

National Infrastructure Advisory Council (NIAC)



A Framework for Establishing Critical Infrastructure Resilience Goals Working Group

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Overview

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Objectives

- Describe and clarify sector-specific resilience strategies and practices, and how they can serve as the basis for setting sector-specific resilience goals.
 - Assess how CIKR sectors currently use resilience practices and strategies to mitigate operational risk.
 - Develop a process to assist sectors in discerning resilience goals.
 - Recommend government policies and practices that will enhance resilience in CIKR sectors.

Study Approach and Scope

- Use sector case studies to develop and refine the resilience goals framework.
- Case Study Process:
 1. Assess current resilience practices and strategies.
 2. Assess sector resilience in “stressed” state.
 3. Develop a process for developing sector goals.
 4. Identify policies and practices to enhance sector resilience.
- Emphasis placed on the electricity sector.
 - Nuclear sector completed Comprehensive Reviews.
- Avoided formulating goals for the sectors.

NIAC and Study Group Members

- **Mike Wallace**, Vice Chairman, Constellation Energy; Chairman, Unistar Nuclear Energy; Chairman, Constellation Energy Nuclear Group; **Study Group Chair, NIAC Member**
- **Al Berkeley**, Chairman, Pipeline Trading Systems; **Study Group Chair, NIAC Vice-Chair**
- **Michael Assante**, former Vice President and Chief Security Officer, North American Electric Reliability Corporation (NERC)
- **William Ball**, Executive Vice President and Chief Transmission Officer, Southern Company
- **Terry Boston**, President and CEO, PJM Interconnection
- **A. Christopher Burton**, Senior Vice President, Baltimore Gas and Electric Company
- **Gerry Cauley**, President and CEO, North American Electric Reliability Corporation (NERC)
- **Jeff Dagle**, Chief Electrical Engineer, Pacific Northwest National Laboratory
- **Ken Daly**, President and CEO, National Association of Corporate Directors
- **Kenneth DeFontes**, President and CEO, Baltimore Gas and Electric Company
- **Jose Delgado**, former President and CEO, American Transmission Company
- **Mark Engels**, IT Risk Management, Dominion Resource Services
- **Ed Goetz**, Executive Director – Corporate and Information Security, Constellation Energy
- **Scot Hathaway**, Vice President – Transmission, Dominion Virginia Power
- **Robin Holliday**, Johns Hopkins University Applied Physics Laboratory, Joint Operations and Analysis Program Area Manager
- **Paul Koonce**, CEO, Dominion Virginia Power
- **Robin Manning**, Executive Vice President – Power System Operations, Tennessee Valley Authority (TVA)
- **Bill Muston**, Manager – Research & Development, Oncor Electric Delivery Company
- **Dan Sadler**, Program Manager – Business Continuity, Constellation Energy
- **Debra van Opstal**, Senior Fellow, Resilience Policy, Center for National Policy

CEO Roundtable and Contributors

- **Don Benjamin**, Executive Director, North American Transmission Forum
- **Stephen Flynn**, President, Center for National Policy
- **Al Fohrer**, CEO, Southern California Edison
- **Gary Fulks**, General Manager, Sho-Me Power Electric Cooperative
- **Bill Gausman**, Senior Vice President – Asset Management, Pepco
- **Keith Hardy**, Vice President – Distribution, Florida Power and Light Company
- **Mary Heger**, Vice President – Information Technology, Ameren
- **Shane Hilton**, General Manager – Retail Operations, Cleco Power, LLC
- **John Houston**, Vice President – Transmission Substation Operations, CenterPoint Energy
- **John McAvoy**, Senior Vice President, ConEdison
- **Paul Murphy**, President and CEO, Independent Electricity System Operator
- **John Procario**, Chairman, President, and CEO, American Transmission Company
- **Scott Prochazka**, Senior Vice President – Electric Operations, CenterPoint Energy
- **Ron Ragains**, Vice President – Electric Transmission, Northern Indiana Public Service Company
- **Joe Rigby**, CEO, Pepco Holding Company
- **Jack W. Roe**, Director, Security Integration and Coordination, Nuclear Energy Institute
- **Jim Turner**, Group Executive; President and CEO – U.S. Franchised Electric and Gas, Duke Energy
- **Mark Weatherford**, Vice President and Chief Security Officer, North American Electric Reliability Corporation

Resilience Construct



*Based on Stephen Flynn and NIAC definitions

Electricity Case Study Inputs

Establish a Baseline of Resilient Practices



Identify “Gaps” in Resilience for High Impact Events



Propose Private and Public Sector Roles and Actions to Achieve Greater Resilience

INPUTS



- *18 Interviews*
- *20 Study Group Discussions*
- *>100 Studies Reviewed*

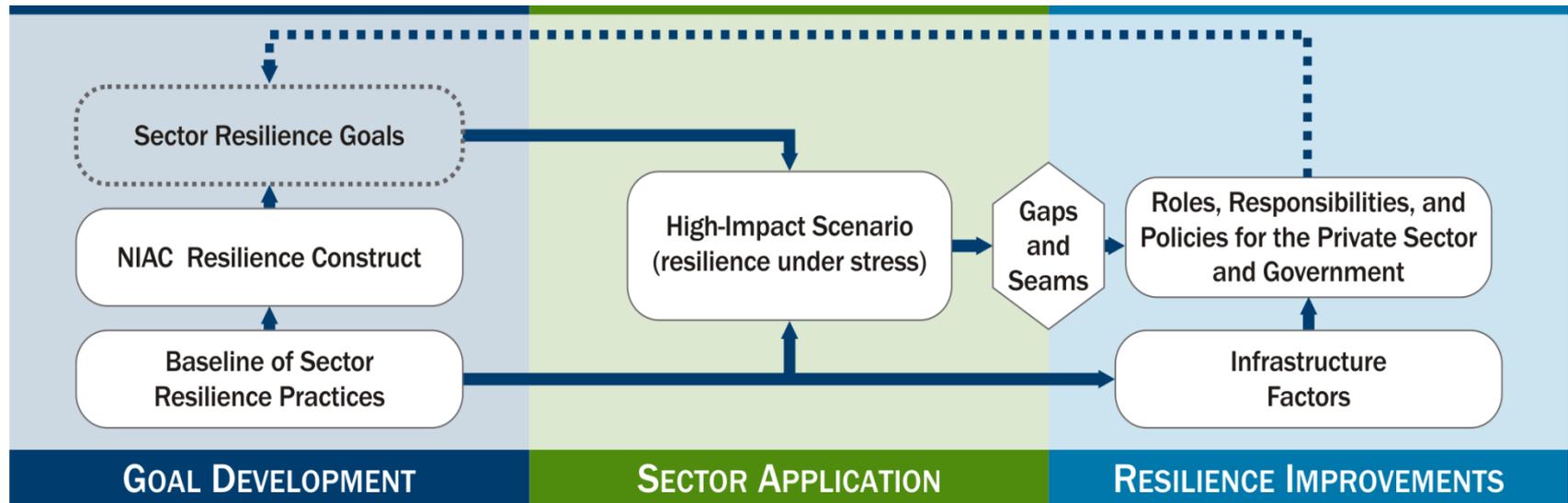


- **Stress Test Exercise**
- *Other Grid Exercises*
- *Interviews*



- **CEO Roundtable**
- *Study Group Deliberations*
- *Interviews*

Basis for Setting Sector-Specific Goals



1. Baseline of sector resilience practices established using the resilience construct; prospective goals developed.
2. High-impact scenario used to reveal gaps and seams in sector resilience.
3. Public/private sector responsibilities and policies examined to address gaps.
4. Sector goals developed and refined.

Key Messages

- The electricity and nuclear sectors are extremely resilient, but emerging risks are proving challenging.
- Infrastructure resilience is a shared responsibility that requires the distinct expertise, capabilities, and combined resources of the private and public sectors.
- Sector owners and operators are best equipped to design, build, operate, and maintain their infrastructures, aided by government information sharing, a reinforcing regulatory environment, and key resources during major disasters.
- The public-private partnership is the most effective strategy for achieving infrastructure resilience, but senior executive leadership and participation should increase.

Findings: Resilience in the Electricity and Nuclear Sectors

1. The U.S. electricity and nuclear sectors are highly reliable and resilient. However, the scope and depth of the resilience practices used routinely by these sectors are not well understood or communicated.
2. Electricity and nuclear sector practices suggest an implied set of sector goals based on the framework for resilience:
 - Withstand a shock from any hazard with no loss of critical functions.
 - Prevent a power disruption from cascading into interconnected systems.
 - Minimize the duration and magnitude of power outages through rapid recovery strategies.
 - Mitigate future risks by incorporating lessons from past disruptions, simulations and exercises, and sound risk assessment processes.

Findings: The Emerging Risk Landscape

3. The risk landscape is changing in ways that may affect both the reliability and resilience of the electric power sector.
4. Increased cyber monitoring and control of the electric grid has reshaped risks in ways that are not fully understood.
5. Cross-sector risks faced by the electricity sector include fuel supply, telecommunications and IT, transportation, and water.

Findings: Challenges and Opportunities to Increasing Resilience

6. The limited availability of extra-high-voltage transformers in crisis situations presents a potential supply chain vulnerability.
7. The ability of utilities to achieve greater levels of resilience is constrained by market, regulatory, and technical factors.
8. Government information sharing on risks to the electricity sector has improved, but more can be done.

Findings: Challenges and Opportunities to Increasing Resilience

9. Restoration planning, including black start capabilities, provides an effective measure of recovery but deserves more focused attention.
10. Boards of directors at power companies receive a high volume of risk information but it remains difficult to communicate and quantify operational risks in a rapidly changing risk environment.

Recommendations

1. The White House should initiate an executive-level dialogue with electricity and nuclear sector CEOs on the respective roles and responsibilities of the private and public sector in addressing high-impact infrastructure risks and potential threats, using an established private sector forum for high-level, trusted discussions between industry executives and government leaders.
2. The nuclear and electricity industries should each develop an emergency response plan that outlines a coordinated industry-wide response and recovery framework for a major nationwide disaster.

Recommendations

3. DHS and other federal agencies should improve information sharing with the private sector by providing focused, actionable, open-source information on infrastructure threats and vulnerabilities.
4. All critical infrastructure sectors should consider adopting the industry self-governance model exemplified by the Institute of Nuclear Power Operations (INPO) and the North American Transmission Forum (NATF) to enable the private sector to collaborate on industry-wide resilience and security issues outside the regulatory compliance process.
5. Promote the use of the NIAC-developed framework for setting resilience goals in the CIKR sectors and providing a common way to organize resilience strategies within federal and state governments and CIKR sectors.

Recommendations

6. DHS should support modeling and analysis studies of the cross-sector economic impacts of CIKR failures using tools such as input-output analysis.
7. Federal and state agencies should allow cost recovery for utility investments that increase infrastructure resilience.
8. Electricity industry and government leaders should pursue options to mitigate supply chain vulnerabilities associated with extra-high-voltage transformers.
9. The federal government should work with owners and operators to clarify agency roles and responsibilities for cyber security in the electricity sector, including those for cyber emergencies and highly sophisticated threats.

Questions

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