

Prepared for the National Association  
of Regulatory Utility Commissioners



# COORDINATED GRID RESILIENCE PLANNING: Technical Needs Assessment

January 2024



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## INTRODUCTION

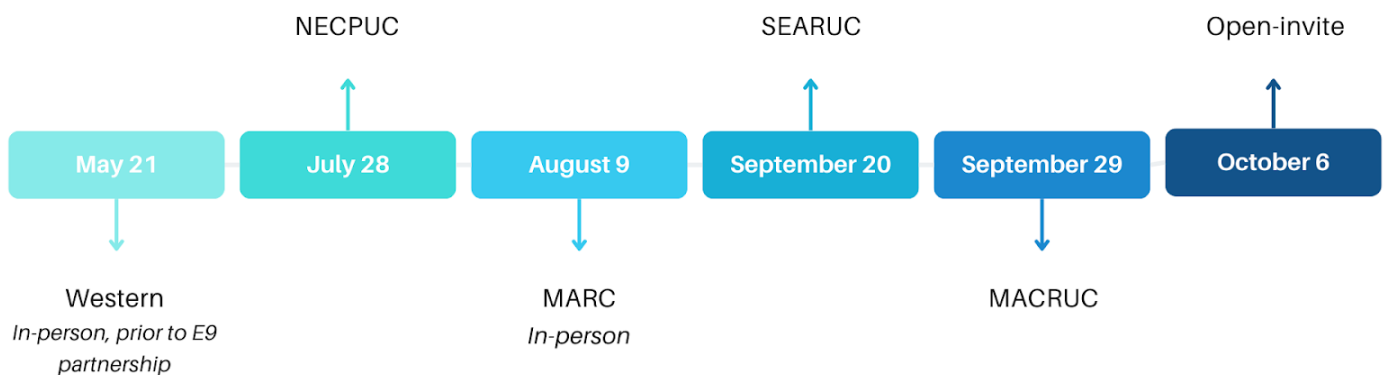
The passage of the Infrastructure Investment and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Law (BIL), appropriated billions of dollars in federal funding to enhance the resilience of electric infrastructure in the United States. Under Section 40101 'Preventing Outages and Enhancing the Resilience of the Electric Grid,' states, territories, and tribes can receive federal formula grant funding to strengthen and modernize the nation's power grid against persistent and exacerbated threats caused by the effects of climate change.

The National Association of Regulatory Utility Commissioners (NARUC) received funding from the U.S. Department of Energy Grid Deployment Office (GDO) to coordinate technical assistance opportunities for state public utility commissions to obtain funding for implementing grid resilience projects under the BIL. To achieve this goal, E9 Insight was engaged by NARUC in May 2023 to facilitate structured discussions with commissions to identify their immediate and anticipated needs related to grid resilience.

## LEVEL-SETTING REGIONAL WORKSHOPS

A total of six workshops, two in-person and four virtual, were held to assist public utility commissions identify grid resilience objectives, develop performance metrics, and identify specific needs for ongoing technical assistance.<sup>1</sup> The events were held for each NARUC regional association: Western Conference of Public Service Commissioners (Western), New England Conference of Public Utilities Commissioners (NECPUC), Mid-America Regulatory Conference (MARC), Southeastern Association of Regulatory Utility

Commissioners (SEARUC), and Mid-Atlantic Conference of Regulatory Utilities Commissioners (MACRUC). The workshops provided a venue for peer-to-peer exchange to improve planning efforts and raise awareness of roles and responsibilities for ongoing engagement. Each event featured presentations by state utility commissioners on their jurisdictions' efforts to advance grid resilience. For more information on the framework presented at each workshop, please see the Attachment.



## WORKSHOP SUMMARIES & RESOURCES

After each workshop, a summary was submitted to GDO. The general [slide deck](#) and [agenda](#) used to orient the discussion in each workshop are available

as a supplement to this report. A description of the framework used in the workshops is provided as an attachment.

1. The first workshop, held for the Western region, occurred before the E9 / NARUC partnership.

## FINDINGS

This project provided commissions with a unique opportunity to connect and discuss challenges, solutions, and lessons learned related to the advancement

of grid resilience. While conducting the workshops, participants consistently emphasized that this type of collaboration is sought after and actively needed.



### COLLABORATION



### GUIDANCE



### CUSTOMERS & STAKEHOLDERS

## COLLABORATION

- There is a need for increased coordination and collaboration between commissions and agencies within their states (intra-state) and externally (inter-state), as well as with stakeholders and other entities involved in resilience planning (e.g., utilities, community organizations) to appropriately plan and identify roles and data sharing needs.
- Participants voiced the need for more standardized resilience metrics to provide common understandings of what utilities regulators and other stakeholders should be measuring and reporting.

## GUIDANCE

- Resilience is a broad topic that spans across multiple areas of regulatory practice. Guidance is needed, as described further in the Recommendations section, to help commissions understand how resilience impacts their ability to act. Topics that commissions and public agencies identified as opportunities to expand expertise and guidance include:
  - Coordination with various state and federal agencies pertaining to Resilience Formula Grant funds and resilience planning in general
  - Definitions of grid resilience that are actionable and unique to jurisdictions
  - Vulnerability and threat assessments
  - Third-party solutions (e.g., technology)
  - Cost-benefit analyses and calculations
  - Equity considerations in various aspects of resilience planning
  - Regulatory mechanisms and how to approach investments
- Commissioners and commission staff need accessible tools and clear guidance on how to use them to successfully advance grid resilience planning. Such guidance can help commissions identify policies and practices that will allow them to set and review utility resilience efforts.

## CUSTOMERS & STAKEHOLDERS

Participants emphasized the importance of understanding different customers' resilience thresholds and expectations, and the tools to build state-specific visibility. For example, a residential customer with medical needs will have different backup power requirements, thus a different customer threshold, than an industrial facility. These differences may result in different expectations of need, value, and cost.

There is a need to strategize around involving various stakeholders in planning processes, especially around the development of equity priorities. Commissions may consider a variety of options to promote increased stakeholder participation, including workshops, informal proceedings and meetings, and holding meetings across the state or utility service area.





## RESILIENCE IN THE REGULATORY LANDSCAPE

The electricity industry is facing enormous changes and is rapidly evolving from the traditional model that has dominated the regulatory landscape for over a century. Functional silos that once operated independently are increasingly recognized as being highly interdependent. Where the industry once was able to operate with relative independence and in a relative degree of isolation, it is now inextricably linked to other sectors of the economy and government agencies that depend on the electric grid as a critical resource. This raises a new suite of questions with which public agencies and regulatory commissions must grapple.

For much of its history, the electric utility industry focused on providing safe, reliable, and affordable energy for a growing economy. These core objectives remain, but in recent decades the industry - and the regulatory bodies overseeing it - have been called upon by consumers, companies, and legislatures to layer new objectives on top of this fundamental foundation. Beginning nearly 50 years ago, the industry was called upon to add increasing amounts of clean energy and energy efficiency. In

particular, the opportunities and expectations to provide clean energy have dramatically increased in the past 20 years.

The industry has long sought to provide electricity service in an equitable manner, but evolving policy and social contexts have heightened the stakeholder community's scrutiny and expectations around equity outcomes. These concerns have established more specific priorities for what investments are made in the electric grid to ensure equity for all consumers and communities.

Additionally, our society has become increasingly reliant on digital technologies that drive our economy, communications, and critical systems. As technology innovation accelerates, it has expanded the scope of how distributed energy technologies can be used to generate, distribute, and manage energy at all scales. This opens new opportunities for consumers, businesses, and communities to operate their own energy systems in ways that can complement and support the grid. Into this dynamic technology and policy landscape, regulators are considering what it means to make the grid "resilient."

Traditionally, regulators have prioritized the “reliability”<sup>2</sup> of the grid, which measures how well these systems perform and protect against the expected disruptions inherent under normal operating conditions. However, as both the consequences of power outages increase and the frequency and intensity of severe disruptions to the grid increase, the traditional frameworks and metrics for reliability are proving insufficient. While the specific metrics remain emergent, resilience measures and characterizes the degree to which the grid can provide flexibility to avoid, withstand and recover from new suites of threats that must be faced.

This NARUC initiative on resilience begins a deliberate process to understand the state regulatory activities to support and grow resilience. It is also an opportunity to provide a snapshot of where regulators and their staff anticipate or hope that these activities will mature in the future. In this context, there are three overriding characteristics of resilience that are novel and potentially transformative to how we envision the electric grid:

1. **Distributed Resources:** Resilience solutions are often local and distributed. When the transmission and distribution systems are disrupted, customers and communities must rely on resources that are located at or near their homes and facilities. This holds the potential to fundamentally change the architecture and operating norms of the electric grid.
2. **Interagency Collaboration:** Similarly, resilience solutions demand a much higher degree of community dialogue and communication between different agencies (e.g., state commissions, state energy offices, departments of transportation) that depend on the grid to operate critical facilities, transportation systems, communications networks, and community infrastructure. This is leading to

increasingly collaborative planning processes to ensure that the grid is designed not only to deliver power, but to understand the consequences of grid failures in a far more granular way than in the past.

3. **Capital Investment:** Resilience solutions that combine distributed resources (owned and operated in most cases by consumers directly) and community infrastructure systems (typically built and managed by public entities) create the need for new approaches to regulation. These include examining how ratepayer investments can support and leverage private capital and public resources. This is an especially necessary outcome because of the enormous investments required to truly create resilient systems. It is both impractical and, in many cases, inequitable to assume that ratepayers will be able to provide all the capital required to build new grid systems, electrify transportation, and meet the demands of a highly heterogeneous society and customer base.

Inevitably, these themes infused the discussions facilitated throughout this initiative. Stakeholders engaged in this initiative expressed that these characteristics of resilience solutions - whether the use case applies to individual homes, businesses or entire communities - may dramatically change the role of the utility and, therefore, the role of the regulator.

The once-isolated domain of regulating and planning the electric grid now overlaps with various parts of the economy and other agency priorities. Nowhere is this more apparent than in planning for resilience, which involves not only understanding the requirements of utility infrastructure itself, but the impact of those requirements on holistic community resilience, including infrastructure related to transportation, water, health, and safety.

## RESILIENCE DEFINITION

In 2013, NARUC issued a report that defined resilience as, “robustness and recovery characteristics of utility infrastructure and operations, which avoid or minimize interruptions of service during an extraor-

dinary and hazardous event.”<sup>3</sup> There are a number of other entities that have released additional definitions of resilience which are listed in Chapter 1 of NARUC’s Energy Resilience Reference Guide.

2. “Reliability is the ability to maintain power delivery to customers in the face of routine uncertainty in operating conditions, as in cases of fluctuating load and generation, fuel availability, and outage of assets under normal operating conditions.” (NREL, 2022)

3. “Resilience in Regulated Utilities,” NARUC, Miles Keogh and Christina Cody at 5 (November 2013). <https://pubs.naruc.org/pub/45491EC6-FF05-559F-2B1D-85D1FC8E7042>

# COHORT RECOMMENDATIONS

While conducting the workshops, it became apparent that additional efforts that dive deeper into resilience topics and provide states with clear guidance are needed. Based on those conversations, the proposed cohorts outlined below are drawn from the facilitated discussions

with commissioners and staff and intended to tackle different challenges commissions are facing on the topic of resilience. The following NARUC-led cohorts will serve as opportunities for agencies to collaborate, coordinate, and problem-solve.

## NARUC-LED COHORTS

RESILIENCE VALUATION FRAMEWORKS	
TENTATIVE RUNTIME	February 2024 - June 2024
COHORT MEMBERS	NARUC, NASUCA, NASEO
NEED	Stakeholders expressed the need to understand existing resilience valuation frameworks and equations, particularly, a need for guidance in evaluating resilience investment proposals from utilities and comparing such proposals to other resilience solutions
DESCRIPTION	<p>States need methodologies with which to value resilience solutions and prioritize investment decisions. Most states frame this in terms of cost-effectiveness of utility investments, but resilience valuation should go beyond cost-effectiveness to also focus on the <b>prioritization of investments</b>, i.e., the question to be answered in resilience valuation is not just whether a particular investment's benefits outweigh its costs. The question is whether an investment is more cost-effective than the alternatives that provide the same amount of resilience.</p> <p>The working group will explore valuation frameworks that consider how “value” is unique to different parties (e.g., customer classes) and identify sets of benefits that may not be captured in traditional cost-effectiveness practices.</p> <p>Rather than trying to find a “standardized” resilience valuation equation, the group will develop a comprehensive list that outlines the factors that can and have been incorporated into such equations. Coupled with real world examples, this framework will provide adaptable guidance for commissions to create and adopt an equation best suited for their jurisdiction.</p> <p><b>Questions to address:</b></p> <ul style="list-style-type: none"><li>● What has “value”?<ul style="list-style-type: none"><li>● Consider private industry benefits, community benefits, societal value, environmental value, rate-payer value, shareholder value</li></ul></li><li>● What are existing methodologies for resilience valuations?</li></ul>
RECOMMENDED TOOLS	<p>Documents targeted at regulatory decisions, consisting of two major sections</p> <ul style="list-style-type: none"><li>● Comprehensive list of variables/factors for inputs in value of resilience equations<ul style="list-style-type: none"><li>● Includes examples and new methodologies needed</li><li>● Includes legislative implications, requirements, and/or directives</li></ul></li><li>● Model process for establishing a resilience valuation methodology for the state’s regulatory decisions</li></ul>



## RESILIENCE METRICS

<b>TENTATIVE RUNTIME</b>	March 2024 - July 2024
<b>COHORT MEMBERS</b>	NARUC, NASUCA, NASEO
<b>NEED</b>	Commissions and stakeholders expressed a desire for better ways to measure resilience of the electricity grid, including ensuring customer comfort, equity, and affordability.
<b>DESCRIPTION</b>	<p>The working group will identify potential metrics to measure resilience, including identifying current metrics, modifications to existing metrics, and capabilities to collect metrics.</p> <p>Potential topics to be considered in the work group:</p> <ul style="list-style-type: none"> <li>● Exploration of new and existing metrics related to resilience</li> <li>● DER topics (e.g., island capabilities, deployment forecasts)</li> <li>● EV deployment</li> <li>● Critical facilities</li> <li>● Customer-centric outage metrics</li> </ul>
<b>RECOMMENDED TOOLS</b>	<ul style="list-style-type: none"> <li>● Potential metrics that can be tracked</li> <li>● Rate implications of tracking metrics</li> <li>● Purposes of utilizing metrics for resilience planning or operations</li> <li>● Party or parties responsible for tracking metrics</li> </ul>

## REGULATORY MECHANISMS FOR GRID RESILIENCE

<b>TENTATIVE RUNTIME</b>	April 2024 - August 2024
<b>COHORT MEMBERS</b>	NARUC, NASUCA
<b>NEED</b>	Workshop participants expressed a need to better understand the different regulatory mechanisms that can be used to address grid resilience investments.
<b>DESCRIPTION</b>	<p>The cohort will discuss and evaluate existing and proposed regulatory mechanisms to provide resilience. The group should leverage existing resources, such as the <a href="#">2021 Sandia report</a>.</p> <p>Topics to be considered by the cohort:</p> <ul style="list-style-type: none"> <li>● Traditional cost of service</li> <li>● Tariff mechanisms</li> <li>● Inclusion of resilience in IRP, DRP, and resource adequacy planning processes</li> <li>● Manage utility biases for capex</li> <li>● Cost recovery of emerging technologies (e.g., SAAS)</li> <li>● Performance-based ratemaking</li> <li>● Affordability</li> <li>● Who benefits? Who pays?</li> <li>● Resilience as a service</li> </ul>
<b>RECOMMENDED TOOLS</b>	Guidebook that includes a “menu”, examples, and pros and cons of various regulatory mechanisms

RESILIENCE TECHNOLOGIES

TENTATIVE RUNTIME	August 2024 - November 2024 NARUC CPI Technology Showcase at 2024 Annual Meeting
COHORT MEMBERS	NASEO, NARUC, NCSL, NASUCA
NEED	Workshop participants expressed a desire to learn about available resilience technologies, particularly those that utilities have proposed or will propose cost recovery for in the future.
DESCRIPTION	<p>The cohort will serve as a venue for technology and solution providers to demonstrate to state agencies the current capabilities of various proven and emerging resilience technologies. The group will consider specific technologies and systems (e.g., microgrids, automation, storage), including existing technologies that utilities are proposing to deploy and upcoming technologies and trends.</p> <p>Questions for the cohort to consider:</p> <ul style="list-style-type: none"><li>• What technologies can improve grid resilience?</li><li>• What is the appropriate scale of adoption?</li><li>• How does increased dependence on DERs impact cybersecurity? Multiplies points of entry to the grid?</li><li>• How do they improve grid resilience?</li><li>• Do utilities have disincentives or incentives to invest in each technology? How can pricing policy compensate?</li><li>• What technologies are utilities investing in?</li></ul>
RECOMMENDED TOOLS	<p>Survey of the technology landscape for resilience solutions</p> <ul style="list-style-type: none"><li>• Barriers and opportunities to technology deployment</li><li>• Current costs and projected cost trends</li><li>• Visible technology innovation in research or pilot stage</li><li>• Catalog of services to owners and ratepayers</li></ul>



## ADDITIONAL NEEDS AND RECOMMENDATIONS

The facilitated discussions led during the interactive workshops with commissioners and staff identified a wide range of needs and discussion topics that might benefit from additional meetings, technical assistance or other actions that complement the

collaborative discussions that will take place in the NARUC-led cohorts. These additional needs and topics areas (including some potential actions or deliverables) are summarized below.

### 1. *Developing Shared State Definitions of Resilience*

**Need:** The specific definition of “resilience” can vary across jurisdictions and applications. There is value in establishing decision-making tools that support states in developing processes to adopt **actionable** definitions of grid resilience.

**Discussion:** State policymakers need clear, consistent, and actionable definitions of “grid resilience” that can be applied statewide to form the basis of policy and program design. These definitions will be most valuable to the extent that they go beyond a dictionary or academic definition, so that they can be applied in ways that guide specific actions. Participants emphasized the need to establish what topics or measures are in and out of scope to a resilience policy conversation. Because each state will have their own definition of “what resilience means to them,” each state should engage stakeholders in a cross-agency process to develop a unique definition applicable in that state and that can guide terminology and collaborative discussions.

Topics that require more exploration include current definitions of resilience and how actionable definitions unique to jurisdictions can be developed. Overlaps between agencies, particularly which agencies should be involved at each stage in the process, should be considered. Technical assistance support could include development of a guidance document that provides (1) a Resilience Definition Template, with customizable sections and examples, and (2) a Stakeholder Process Outline, including recommendations to ensure interagency collaboration, scope of resilience actions considered and guiding questions that can facilitate structured and comprehensive discussions.

### 2. *Interagency State Coordination and Collaboration*

**Need:** Increased coordination between agencies and clear guidance for how to do so.

**Discussion:** Challenges associated with coordination and collaboration among agencies within states (intra-state) and outside agencies (inter-state) was one of the most prevalent topics that arose in workshops. Members expressed difficulties with coordination within and between states for both grid resilience planning and operations during resilience events. Technical assistance could focus on developing a guidance document that outlines (1) a model framework for inter-agency coordination and (2) a process for ensuring participation across state agencies to enhance communication and resilience planning efforts.



### 3. Federal Funding Implications on Resilience Investments (included in cohorts)

**Need:** Increased understanding of the implications of federal funding, particularly related to BIL grants.

**Discussion:** Participants voiced questions related to the cost implications of federal funding for jurisdictions. Many of these questions are central to fundamental regulatory and cost recovery issues addressed by state commissions, such as: What parts of the BIL grid resilience cost-match funds are rate recoverable?

- What are the cost-recovery implications of federal funding programs?
- What are different states doing?
- Are there relevant tax code or tax treatment implications?
- What is the role of the utility in pursuing or facilitating federal grant applications?
- What is the role of the commission in prioritizing grant applications?

Technical assistance could focus on development of a guidance document that examines these and other questions relevant to the intersection of federal funding opportunities and state-level utility regulation, with particular attention to questions related to federal resilience funding, DOE experience and facilitation of peer-sharing opportunities.

### 4. 40101(d) Grants

**Need:** Assistance for states to facilitate applications and implementation of 40101(d) grants.

**Discussion:** Participants highlighted the potential value of receiving clarification on the evaluation criteria used for state grant programs under 40101(d), including equity considerations, value of loss load, or similar economic criteria, workforce development, etc. is needed. This information and other resources would facilitate the development of successful grant applications to further the objectives of the 40101(d) grant program. Technical assistance could include resources that provide templates materials or outline the criteria being used by various jurisdictions and grant applicants.

### 5. Vulnerability & Threat Assessments

**Need:** Guidance on the need for vulnerability and threat assessments, threat implications and interactions between agencies, and how to conduct threat assessments.

**Discussion:** Direct technical assistance to commissions and other state agencies, such as state energy offices, on how to conduct a climate-informed risk assessment and potential requirements or guidelines for utilities to conduct these assessments. Participants highlighted priority topics including scope assessments, threat interdependencies, cybersecurity, the roles and responsibilities of commissions, utilities and various state-level stakeholders. Potential resources could include recommendations addressing effective resilience definitions, threat assessment templates, potential impacts on critical facilities and discussion of the range of grid threats and actors.

### 6. Mitigation & Emergency Preparedness

**Need:** To develop a plan that addresses local, community, state, and regional wide preparedness strategies in response to threats.

**Discussion:** Participants highlighted the potential value of cross-agency collaboration that focuses on preparedness and response to emergencies across a wide range of natural, man-made and other specific risks. Technical assistance might focus on developing a framework to assist relevant agencies and stakeholders address issues such as identifying state agencies, developing evaluation processes, implementation and model resilience plans.

## 7. Workforce Development

**Need:** Enhanced understanding of workforce development challenges and actionable solutions.

**Discussion:** When discussing grid resilience investments, participants noted the workforce challenges their jurisdictions. Many commissions and utilities are facing difficulties surrounding a limited workforce to conduct necessary improvements and maintenance to the grid. Some participants from commissions and other state agencies voiced their concerns with a lack of staff to implement additional on-the-ground programs, such as community outreach programs. Conversations with a wide audience of stakeholders (e.g., utilities, state agencies, commissions, workforce) would help states develop plans to improve workforce development. A document with potential solutions and guidance to conduct these conversations could be helpful.

## 8. Regional Coordination

**Need:** Improved coordination in regions that experience similar grid resilience threats.

**Discussion:** Participants highlighted the value of regional collaboration related to specific hazards and issues, such as wildfires, hurricanes, winter storms, and extreme heat that can have regional impact. Discussion topics could include outreach strategies (especially to cities and communities), identification of relevant issues specific to the region, threat assessment implications and the role of other regional stakeholders (such as ISOs and RTOs).

## 9. Legislative Strategies

**Need:** Awareness of resilience issues and regulatory mechanisms that may require legislative action to resolve or implement and example legislative solutions.

**Discussion:** Collaborative discussions related to regulatory mechanisms that may require legislative action were highlighted as a priority topic, including equity considerations, state funding requirements and peer-sharing opportunities. Technical assistance might include a compendium of legislative actions and issues emerging from the ongoing working groups.

## 10. Equity & Affordability

**Need:** Understanding the impacts of resilience (and resilience spending) on different communities is a growing concern among regulators and stakeholders. Ensuring that resilience spending is contributing to an affordable system and that those investments treat customers equitably is a topic of increasing importance.

**Discussion:** Equity and affordability became a common theme in discussion throughout each workshop. A focus on equity and affordability in multiple resilience-related topics became a clear need for technical assistance. This topic was originally proposed as a stand-alone cohort. Following additional planning and input, equity and affordability will instead be incorporated into the Resilience Valuation Frameworks, Resilience Metrics, Regulatory Mechanisms for Grid Resilience, and the potential Resilience Technologies cohorts. Additionally, rather than being considered separately, equity and affordability should also be addressed through all additional technical assistance mechanisms that are pursued.



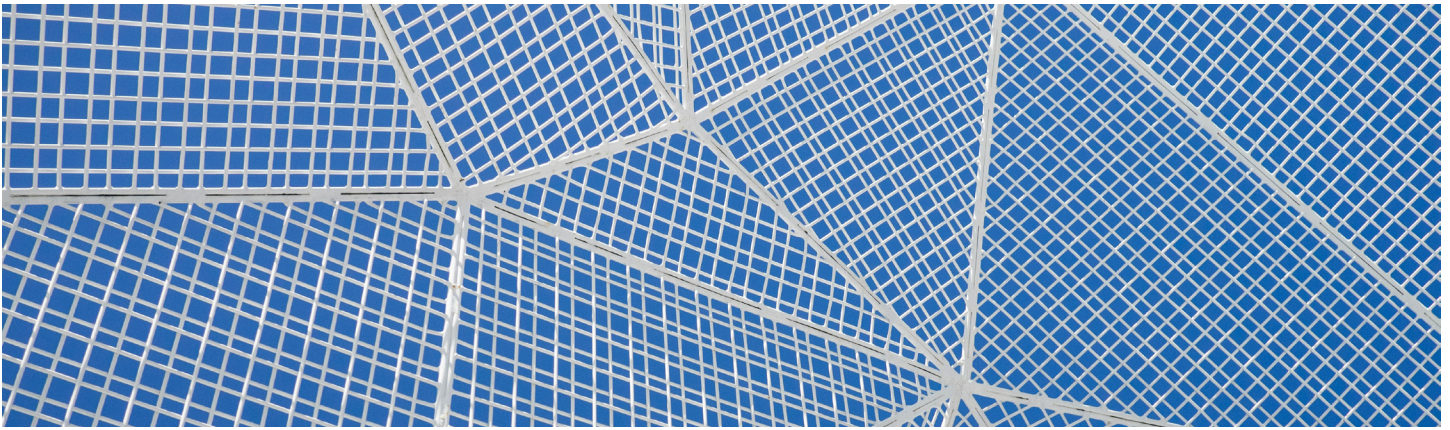
## CONCLUSION

This needs assessment is a reflection of changes occurring across the United States and how these changes are being considered by the utility regulatory community. It is increasingly imperative to focus beyond reliability. Instead, electricity consumers of all sizes and the policy makers that oversee the industry are expecting the grid to be both reliable on a day-to-day basis and resilient in the face of new challenges and flexibility requirements. The prioritization of resilience is a response to changes in the new mix of resources providing electricity, changing climate impacts and weather patterns, and evolving customer choices and community needs. In this context, it is valuable to consider how new technologies can be used to enhance grid operations and community resilience. However, it is also valuable to recognize the new

regulatory needs and expectations that accompany these new technologies. The cohorts launched through this initiative are designed to help regulators respond to this industry evolution and changing expectations for resilience in the energy systems that support customer and community needs.

A core theme that emerged in this process was the need for guidance and tools that go beyond presentations and reports. Participants consistently highlighted the value of engaging in collaborative discussions that could lead to practical applications and near-term solutions that advance resilience in the policy and regulatory communities. In other words, the technical assistance provided by this and other related initiatives should be as actionable as possible, which will shape both the outputs of this initiative as well as the stakeholder process itself.





## ATTACHMENT | WORKSHOP FRAMEWORK

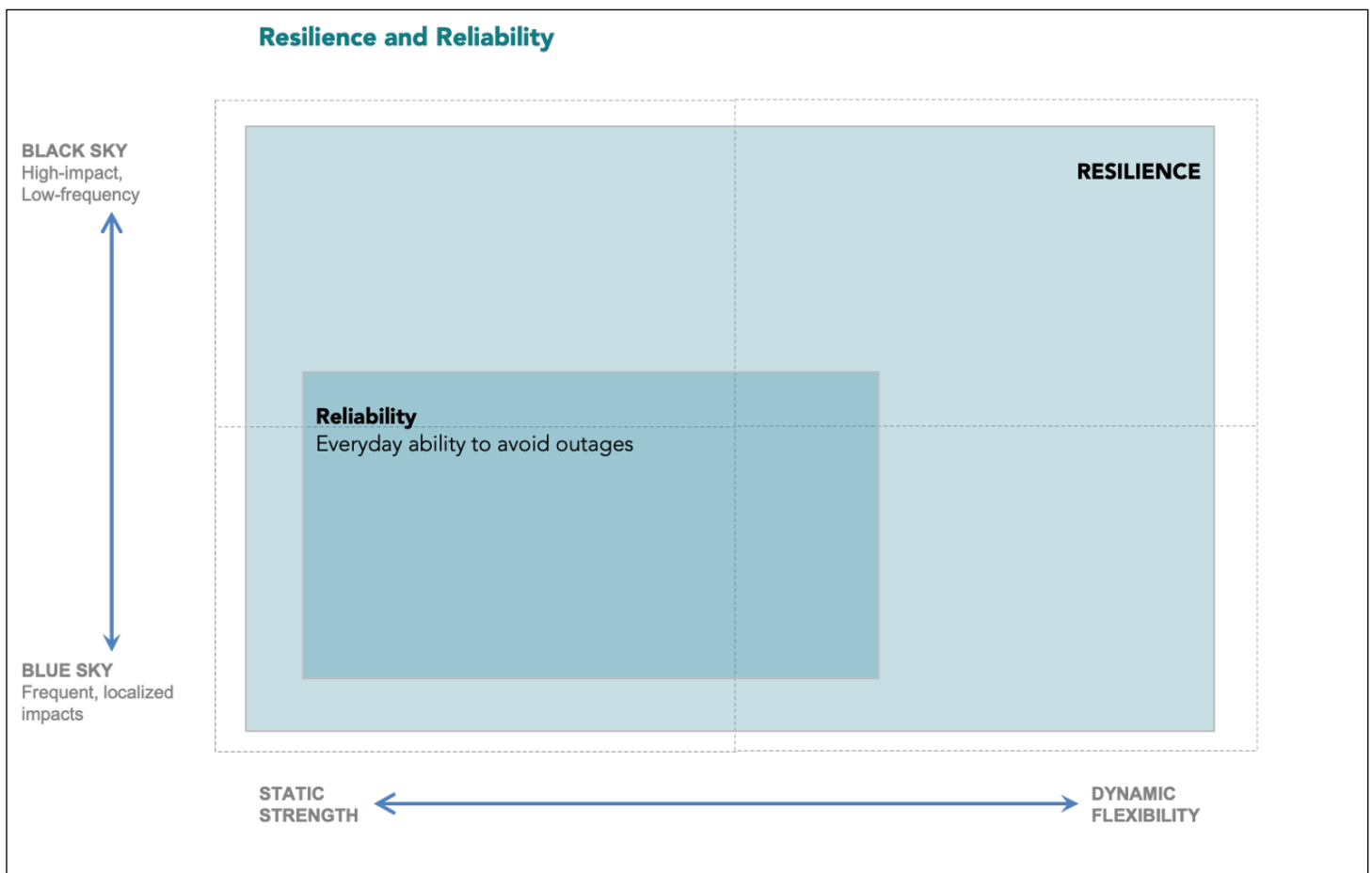
To assist the work of the facilitators and attendees to the workshops, a representative Resilience Framework was developed. The Framework was built upon the work that went into a storage industry whitepaper titled:

"Designing a Policy Roadmap to a Clean Resilient Grid". This whitepaper provided a set of standard terminology and a methodology for envisioning and designing a state level policy roadmap for grid resilience.

### RELIABILITY VS RESILIENCE

This Framework is organized around the perspective of a resilience journey and the relationship between reliability and resilience.

In order to align attendees on resilience, it was first necessary to distinguish resilience from reliability.



As depicted in this image, reliability is part of resilience, focused on specific types of risks and events. Resilience, on the other hand, deals with a broader set of risks and events. Reliability has been a focus of the electricity system for years and the industry has several metrics to measure reliability since power is either on or off. Resilience, on the other hand, addresses the ability of the system to withstand an event or action. It requires greater flexibility and responsiveness to avoid an outage, or reduce the length of an outage, due to an event or action.

Identifying the differences between reliability and resilience is important because the plans and

actions one may take also are different. Where reliability can be focused on specific actions to enhance the system's ability to provide power, such as increasing the strength of utility poles, resilience requires additional tools and organization to identify those actions and practices to help restore and respond to events. Resilience may also rely upon far more organizations and people than reliability. To help organize the workshop, and ensure that attendees were focused on resilience, as opposed to reliability, a framework was developed to walk attendees through development of a resilience journey.

## RESILIENCE JOURNEY

The concept of the resilience journey framework is organized around five components:

- Destination- Picking a moment in the future, what does a resilient grid look like for the jurisdiction? Which electricity consumers have resilience and how much resilience do they have?
- Risks- How are risks assessed and what risks are being assessed, who is responsible for providing the risk assessment, and risks are different between states and regions, and even within a jurisdiction.
- Evaluation- How is resilience being measured, how to determine which investments are cost-effective, what data is needed, is the data accurate, and are the metrics transferable.
- Mapping- How does the jurisdiction get to the destination, who needs to be part of the

journey, how are actions prioritized, how is collaboration between agencies conducted, and how are gaps being filled in.

- Embarking- What process does the jurisdiction use to determine its destination, what is the timeline for action, what is the timeline for development of the framework and what are the needs of the jurisdiction to develop the details under this framework.

A regulator could start with any component since events can happen at any time. It is also not static, that is, resilience is constant, and the regulator will need to learn throughout the journey and be prepared for what is over the next hill. This is not a one and done process; it changes and evolves throughout and after the event is over. Indeed, evaluation and flexibility flow throughout the framework.



## GEAR FOR THE JOURNEY

In addition to the components of the framework, there is a need to identify necessary gear, or policies, to help in the resilience journey. The gear represents the tools a regulator might need or use for each component. For example, to understand the risks, it may be necessary to undertake a risk assessment. So, what are the risk assessment models available

for the regulator to use to do a risk assessment and are those models specific to risks or events. Similarly, to understand the mapping component, a tool that may be used is leveraging existing capabilities and services from utility and non-utility providers. If there are already tools being used and are available, the regulator should consider using them.



## CONCLUSION

Organizing this framework around the conceptual model of a journey allows a regulator, or anyone implementing this framework, a logical organizational tool to address resilience. By organizing its actions and plans towards a resilience framework may allow the regulator to better identify appropriate actions, identify needs, and plot out a course of action to address resilience. This can then help regulators and stakeholders engage in meaningful conversations around resilience, including what it means, what is the jurisdiction's destination, who needs to be part of this conversation, and how it should be implemented. Taken together, resilience is a conversation that regulators are increasingly being asked to consider. Utilities are increasingly focused on system resilience and have begun increasing potential expenditures on the topic of

resilience. This framework can be used to help regulators not only identify what resilience means, but also recognize those investments that can help the jurisdiction on its journey to a more resilient system, but review utility plans and proposals for alignment with the jurisdiction's resilience plan and objectives. This should not be viewed as limiting regulatory actions, instead, it should be viewed as an opportunity for regulators to be better aware and prepared for the variety of risks and challenges increasingly posed to utilities. Such a framework is likely to be needed as utilities handle increasing amounts of solar and other distribution energy resources onto its system. Resilience is becoming ever more important, and this representative framework may be key to creating an organized framework for how it, the commission, is addressing resilience.