



Surviving a Catastrophic Power Outage

Quarterly Business Meeting

December 13, 2018

NIAC The President's National
Infrastructure Advisory Council

Agenda

- ▶ Review Background
 - Scoping Effort Overview
 - National Security Council (NSC) Tasking
 - Study Approach
 - Catastrophic Power Outage Definition
- ▶ Discuss Recommendations
- ▶ Answer Questions

Scoping Effort Overview

- ▶ Tasked to identify the gaps, challenges, or questions related to a catastrophic power outage
- ▶ Interviewed **21 senior leaders** and subject matter experts from federal/state government and industry
- ▶ Reviewed more than **350 resources**, including statutes, regulations, reports, articles, and prior studies
- ▶ Identified **8 key areas of inquiry** for in-depth examination
- ▶ Completed in June 2018

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NSC Tasking Background

The Nation has made significant advancements in emergency response and recovery planning over the past decade in response to the growing occurrence of complex disasters.

Given the interconnected nature of critical systems and networks, new broad-scale approaches are needed to adequately prepare for, respond to, and recover from catastrophic disasters that can create significant power outages with severe cascading impacts to multiple critical sectors.

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NSC Tasking (issued May 21, 2018)

- ▶ The desired outcome of this study is a greater understanding of ***how the public and private sectors can work together*** to further enhance and integrate critical infrastructure resilience with response and recovery actions ***to mitigate the risks posed by catastrophic power outages.***
- ▶ Using the insights gathered during the current scoping effort, the NIAC should develop findings and actionable, pragmatic recommendations.

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NSC Tasking Questions (1/2)

1. What investments, including approaches to increase resilience and reliability, are needed in infrastructure systems and supply chains to minimize the duration, extent, and recovery time for long-duration, large-scale power outages? What are the roles of the private and public sectors in these investments?
2. What critical factors are required to sustain national security; operations within the banking and finance, public health and medical, communications, transportation, and water sectors; and the integrity of the national and regional economies during efforts to restore electric power?

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NSC Tasking Questions (2/2)

3. What is the nation's readiness to prioritize and coordinate resource sharing among federal, state, and private entities during catastrophic power outages that will mitigate cascading impacts across the lifeline functions?
4. To what extent are regional and national-level vulnerabilities to catastrophic power outages understood, given the diversity and complexity of North American electric generation, transmission, distribution, and storage configurations and markets?
5. Where does the *Power Outage Incident Annex to the Response and Recovery Federal Interagency Operational Plans* fit within the context of public-private preparedness activities?

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Study Approach

- ▶ Built on the NIAC Catastrophic Power Outage Scoping Study completed in June 2018
- ▶ Formed a Study Group of 13 subject matter experts to vet and validate the 8 key areas of inquiry identified in the scoping effort (see Appendix)
- ▶ Conducted interviews with senior leaders in government and industry:
 - **Working Group:** interviews with 20 senior leaders and experts
 - **Study Group:** 6 panels with 24 experts between July-September
- ▶ Conducted background research on statutes, regulations, reports, articles, and prior exercises

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Catastrophic Power Outage Definition

- ▶ An event beyond modern experience that exhausts or exceeds mutual aid capabilities
- ▶ Likely to be a no-notice or limited-notice event that could be complicated by a cyber-physical attack
- ▶ Long duration, lasting several weeks to months due to physical infrastructure damage
- ▶ Affects a broad geographic area, covering multiple states or regions and affecting tens of millions of people
- ▶ Causes severe cascading impacts that force critical sectors—drinking water and wastewater systems, communications, transportation, healthcare, and financial services—to operate in a degraded state

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Recommendation Overview



Design a National Approach for Catastrophic Power Outages

Design a national approach for catastrophic power outage planning, response, and recovery to create a cross-sector, cross-government strategy.



Mitigate Cross-Sector Interdependencies and Cascading Failures

Identify cascading failures impacting key sectors, especially natural gas supply and communications, to ensure their availability to aid power restoration, and identify actions to improve resilience to a catastrophic power outage.



Rec. 1: Federal Authorities

- ▶ Examine and clarify the federal authorities that may be exercised during a catastrophic power outage and grid security emergency and clearly identify the cabinet-level leadership and decision-making processes.

Lead: Secretary of Homeland Security

Support: Department of Energy (Primary), Department of Defense, and other agencies as appropriate



Rec. 2: Federal Design Basis

- ▶ Develop a federal design basis and the design standards/criteria that identify what infrastructure sectors, cities, communities, and rural areas need to reduce the impacts and recover from a catastrophic power outage.

Lead: Secretary of Homeland Security

Support: Department of Energy (Primary), National Risk Management Center, National Institute of Standards and Technology Community Resilience Program, Council of Economic Advisers, and other federal agencies as appropriate

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Rec. 3: Community Enclaves

- ▶ Develop guidance and provide resources for states, territories, cities, and localities to design community enclaves—areas that co-locate critical services and resources to sustain surrounding populaces, maintain health and safety, and allow residents to shelter in place.

Lead: Secretary of Homeland Security

Support: Federal Emergency Management Agency (Primary), Cybersecurity and Infrastructure Security Agency (Primary), Department of Energy, and the National Institute of Standards and Technology Community Resilience Program

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Rec. 4: Incentives Portfolio

- ▶ Design and support a portfolio of incentives that provide financial support or remove financial and regulatory barriers to help companies, nongovernmental organizations, and state, local, tribal, and territorial governments implement the recommendations included in this report.

Lead: Secretary of Treasury

Support: Secretaries of the relevant Sector-Specific Agencies (Primary), Federal Energy Regulatory Commission, and other federal agencies as appropriate

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Rec. 5: Regional Exercises

- ▶ Conduct a series of regional catastrophic power outage exercises that identify the second- and third-order cascading failures of an outage over time, as backup resources and mutual aid agreements are exhausted, and examine cross-sector supply chain and cyber risks that could delay re-energizing the grid.

Lead: Secretary of Energy

Support: Federal Emergency Management Agency (Primary), North American Electric Reliability Corporation (Primary), Department of Homeland Security, and Federal Energy Regulatory Commission

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Rec. 6: Natural Gas Assurance

- ▶ Ensure that all critical natural gas transmission pipeline infrastructure has the appropriate standards, design, and practices to continue service during a catastrophic power outage and maintain rapid availability to support blackstart generation.

Lead: Secretary of Energy

Support: Department of Transportation (Primary),
Transportation Security Administration, North American
Electric Reliability Corporation, Federal Energy Regulatory
Commission

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Rec. 7: Survivable Communications

- ▶ Develop or support a flexible, adaptable emergency communications system that all sectors can interoperably use, that is self-powered, and is reasonably protected against all hazards to support critical service restoration and connect infrastructure owners and operators, emergency responders, and government leaders.

Lead: Secretary of Homeland Security

Support: Department of Defense (Primary), Department of Energy, Federal Communications Commission

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Moving Forward: A Call to Action

- ▶ Magnitude of the threat requires:
 - Federal leadership
 - Strong public-private collaboration
- ▶ Request an update by the NSC within 9 months on:
 - Implementation progress
 - Progress of ongoing initiatives
 - Any implementation barriers

Questions?

Appendix

Working Group Members

Co-Chair: Connie Lau, President and CEO, Hawaiian Electric Industries, Inc.

Co-Chair: Bill Fehrman, President and CEO, Berkshire Hathaway Energy

Jan Allman, President, CEO, and General Manager, Marinette Marine Corporation

Dr. Georges Benjamin, Executive Director, American Public Health Association

William Terry Boston, Former CEO, PJM Interconnection

Ben Fowke, Chairman, President, and CEO, Xcel Energy

George Hawkins, Former CEO and General Manager, District of Columbia Water and Sewer Authority

Joan McDonald, Director of Operations, Westchester County, NY

Beverly Scott, Ph.D., CEO, Beverly Scott Associates, LLC; former General Manager, Massachusetts Bay Transportation and Rail, and Transit Administrator for the Commonwealth of Massachusetts

Mike Wallace, Former Vice Chairman and COO, Constellation Energy

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Working Group Interviews (1/2)

1. **Robert Blue**, Executive Vice President and President and CEO-Power Delivery Group, Dominion Energy
2. **Jeffrey Byard**, Associate Administrator, Office of Response and Recovery (ORR), Federal Emergency Management Agency (FEMA)
3. **Carlos J. Castillo**, Associate Administrator, Resilience, FEMA
4. **Stephen A. Cauffman**, Research Engineer, Community Resilience Program, National Institute of Standards and Technology (NIST)
5. **Christina Cody**, Director of Energy Sector Resilience, National Security Council (NSC)
6. **Jimmie Collins**, Senior Advisor to U.S. Indo-Pacific Command (USINDOPACOM), U.S. Department of Energy (DOE)
7. **Lt. Gen. Reynold Hoover**, Deputy Commander, U.S. Northern Command (NORTHCOM)
8. **Maj. Gen. Donald E. Jackson Jr.**, Deputy Inspector General, Office of the Inspector General, U.S. Army; former Deputy Commanding General, Civil and Emergency Operations, U.S. Army Corps of Engineers (USACE)
9. **Chris Krebs**, Director, Cybersecurity and Infrastructure Security Agency (CISA), U.S. Department of Homeland Security (DHS)

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Working Group Interviews (2/2)

10. **Bob Kolasky**, Director, National Risk Management Center (NRMC), DHS
11. **Mark Lauby**, Senior Vice President and Chief Reliability Officer, North American Electric Reliability Corporation (NERC)
12. **John McAvoy**, Chairman, President, and CEO, Consolidated Edison, Inc.
13. **Arthur Ray**, Director, Critical Infrastructure Policy, NSC
14. **Louis Renjel**, Vice President, Federal Government Affairs and Strategic Policy, Duke Energy
15. **James Robb**, President and CEO, NERC
16. **Lt. Col. Brad Smith**, Homeland Defense, Defense Support to Civil Authorities, USINDOPACOM
17. **Mark Stephens**, City Manager, New Bern, North Carolina
18. **Paul Stockton, Ph.D.**, Managing Director, Sonecon LLC; former Assistant Secretary of Defense for Homeland Defense and Security Affairs
19. **James P. Torgerson**, CEO, Avangrid, Inc.
20. **Bruce Walker**, Assistant Secretary, Office of Electricity (OE), DOE

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Study Group Members

Co-Chair: Scott Seu, Senior Vice President, Hawaiian Electric Company

Co-Chair: Peter Grandgeorge, National Security and Resiliency Programs Advisor, MidAmerican Energy

Scott Aaronson, Vice President, Security and Preparedness, Edison Electric Institute

Ted Basta, Chief Executive, TJB Transit Consultant Services

Kathryn Condello, Director, National Security and Emergency Preparedness, CenturyLink

Randy Crissman, Senior Reliability and Resilience Specialist, Utility Operations, New York Power Authority (NYPA)

Kimberly Denbow, Senior Director of Security, Operations and Engineering Services, American Gas Association

Michele Guido, Business Assurance Principal, Southern Company

Suzanne Lemieux, Manager, Midstream and Industry Operations, American Petroleum Institute

Nathaniel T. Millsap Jr., Director, Industrial Security and Technology, Marinette Marine Corporation

Frank Prager, Vice President, Policy and Federal Affairs, Xcel Energy

Jonathan Reeves, Americas, Resiliency Lead, Facebook; former Chief, Office of Emergency Management, District of Columbia Water and Sewer Authority

Saul Rojas, Vice President, Technical Compliance, NYPA

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Study Group Interviewees and Panelists (1/2)

1. **Keith Adams**, Vice Chair, National Voluntary Organizations Active in Disaster (NVOAD); Chair of the New Jersey VOAD
2. **Allen Bintz**, Principal Solutions Architect, Strategic Government, CenturyLink
3. **Michael Bryson**, Vice President, Operations, PJM Interconnection LLC (PJM)
4. **Janice K. Devers**, Director, Tariffs and Regulatory Affairs, Algonquin Gas Transmission, LLC
5. **Antonio L. Fernández**, Director, Latinos for Healthcare Equity
6. **Dr. Eric Goralnick**, Medical Director, Emergency Preparedness, Brigham and Women's Hospital (BWH)
7. **Brian Harrell**, Managing Director, Enterprise Protective Services, Duke Energy Corporation
8. **Trevor Hines**, Lead of Operations Information and Communications, Midcontinent Independent System Operator (MISO)
8. **Jesse Levin**, Founder, Tactivate
9. **Dave McCurdy**, President and CEO, American Gas Association (AGA)
10. **James Merlo**, Ph.D., Vice President and Director of Reliability Risk Management, NERC
11. **Manuel Miranda**, Senior Vice President of Power Delivery, Florida Power & Light Company (FPL)
12. **Jay Montgomery**, Vice President, Corporate Security and Business Continuity, Kinder Morgan Energy Partners; Chair, Oil and Natural Gas (ONG) Sector Coordinating Council (SCC)

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Study Group Interviewees and Panelists (2/2)

14. **Chris Oberg**, Principal Engineer, Network, Verizon Wireless; Chair, Communications Information Sharing and Analysis Center (ISAC)
15. **David Owens**, Chair, Transformation Advisory Council (TAC), Puerto Rico Electric Power Authority (PREPA)
16. **Jeffrey Pillon**, Director, Energy Assurance Programs, National Association of State Energy Officials (NASEO)
17. **Gil Quiniones**, President and CEO, New York Power Authority (NYPA); Chair, Puerto Rico Energy Resiliency Working Group
18. **Steve Rourke**, Vice President, System Planning, ISO New England (ISO-NE)
19. **Kris Ruud**, Principal Advisor of Principal Advisor of Engineering and Real-Time Operations, MISO
20. **Donald Santa Jr.**, President and CEO, Interstate Natural Gas Association of America (INGAA)
21. **William Whaley**, Vice President, U.S. Pipelines Gas Control, Enbridge Gas Distribution and Union Gas
22. **Dena Wiggins**, President and CEO, Natural Gas Supply Association (NGSA)
23. **Le Xie, Ph.D.**, Associate Professor, Texas A&M University
24. **Wesley Yeomans**, Vice President, Operations, New York Independent System Operator (NYISO)

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