

The New York Times

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A Blog About Energy and the Environment

JUNE 2, 2010, 11:09 AM

Grid Confronts a Threat from Mother Nature

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A report just issued by the Energy Department and the [North American Electric Reliability Corporation](#), known as Nerc, an industry group that polices the power grid, lists three categories of threats to the grid: coordinated cyber- and physical attacks, pandemic disease and electromagnetic damage.

Grid experts have long worried that the [high-altitude detonation of a nuclear weapon](#) would send a damaging pulse of energy to earth. And changes in solar activity have occasionally distorted the earth's magnetic field and generated currents in the rock that have caused [blackouts](#).

What the threats [have in common](#), said Jerry Cauley, the president and chief executive of Nerc, is the "potential to simultaneously impact many assets at once." The grid comprises 200,000 miles of transmission lines and millions of digital controls, he pointed out. The study is an attempt to map out preparations for events that are rare or have so far never happened, what the Energy Department calls "[high-impact, low-frequency events](#)."

The utility industry did begin to prepare for the H1N1 outbreak – that is, the possibility that widespread illness result in a shortage of workers to maintain power lines and the grid – but that did not turn out to be a problem. The electric system in Quebec was shut down by a geomagnetic storm in 1989; Mr. Cauley said that while utility systems at northern latitudes were thought to be most vulnerable, recent work has established that Mother Nature could reach further south than previously thought.

The geomagnetic problem is that the sun is constantly sending out streams of charged particles that hit the earth's magnetic field. If the strength of the stream changes, the field will move. And if the magnetic field moves through rock that is an electric conductor, it will induce currents in the earth. These currents can overload transformers and other components of the power system.

The study recommends a variety of steps, including preparing a better inventory of spare parts and better contingency plans for starting up the grid in circumstances where there is no electric power – a trick akin to starting a fire without a match. And, in the tradition of government/industry studies, it recommends more studies.

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