The Energy 202: Polar vortex tests gas and electric systems in Midwest, Mid-Atlantic

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THE LIGHTBULB

People walking outside in Chicago despite a temperature around minus-20 degrees. (Photo by Scott Olson/Getty Images)

As millions of residents in the Midwest and Mid-Atlantic hunker down amid historically bitter temperatures, the cold is testing the very energy systems meant to keep their lights on and homes warm during the brutal winter weather.

The polar vortex is poised to deliver a one-two punch to power systems across the eastern half of the United States. Not only are residents demanding more heat and electricity while staying indoors, the icy and windy weather is straining generating stations, power lines and other infrastructure that deliver that power.

Already, thousands of Americans in the Midwest have experienced power outages amid the polar vortex. Dozens in one Minnesota city lost heat in the middle of the night on Tuesday as the mercury plunged to minus-26 degrees Fahrenheit there. And on Thursday in Michigan, Gov. Gretchen Whitmer (D) asked most state residents to lower their thermostats to 65 degrees or less until Friday to conserve on gas.

Ahead of the historic lows this week, electric utilities and grid operators began taking precautions to brace for the deep freeze.

Two of the nation's largest regional grid operators, PJM Interconnection and Midcontinent Independent System Operator, put emergency cold-weather procedures into effect this week. Power generators in the PJM regional grid, which stretches from Illinois to New Jersey, were instructed to insulate pipes and top off backup fuel tanks ahead of the cold.

“This is a kind of call to action for any of those last-minute preparations,” said Michael Bryson, PJM's vice president of operations.

Just as snowflakes are varied, winter weather can weaken power generation in a number of ways. Cold can stall coal, natural gas or nuclear power generation. Ice can grid wind turbines to a halt. Snow can incapacitate solar panels.

For homes heated directly by natural gas, frigid temperatures can also strain the supply of heating fuel — as is the case this week in Minnesota.

The Minneapolis-based electric utility Xcel Energy has asked Minnesotans to turn their thermostats down to 63 degrees Fahrenheit through Thursday morning because of a “significant strain on our natural gas system due to extreme weather,” the company said in a statement.

About 150 residents around Princeton, Minn., lost natural gas service about 10:30 p.m. amid subzero temperatures Tuesday night, forcing some to rely on space heaters for warmth. Xcel said it expects to return to service by Thursday. In the meantime, it offered to put those customers up in hotels until heat is restored to their homes.

High winds and other wintry conditions can also disrupt the delivery of electricity, such as by bringing down power lines.

At one point on Wednesday morning, for example, 50,000 homes and businesses served by Commonwealth Edison, the biggest electric utility in Illinois, were without power, mostly in the towns and cities north and south of Chicago. Service was restored to most of those customers by the afternoon.

“When the temperature gets this unusually low,” Commonwealth Edison spokesman Paul Elsberg said, “we're bound to see these types of outages.”

Outages also rolled through parts of Wisconsin and Iowa early that day, affecting about 7,000 customers, according to outage maps of various utility companies. Kenosha County, south of Milwaukee, was hit particularly hard after a power line snapped and sheared power poles in the small town of Somers, Wis., according to the electric and gas utility We Energies.

To keep workers warm, Commonwealth Edison dispatched two or even three crews at a time to allow repair workers to take breaks. We Energies also encouraged its repair staff to pause in warm vehicles.

While the cold is concentrated in the Great Lakes region, policymakers in Washington are feeling the chill. On Wednesday, Energy Secretary Rick Perry huddled to discuss the polar vortex with top aides.

They included Karen Evans, assistant secretary of the newly formed Office of Cybersecurity, Energy Security, and Emergency Response. The Trump administration established that office last year to coordinate its response to power outages from extreme weather events, as well as terrorist attacks. Both Republicans and Democrats in Congress generally applauded the creation of the bureau.

Earlier in President Trump's administration, however, the Energy Department also pitched a more controversial proposal to keep electricity flowing during cold snaps. The department said such polar vortices are reasons to subsidize coal and nuclear power plants.

Perry said that only those two types of power generation could assure grid reliability because they, unlike gas and renewable energy generators, could keep a 90-day supply of fuel on site. But critics of the plan saw it as a ham-handed effort to prop up Trump's political allies in the coal business.

The independent Federal Energy Regulatory Commission ended up agreeing with those naysayers. In a binding decision last year, all five of its commissioners, including four appointed by Trump, rejected the Trump administration's plan.