Improving Power System Resilience in the 21st Century
An Expert Meeting

The Resilient America Roundtable and the Board on Energy and Environmental Systems
in collaboration with EPRI and NARUC

Date: July 24-25, 2014
Location: The National Academy of Sciences, Room 120
2101 Constitution Ave NW, Washington, DC 20418

Objective: This two-day event is being conducted in support of the work of the NRC's Resilient America Roundtable.[1] Since electric power is critical to the provision of a wide range of social services, and to disaster recovery, the objective is to identify strategies that could be used to improve the resilience, and speed the restoration, of transmission and distribution systems after disasters, as well as assure the continued provision of critical electricity-dependent social services during disasters.

Improving the Resilience of High Voltage Electric Power Transmission Systems
Thursday, July 24, 2014

OPEN SESSION

8:45 – 9:00 am Welcome and Introductions

9:00 – 9:10 am The Resilient America Roundtable – Lauren Augustine

Improving the Resilience of High Voltage Electric Power Transmission Systems

09:10 – 09:20 am Overview and objectives for the first day which focuses on the Transmission System – Granger Morgan

9:20 – 10:20 am <u>Panel Discussion 1:</u>
Strategies to increasing both transmission system resilience, as well as speed restoration, in the event of severe weather (wind, ice etc.), floods, earthquakes, tsunami, volcanic events and intentional physical disruption

Panelists:
Terry Boston, *CEO, PJM*
Billy Ball, *Chief Transmission Officer, Southern Co.*
Dan Ton, *Office of Electricity Delivery and Energy Reliability Department of Energy*
Paul Parfomak, *Congressional Research Service*

[1] See: http://resilientamerica.nas.edu

10:20 – 11:00 am	Q&A and general discussion
11:00 am	Break
11:15 – 12:00 pm	<u>Panel Discussion 2:</u> Strategies to assess and improve transmission system resilience to solar weather and to speed restoration after disruption Panelists: Ronald Turner, *Analytic Services, Inc.* John Kappenman, *Storm Analysis Consultants* Mark McGranaghan, *Electric Power Research Institute* Emanuel Bernabeu, *Dominion*
12:00 – 12:15 pm	Q&A and general discussion
12:15 – 1:00 pm	Lunch
1:00 – 1:45 pm	<u>Panel Discussion 3:</u> Strategies to assess and improve transmission system resilience to, and recovery from, cyber events Panelists: William Sanders, *University of Illinois & DOE/DHS Trustworthy Cyber Infrastructure for the Power Grid* Paul Hines, *School of Engineering, University of Vermont*
01:45 – 02:00 pm	Q&A and general discussion
2:00 – 3:00 pm	Group Exercise: Build a list options and strategies that could be used to increase transmission system resilience and speed system restoration
3:00 – 3:30 pm	Break
3:30 – 4:15 pm	<u>Panel Discussion 4:</u> How might society decide which options and strategies to adopt and how might they best be paid for? How could coordination between relevant players be improved? How might legal and regulatory obstacles be alleviated? Panelists: Ellen Lapson, *Lapson Advisory* Paul Stockton, *Sonecon, LLC* Patrick Hogan, *PG&E*

4:15 – 4:30 pm	Q&A and general discussion
4:30 – 5:00 pm	Around-the-table with final thoughts and comments
5:00 pm	Adjourn

Improving the Resilience of Electric Power Distribution Systems
Friday, July 25, 2014

OPEN SESSION

8:45 – 8:50 am	Welcome and Introduction of New Arrivals

Improving the Resilience of Electric Power Distribution Systems

8:50 – 9:00 am	NARUC's concern about improving the resiliency of the electric power system - Colette Honorable
9:00 – 9:05 am	Overview and objectives for the second day which focuses on the Distribution System – Granger Morgan
9:05 – 11:00 am	<u>Panel Discussion 1:</u> Strategies to increasing both distribution system resilience, as well as speed system restoration, in the event of severe weather (wind, ice etc.), floods, earthquakes, tsunami, volcanic events and intentional physical disruption. Panelists: Jeffrey Williams, *Entergy* David Owens, *Edison Electric Institute* Craig Miller, *NRECA* Jay Apt, *Carnegie Mellon University*
11:00 am	Break
11:15 – 12:00 pm	<u>Panel Discussion 2:</u> Strategies to assess and improve distribution system resilience to, and recovery from, cyber events Panelists: Arthur House, *Chairman of the Connecticut Public Utilities Regulatory Authority* Scott Baron, *National Grid*
12:00 – 12:15 pm	Q&A and general discussion

12:15 – 1:00 pm	Lunch
1:00 – 1:45 pm	<u>Panel Discussion 3:</u> The potential role, and challenges posed by, distributed generation and micro-grids. Panelists: Erich Gunther, *EnerNex* Richard Kidd, *US Army* Anu Narayanan, *RAND Corp.* Charles C. Agosta, *Clark University*
1:45 – 2:00 pm	Q&A and general discussion
2:00 – 3:00 pm	Group exercise: Build a list options and strategies that could be used to increase distribution system resilience and speed system restoration.
3:00 – 3:30 pm	Break
3:30 – 4:15 pm	<u>Panel Discussion 4:</u> How might society decide which options and strategies to adopt and how might they best be paid for? How could coordination between relevant players be improved? How might legal and regulatory obstacles be alleviated? Panelists: Diane Solomon, *NJBPU* Cheryl Roberto, *Environmental Defense Fund* Miles Keogh, *NARUC* Kevin Jones, *Vermont School of Law*
4:15 – 4:30 pm	Q&A and general discussion.
4:30 – 5:00 pm	Around-the-table with final thoughts and comments
5:00 pm	Adjourn