are:

- **3.1 Investment Planning**
- **3.2 Real-World Testing and Simulations**
- **3.3 Environmental and Sustainability Standards Support**

Applicants can apply across topics in Theme 2 and Theme 3



Theme 3

Strategic Planning and Execution for Grid Resilience – Planning, Implementation and Compliance

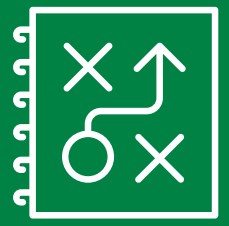
TA THEMES AND TOPICS

THEME 3) STRATEGIC PLANNING AND EXECUTION FOR GRID RESILIENCE – PLANNING, IMPLEMENTATION AND COMPLIANCE

3.1 Real-World Testing and Simulations

This involves conducting real-world testing and simulations of resilience measures under realistic conditions. Projects could use microgrids or other controlled environments to test modern technologies and strategies before widespread deployment. This will allow for effective evaluation of proposed solutions and refinement before full-scale implementation.

Deliverables will include data from real-world testing and simulations, and assessments of the performance and efficacy of the tested resilience measures.



Example milestones include:

- Testing environmental setup
- Initial tests and simulations
- Validation of resilience measures
- Final Report

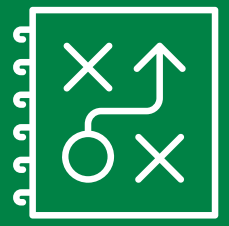
TA THEMES AND TOPICS

THEME 3) STRATEGIC PLANNING AND EXECUTION FOR GRID RESILIENCE – PLANNING, IMPLEMENTATION AND COMPLIANCE

3.2 Investment Planning

This topic will guide the prioritization of investments in grid hardening and resilience measures. Projects will use a cost-benefit analysis framework to assess the economic and societal value of various resilience improvements. This will enable utilities to make informed decisions about resource allocation and prioritize the most effective investments.

Deliverables will include detailed investment plans with cost-benefit analyses, supporting documentation and a rationale for the prioritization of projects.



Example milestones include:

- Initial cost-benefit analysis
- Draft investment plan
- Final investment plan
- Final Report

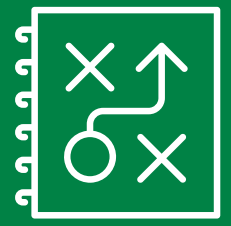
TA THEMES AND TOPICS

THEME 3) STRATEGIC PLANNING AND EXECUTION FOR GRID RESILIENCE – PLANNING, IMPLEMENTATION AND COMPLIANCE

3.3 Environmental and Sustainability Standards Support

This focuses on ensuring that resilience projects comply with all relevant environmental regulations and sustainability standards. Projects will help utilities navigate the complexities of environmental regulations and integrate sustainability considerations into their resilience planning efforts.

Deliverables will include guidance on complying with environmental regulations, recommendations for integrating sustainability into resilience planning, and documentation demonstrating compliance with relevant standards.



Example milestones include:

- Environmental impact assessment
- Sustainability strategy development
- Strategy implementation
- Final Report

APPLICATION REVIEWS WILL CONSIDER THREE CRITERIA

60%

Technical Merit

30%

Technical Approach and Management Capabilities

10%

Dissemination and Impact

REVIEW CRITERIA: TECHNICAL MERIT

60% of evaluation score

Extent to which project has the potential to improve grid resilience for customers relative to applicant-described baseline, and extent to which project is targeted to address challenges in alignment with GDO goals.

In the proposal, please:

- Describe the hazards and challenges the utility faces, the proposed project to address them, and explain how it will improve grid reliability and/or resilience for your customers. Include details on baseline infrastructure, practices and regulatory framework and/or technology, and how this project will improve grid reliability and/or resilience for your customers.
- Describe how this project would support the urgency of your information needs, or help you with overcoming resource constraints
- Provide an analysis of historical data on extreme weather events, their impact on customer outages, and the performance of grid system components, identifying correlations and informing the proposed project design.
- Demonstrate projected improvements in grid reliability and resilience by either:
    i. providing a comparative table showing before-and-after values for relevant metrics (e.g., SAIDI, SAIFI, CAIDI)
    ii. or providing a detailed justification of the qualitative improvements expected from the project.

REVIEW CRITERIA: TECHNICAL APPROACH AND MANAGEMENT CAPABILITIES

30% of evaluation score

Extent to which project is well-scoped and feasible, including identification of potential project risk and mitigation. Project is supported by a robust team structure and management. A well-thought-out budget and schedule are included.

In the proposal, please:

- Provide an overview of the areas of expertise the team brings
- Describe the team management and structure, including a brief explanation of your internal communication plan
- Include a risk assessment plan that identified potential risks, assesses their probability and impact, and outlines mitigation strategies for each.
- Provide a detailed schedule outlining key milestones and deadlines.

REVIEW CRITERIA: DISSEMINATION AND IMPACT

10% of evaluation score

Extent to which project benefits, best practices, and lessons learned are shared with the broader industry.

In the proposal, please:

- Describe how the project's benefits, best practices, and lessons learned will be shared to maximize impact on the broader energy sector. The plan should specify methods for dissemination (e.g., conference presentations, publications, collaboration with national labs) and explain how these efforts will contribute to improved operational and decision-making across the industry

IMPORTANT DATES

Applications Open	**January 8, 2025**
Office Hours Session #1	March 12, 2025 at 2 p.m. ET
Office Hours Session #2	April 9, 2025 at 3 p.m. ET
Application Deadline	**April 18, 2025 at 5 p.m. ET**
Selectees Announced	Est. May/June 2025

THANK YOU FOR ATTENDING THE

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