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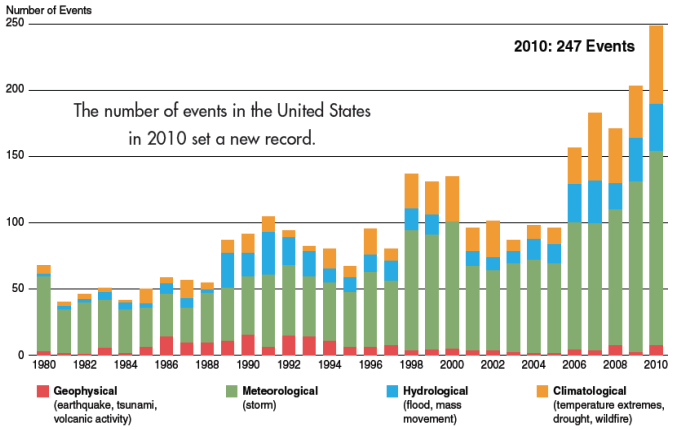
Technical Assessment of Resiliency Metrics and Analytical Frameworks



NatCatSERVICE, Munich Reinsurance America (2011)

- Examine current practices in resiliency assessment and decision-making – including metrics, risk management, and cost-benefit approaches being requested and applied by regulators, insurers, investors, and public groups
- Collaboratively advance industry understanding of emerging resiliency issues
- Identify opportunities, barriers, and key research needs for technically and economically sound approaches to assessing resiliency measures

Background and Objectives

Recent extreme events and catastrophic threats have placed "resiliency" in the spotlight for energy system operators, executives, customers, and regulators. Examples of such events include severe storms, drought, and flooding as well as cyber or physical attacks, and their impacts range from structural damage and prolonged outages to operational impacts from fuel scarcity or resource constraints to damages in the hundreds of millions of dollars. EPRI's focus on a "resilient, flexible, and connected" power sector highlights the need for expertise in this area.

Despite growing concern over the critical need to address resiliency, current resiliency efforts and analytical frameworks are diverse and lack a unifying perspective – there is no standardized framework for assessing resiliency levels or evaluating investment options. The result is that power companies face a myriad of different and inconsistent requests from regulators, insurers, investors, and public groups to assess and address their resiliency. Even within companies there is a diverse audience that must engage with resiliency, requiring cross-function coordination between subject matter experts in, for example, risk management, engineering design, corporate sustainability, regulatory affairs, and emergency response. In the absence of more appropriate metrics, the benefits of resiliency measures are being estimated with metrics that have traditionally been used for reliability planning. While there are commonalities between resiliency and reliability, there are critical differences related to the type of hazards and their "low-probability, high-consequence" nature that indicate the need for a focused research initiative on resiliency metrics on behalf of the electric power sector.

Benefits

This project has been designed to provide technical clarity and insight into the wide-ranging and evolving landscape of resiliency. Specifically, this project will provide value by collaboratively advancing industry understanding of resiliency as it relates to the electric power sector, at multiple scales (for example, asset/structure, company, and system-level). Increasingly, the issue of resiliency is expected to influence the future operating, investment, and regulatory environment for utilities. This is reflected in ongoing federal research initiatives at the Department of Energy (DOE) and Environmental Protection Agency (EPA) confronting the potential impact of variable and extreme weather conditions on the energy system and risks to society at large.[1] In April 2015, DOE formally established the Partnership for Energy Sector Climate Resilience, an agreement with 18 electric utilities to develop and pursue strategies to reduce climate and weather-related

[1] See for example, DOE's US Energy Sector Vulnerabilities to Climate Change and Extreme Weather and EPA's Climate Change Impacts and Risks Analysis (CIRA).

vulnerabilities. EPRI's parallel and coordinated research in this area will be a complementary effort intended to advance long-term understanding of resiliency. This topic is timely and worth a sustained research focus to ensure that the electricity industry is aware of key issues and well-positioned to respond in a proactive manner.

Project Approach and Summary

EPRI will conduct a technical assessment of metrics and analytical policy frameworks relevant to electric power sector resiliency at various scales and from the perspective of various hazards, such as catastrophic events and weather or climate extremes. Project participants will help prioritize topics to collaboratively advance industry understanding of resiliency issues. This work aims to identify key research needs as well as opportunities and barriers for evaluating resiliency decisions.

Deliverables

Outreach and communication: This ongoing deliverable will engage participants via regular webcasts to discuss project insights, engage with outside experts and stakeholders, and identify emerging issues. In addition, semi-annual in-person meetings will highlight project developments as well as best practices for the electric power sector. This project will provide an interactive and facilitated forum, enabling members to share industry perspectives and build resiliency understanding.

Year 1 – Survey of resiliency metrics and practices: EPRI will review the current landscape and state of the art related to resilience including, but not limited to, metrics for measuring resiliency levels and resiliency investments (for example, vulnerability, exposure, impacts, likelihood, costs, and benefits). This survey will evaluate existing reliability metrics and tools like the Interruption Cost Estimate (ICE) calculator, and also cover measures being proposed outside of the industry, including by government agencies, NGOs, and third-party organizations like insurance companies and financial reporting entities. This assessment will leverage EPRI's demonstrated thought leadership in the realm of sustainability metrics and maturity, and similarly provide technical clarity on the concept of resiliency. EPRI will synthesize these learnings and approaches, identifying commonalities or conflicts, and publish an initial technical report deliverable.

Year 2 – Technical evaluation: EPRI will build on the year-one inventory of resiliency metrics and tools, seeking to evaluate the purpose (for example, regulatory, benchmarking, decision-making) and technical validity of these frameworks, as well as identifying how they have been applied across the industry. This evaluation could cover experiences and best practices via facilitated dialogue and/or structured interviews, informing EPRI's technical review and future research priorities with a company-focused, decision-relevant perspective. The final deliverable will be a comprehensive publication on resiliency metrics and frameworks, discussing opportunities and barriers as well as key research needs for evaluating planning and investment decisions.

Price of Project

The price to participate is $40,000 per year for two consecutive years. Companies that fund any EPRI program can use Self Directed Funds (SDF) to participate in this project. Companies that have not purchased any EPRI program may participate through co-funding.

Project Status and Schedule

The project would begin during the first half of 2016 and run for two years as described with on-going outreach and communication. In the second year of the project, EPRI will coordinate with participants to assess the value of continuing the work with a Phase II focused on applying analytical frameworks to assess resiliency at various scales or levels (for example, asset/structure, company, and power system), leveraging EPRI's expertise in energy system analysis with tools such as the US-REGEN model.

Who Should Join

Companies interested in understanding metrics, frameworks, and issues related to resiliency for the electric power sector.

Contact Information

For more information, contact the EPRI Customer Assistance Center at 800.313.3774 (askepri@epri.com).

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