

2.6.2

SERIES 2

Understanding
Vulnerability & Risk



Case Study 2.6.2

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Case Study: New York City Summer 2003 Blackout

At 4pm on August 14, 2003, the grid that distributes electricity to the eastern United States became overloaded, resulting in a series of power failures and electrical system shutdowns that left parts of eight states in the northeast and mid-western United States and Canada without electricity. Millions of people were instantly caught up in the largest blackout in American history.

The blackout began just as thousands of workers were about to head home. Soon hospitals and government buildings were switching on backup generators to keep essential equipment operating, and the police were evacuating people trapped in elevators. Nine nuclear plants in the affected area shut down automatically, decreasing available power. Airports suffered serious disruptions, including the three major airports in New York City, and regional airports closed as they couldn't perform security screenings. Flight delays and cancellations rippled all the way to San Francisco on the west coast of the United States, 3000 miles away.

Thousands of subway passengers in New York City had to be evacuated from tunnels, and 600 commuter and subway trains were stalled between stations, unable to run. People who would normally have taken buses and trains home from work walked miles instead. Sidewalks were crowded, and many pedestrians ended up in the streets. While some commuters were able to find alternate sleeping arrangements, many were left stranded in New York and slept in parks and on the steps of public buildings. Cars were basically immobile due to gridlock caused by lack of traffic lights. Many gas stations were unable to operate their electric pumps, leading to long lines at functioning stations and an immediate, dramatic rise in gas prices. Oil refineries shut down, causing a rise in fuel prices following the blackout and prompting some governments to consider fuel rationing.

Many hospitals saw increased admissions. The first wave consisted of minor injuries such as broken bones and cuts as people tried to get out of the city, minor traffic injuries

from pedestrians hit by cars, and people who suffered heart attacks from walking down stairs of high-rise buildings because the elevators weren't working. The next wave was people who got too hot, who had respiratory problems triggered by heat and stress, or who had been trapped in underground subways. In some areas, the elderly and ill were moved to emergency medical centers to keep them from suffering heat illnesses or running out of water; without this advance planning hospital admissions would no doubt have been higher. Nonetheless, heat-related deaths were unusually high.

Water treatment and pumping was shut down in many areas. For those that did retain water service, loss of pressure in the lines led to contamination and people were instructed to boil their water for several days following resumption of power service. Wastewater treatment plants shut down, resulting in discharge of raw sewage into waterways. Computer shutdowns caused lost business productivity; businesses with backup power for computers but not for cooling lost computers entirely as they overheated and catastrophically failed. Main telephone networks and major cellular providers continued to operate on standby generator power, but increased demand overwhelmed available circuits. Verizon, one of the primary land and cellular phone networks, had their emergency generators fail several times, leaving the emergency services number 911 out of service for several



People walking home during the 2003 blackout. Street lights were not functioning, so vehicle traffic came to a halt.

periods of about a quarter hour each. Several television and radio stations were knocked off the air for periods ranging from several hours to the length of the entire blackout. Lack of official communications increased confusion, but people responded in innovative ways to deal with the situation as individuals and self-organizing groups.

Large numbers of factories were closed in the affected area and others outside the area were forced to close or slow work because of supply problems and the need to conserve energy while the grid was being stabilized. At one point, a 7-hour wait developed for trucks crossing one of the US-Canada border crossings due to the lack of electronic border check systems. Freeway congestion in affected areas affected the “just-in-time” supply system. Some industries (including the auto industry) did not return to full production until August 22, eight days later.

Many countries are far more experienced with power blackouts than the United States and the widespread system failure seen here may seem surprising. However, the point is that until a key system fails, we may be unaware of the related systems that will be impacted or how people will respond in such situations. As you reflect on the exercises in this section, we encourage you to explore how your systems and communities are interrelated.