States Work To Protect Electric Grid

BY JENNI BERGAL

WASHINGTON — A huge solar superstorm fries hundreds of high-voltage transformers, shutting down the nation's electrical power grid. A hostile nation or a group of terrorists detonates a nuclear weapon above the U.S. atmosphere, raining gamma rays and causing massive blackouts.

While these sound like sci-fi movie plots, some scientists and government officials think either scenario could actually occur and end up disabling the country's electrical grid for weeks, months or years, leaving telecommunications and emergency services severely disrupted and affecting the food supply, sanitation and drinking water.

Congress has commissioned reports and held hearings over the years on bills focused on protecting the grid from such catastrophic disturbances, but it hasn't taken any action. So a number of state legislators have decided to file their own grid-related measures, and in some cases, the legislation has been adopted.

"This is an area in which we are extremely vulnerable. It's a real problem. What if the power doesn't come back on?" said Virginia Republican state Sen. Bryce Reeves, who sponsored a measure that passed last year mandating a legislative commission to study the issue and come up with ways to protect against such threats.

Other experts and scientists are skeptical of the dire warnings, saying the chances of such doomsday scenarios are extremely remote. And utility companies argue that they are already highly regulated and prepared for disasters, and that the electrical grid is safe.

"We are the only sector with mandatory and enforceable cyber and physical security standards," said Scott Aaronson, senior director of national security policy at the Edison Electric Institute, a trade association for investor-owned utilities. "I bristle at the assertion that the industry is moving too slowly on this. Instead, we are moving deliberatively to ensure the reliability of the electric grid."

Some legislators say the states have a responsibility to take action because they have regulatory authority over the electric grid's transmission and distribution systems.

States can require power companies to install blocking devices or other technologies to protect large transformers and generators against man-made electromagnetic pulse (EMP) attacks created by nuclear detonations or geomagnetic disturbances caused by solar storms.

A report last year by the National Governors Association found that 70 percent of the nation's transmission lines and transformers are at least 25 years old, and 60 percent of circuit breakers are at least 30 years old. It noted that much of the infrastructure was designed in the 1950s, making the system "vulnerable to disruption."

The report, which didn't focus on solar storms or manmade electromagnetic disturbances, did note that both pose threats to the grid and "should be considered alongside efforts to modernize the electric power grid."

Kristy Hartman, senior energy policy specialist for the National Conference of State Legislatures (NCSL), said that since 2013, EMP or solar storm-related legislation has been filed in at least 11 states. It was enacted in five, failed in three and is pending in the rest.

The measures have ranged from establishing commissions to study the potential threats and make recommendations to requiring electric providers to install certain technology to protect the infrastructure. Among those that have passed:

Arizona last year required its emergency management agency to develop preparedness recommendations for the public in the event of an EMP or solar flare occurrence.

Louisiana last year asked the governor's emergency preparedness office to study the potential threats and consequences of a sudden burst of electromagnetic radiation caused by a natural or man-made event.

Kentucky in 2013 voted to establish an interagency working group to identify risks and assess the state's preparedness to respond to acts of war or terrorism, including an EMP.

In Virginia, state Rep. Reeves' 2014 grid-related measure passed the legislature unanimously. This session, Reeves sponsored a bill requiring the state's emergency management agency to formulate a plan for disasters caused by EMPs or geomagnetic disturbances. It passed in February and is awaiting the governor's signature.

"This is a nonpartisan issue for us," Reeves said. "And in our state, the utility companies get it. They understand and are on board with it. They don't want to be 'the bad people.' They are at the table and are not opposed to placing protections from EMPs on the grid."

While Reeves' colleagues have given his proposals a thumbs-up, some lawmakers in other states say they've had a tougher time getting legislation passed.

In Florida, Democratic state Rep. Michelle Rehwinkel Vasilinda sponsored a measure last year that urged Congress to direct the Department of Homeland Security to request resources to protect the nation's grid and recover from such natural or man-made events. It never had a hearing. She also filed an amendment to another measure that would have required the state to develop an emergency response plan in preparation for those types of disasters. It failed in committee.

"We are a state that has been very much ready for hurricanes, but this is different. We are not prepared for an event like this at all," she said, noting that she is planning to file another grid-protection measure this session.

Rehwinkel Vasilinda said she ran up against strong industry opposition.

"There is a reticence on the part of the utility companies, and in Florida, they are very politically powerful," she said.

Utility industry officials scoff at such criticism. They say that they support state policymakers partnering with the industry to learn more about grid reliability, protections and recovery plans. But they argue that piecemeal state legislation isn't the way to go.

"This is a technical and technological issue, not a regulatory or legislative one," said the industry's Aaronson, who noted that he finds it "very troubling" that some state legislators are pushing measures that would require utilities to install blocking devices without knowing whether they would work.

"Until the electrical engineers who have the expertise to operate the grid are convinced that a particular strategy will be successful and not have unintended consequences, we're going to resist the notion that there is a silver bullet that can solve all of our problems," he said.

Those pushing for more grid protections say they worry about the devastation that could result if an incident occurred similar to the Carrington Event of 1859.

That powerful solar storm's electric currents made telegraph machines worldwide go haywire, sending shocks to wire operators and setting telegraph paper on fire. They refer to a 2012 study by a senior scientist published in the journal Space Weather that concluded there is a 12 percent chance of a Carrington-type storm in the next decade.

They also point to a less serious solar storm that struck Quebec, Canada, in 1989 that caused a nine-hour blackout that cost $2 billion and burned up a major transformer at a New Jersey nuclear power plant.

But utilities officials argue that they are prepared. A system already exists that would warn of a potential solar event up to hours in advance, according to the National Rural Electric Cooperative Association, which represents nonprofit rural electric cooperatives and public power districts.

The group says that the industry also is participating in research projects and planning for solar storms and EMPs, and working with federal regulators on standards addressing those concerns.

Industry officials say the likelihood of a high-altitude nuclear detonation is extraordinarily low, and that it would be a national security issue within the purview of the military and federal government, not utility companies and states.

Even so, they say utility companies have implemented a number of protections to secure the grid, such as installing shielding on some substations that house the digital infrastructure that supports equipment controls as well as some operations centers.

"There is no such thing as 100 percent security," said Aaronson of the Edison Electric Institute. But he added that key parts of the grid are resilient and have a high level of protection.

COURTESY PHOTO

ABOVE: This photo taken from atop one of the wind turbines in the Beethoven wind farm near Tripp shows the area's rural landscape. The power that will be generated by the wind farm is being sold to NorthWestern Energy. BELOW: This photo was taken during the construction phase of the project

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go to the Tripp junction substation, located six miles south of Tripp.

"The last I heard, they had generation coming into our substation at about two megawatts," he said. "They have one wind turbine that's up and going, and its feeding into our substation."

The wind project should go fully online in the coming days, Fergen predicted.

The Beethoven wind farm will generate a maximum of 80 megawatts under ideal conditions, but that would likely happen infrequently, Fergen said. NorthWestern will prepare for times when the wind project generates less than full capacity or suddenly drops in output, he said.

"For us, this (wind energy) is something extra or supplemental power. For every megawatt of wind generation, it has to be backed up by something else," he said. "If (the turbines) would happen to be out-putting 32 megawatts and the wind suddenly

drops, we would need to replace 32 megawatts really quickly."

NorthWestern Energy has shown an interest in wind energy at other locations, Fergen said.

"This is our third or fourth wind project in South Dakota, and out in Montana we have several wind projects," he said. "It's one way of getting our foot in the door for generating wind power and green energy."

The Beethoven project also stands to generate revenue for the area, Hornstra previously told the Press & Dakotan.

"We did this primarily for economic development for the area," he said at the time. "It's better than we'd thought it would be, and it's going to bring a lot of money in."

"It's quite an economic boon to the area," he said.

The project is also expected to generate tax revenues, lease payments and transmission payments.

Roland Jurgens with the project recently told the Bon Homme County commissioners that the wind farm should start generating revenue in 2016.

The wind farm has been more than five years in the making.

Hornstra explained the project's origins in a previous Press & Dakotan story.

Made up of 51 area investors, B&H Wind was formed in 2009 in response to information gathered from area towns to gauge interest in a wind farm project. Towns that held public meetings included Avon, Tripp, Tyndall, Springfield and Wagner.

B&H Wind then leased roughly 34,000 acres southwest of Tripp for the project.

Each phase of the two-phase project will utilize about 2,000 acres of land and will feature 20 to 22 wind turbines, which are approximately 400 feet tall.

The first phase will cost approximately $71 million, with the second phase expected to cost slightly less, Hornstra said.

Hornstra is already looking forward to another wind project, also located in the same vicinity.

"We hope to expand with more projects in the area," he said.

NorthWestern officials would likely be interested in participating in another wind generation effort under the right circumstances, Fergen said.

"We would pursue it if it makes sense for our company," he said.

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