

A Workshop on
Electricity Security and Survivability

November 28-29, 2001
Carnegie Mellon University

The U.S. electric power system is one of our most important critical national infrastructures. The electric power system is more vulnerable than other infrastructures because it is so large and distributed that it is essentially indefensible. It is vulnerable to cyber as well as conventional physical attack since the systems that operate it on a second-by-second basis as well as plan operations for the next several days (e.g. power markets) generally consist of distributed communication and computation networks. Further complicating these problems are the fact that the electric power system must balance supply and demand at every instant, so and modest disruptions in key locations can have major effects systemwide.

The terrorist attacks of September 11 have highlighted these issues and raised new concerns, although research into electricity security has been underway for some time. For the most part, this work has been accomplished by the federal government through various Departments and a number of National Labs, as well as by a few industry groups. Much of this research has focused, naturally enough, on near-term actions and on the protection of the existing electric power system. Much less research has been conducted on the fundamental characteristics of complex networked systems, the interactions and interdependencies of complex networked systems, and the potential security and survivability aspects of different future configurations of the electric power system. This last set of issues will be the focus of a workshop hosted by the Carnegie Mellon Electricity Industry Center, with the support of the Carnegie Bosch Institute.

One approach to protecting the electric power system is to provide armed guards and firewalls to prevent destruction or takeover. While this approach may be feasible for some components, it cannot assure continued reliable operation of the entire system. An alternative approach is to reconfigure the system to make it more robust so that if any one part is destroyed, there are local consequences but no system failures. This second approach, called 'survivability' or 'resilient' system architecture, will require significant changes to the current system, both in the technologies in use as well as in the regulatory and software design aspects of the electric power system. The technical, operational, and policy options available here are not well understood yet, and are further complicated by the fact that the electric power system is a rapidly restructuring mixture of privately-owned and government-owned assets, the future of which is unclear. The commercial implications for firms in the electricity industry of a more secure and survivable electric power system are also unclear.

Sponsors

**Carnegie Mellon Electricity Industry Center
Carnegie-Bosch Institute**

Location:

**Carnegie-Bosch Executive Classroom, Posner Hall 343
Graduate School of Industrial Organization – Carnegie Mellon University
5000 Forbes Ave.
Pittsburgh, PA 15213**

For information, see www.cmu.edu/ceic

Carnegie Mellon Electricity Security and Survivability Workshop

Agenda

Day 1

12:00-1:00 – Lunch (Grand Room – Posner Hall 3rd Floor)

1:00-1:30 Welcome and Introductions (Carnegie Bosch Executive Classroom, Posner 343)

Alex Farrell – Carnegie Mellon

1:30-2:30 Defining the Problem

Terry Kelly – Office of Science and Technology Policy

Steve Gehl – EPRI

Herman Green – Alliant Energy

2:30-3:30 Approaches to Increasing Security and Survivability

Rodney Anderson – National Energy Technology Laboratory

Howard Lipson – Carnegie Mellon

Stefan Leader – Eagle Research Group

Break (Carnegie-Bosch Institute Lounge, Posner 382)

3:45-5:00 Changes in System Architecture and Operation

Marija Ilic – Massachusetts Institute of Technology

Suresh Sharma – General Electric

Ron Fisher – Argonne National Lab

5:00-6:00 Financing These Changes

Paul Parformak – McKinsey & Co.

Tom Hancock – Tennessee Valley Authority

Lester Lave – Carnegie Mellon

7:00-9:00 – Reception/Dinner (Rachel Mellon Room, 1st Floor of Posner Hall)

Day 2

7:30-8:30 – Continental Breakfast (Carnegie-Bosch Institute Lounge, Posner 382)

8:30-10:00 – Possible Policy Approaches (Carnegie Bosch Executive Classroom, Posner 343)

Richard Cowart – Regulatory Assistance Project

Richard Schuler – Cornell University

Alison Silverstein – Federal Energy Regulatory Commission

Break (Carnegie-Bosch Institute Lounge, Posner 382)

10:15-12:00 – Existing Research and Action

Hisham Zerriffi – Carnegie Mellon

Anjan Bose – Power Systems Engineering Research Center

Sarosh Talukdar – Carnegie Mellon

Douglas Bauer – National Academy of Science

Pradeep Khosla – Carnegie Mellon

Jeffery Hunker (or Ken Gabriel) – Carnegie Mellon

others

12:00-1:00 – Lunch (Grand Room – Posner Hall 3rd Floor)

1:00-3:00 – Research Needs

All, led by Granger Morgan – Carnegie Mellon