

Iowa Climate Statement 2021: Strengthening Iowa's Electric Infrastructure

Climate change is powerfully upon us.¹ In the Midwest it has increased the frequency and intensity of heavy precipitation, floods, droughts, and extreme heat,^{2,3,4} all of which create environments that threaten grid reliability and resilience at a time when increasing electrification will make infrastructure performance ever more critical.

When the derecho hit Iowa on August 10th last year, most had never heard of such an event. But it proved to be the most destructive thunderstorm in US history;⁵ wind gusts were measured as high as 140 mph;⁶ 70 percent of the canopy in Cedar Rapids was downed;⁷ 554,077 utility customers lost power for as much as two weeks;⁸ and the total cost of clean-up approaches \$11 billion, second only to Hurricane Laura in 2020.⁹

The electric “grid” is actually three distinct electric subsystems working together: generation, transmission (high voltage circuits), and distribution (low voltage circuits). Multiple outages in any of these three subsystems, or in combinations, can contribute to large scale power outages. For example, Iowa's power outages from the 2020 derecho resulted from extreme damage to transmission and distribution. The 2008 floods caused the Cedar River in Cedar Rapids to reach a record crest, damaging or destroying two generation facilities and over 20 substations.¹⁰ Recent power outages in Texas in February 2021 due to extreme cold, and in June 2021 due to extreme heat, were severe threats that were generation-related.¹¹ The power outage severity for these and other cases can be significantly reduced by strengthening electric subsystems while protecting critical services.

Adding transmission capacity supports increased utility-scale wind and solar, which we will need to meet rapid carbon reductions identified as necessary in the IPCC's 2021 Assessment Report. Added transmission capacity also provides access to a more diversified electric infrastructure, addresses generation outages, and enhances grid redundancy and controllability. Iowa needs more local (intrastate) transmission and would also benefit from new regional and national (interstate) grid transmission. The growth in electric vehicles increases the importance of expanding grid infrastructure.¹²

Hardening transmission through improved pole and tower structural strength and hardening distribution by undergrounding builds resilience to withstand extreme wind and heavy ice loading. Critically important facilities such as hospitals, water infrastructure and grocery stores could be connected within microgrids having distributed generation, battery storage, and the capacity to isolate and continue supplying the demand during extreme events. Energy efficiency, conservation and demand response and control programs should continue to grow.

Socio-economically disadvantaged Iowans are disproportionately vulnerable to electric infrastructure disruption. Outages impact household safety and security, access to food, water and social services, and cause heat stroke, hypothermia or even death.¹³ Iowa studies found the greatest negative human health impacts occurred in homes without air conditioning during times of high air temperature and humidity.¹⁴

To prepare for future Iowa extreme weather events, we recommend that industry, policy makers and stakeholders identify ways to strengthen Iowa's electric infrastructure, protect vulnerable people, and consider enhanced risks from climate change while managing costs. Climate change is here. We need a resilient electric infrastructure as we curtail carbon emissions for a more sustainable future.

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