

# **Iowa Climate Statement 2021: Strengthening Iowa's Electric Infrastructure**

**Released October 13, 2021**

## **Statements by Presenters:**

**David Courard-Hauri**, Chair of Environmental Science and Sustainability, Drake University.

Good morning, everyone, and thanks for joining us today. I'm David Courard-Hauri, Chair of the Env Science and Sustainability Dept at Drake University, and one of the organizers of the Iowa Climate Educators group, and I'm here with Gene Takle, Emeritus Professor of Agronomy, Iowa State University; James McCalley Anson Marston Distinguished Professor, London Chaired Professor of Power Systems Engineering, Department of Electrical and Computer Engineering, Iowa State University; and Jerry Schnoor, Co-director, Center for Global and Regional Environmental Research, University of Iowa.

We're here today to announce the release of the 11<sup>th</sup> Annual Iowa Climate Statement, a collaborative effort by researchers and educators from nearly all of Iowa's colleges and universities. We just sent copies of the statement and press release, so check your e-mail for those. The current statement was endorsed by 223 researchers and educators in climate and climate-impacted fields, from 34 colleges and universities located in every part of Iowa. These statements, vetted by Iowa's top climate experts, place pivotal climate change research into an Iowa-specific context, encouraging preparedness and resilience in the face of the climate crisis. Previous statements have drawn attention to agricultural impacts as well as human and animal health impacts.

We are releasing this statement after yet another extremely difficult year in some parts of Iowa. Over 80% of the state is currently listed as abnormally dry, with over 50% in drought conditions. As we've discussed previously, this is part of a pattern of extreme events, including short-term, heavy rainfall and flooding, that we expect to see more of under a changing climate.

As we've discussed in previous statements, the best way to reduce future damages is to reduce emissions and find ways to mitigate the extent of climate change as much as possible. Electric infrastructure plays an important role in this effort, as emissions reductions necessarily go hand-in-hand with increased electrification and a conversion of our grid to renewable and zero emission energies. However, because climate change is currently upon us and will continue to become more of a threat regardless of reductions for at least the next few decades, it is also critically important that we think differently about infrastructure and resilience in the face of this growing challenge moving forward.

Thus, the focus of this year's statement is building the resilience of our electrical infrastructure. With that, I'll turn you over to Gene Takle, who will talk to you about parts of the local threat landscape associated with our changing climate.

End

**Gene Takle**, Emeritus Professor of Agronomy, Iowa State University.

Utility companies, having decades of experience refining rapid response to "downed power lines", have enabled customers to expect power being restored with minimal disruption.

But incremental improvements from past experience have not prepared us for our 21<sup>st</sup> century vulnerability to the scope of destruction and societal consequences of climate change on the electric generation and distribution system. Each of the recently increasing number of unprecedented climate extremes – such as the derecho in Iowa, the extreme freeze in Texas, and the wild fires in the western US – have revealed new and disturbing challenges for electric grid reliability.

Our Iowa derecho created 110-140 mph winds that blew down 7 million trees and caused \$11 billion in damage to outbuildings, barns, grain bins, homes, mobile homes and power lines across the central third of Iowa in about 3 hours in August 2020. Have you ever wondered where all that energy came from? Climate scientists know a lot, but not everything, about how the atmosphere concentrates and releases enormous amounts of energy in a short time in relatively limited regions. But one thing we know for sure is that increasing levels of carbon dioxide will capture and accumulate increasing amounts of energy in the lowest 8 miles of the earth's atmosphere.

We don't know when, where, or in what form such an extreme event could occur again. But a widespread protracted power outage has happened now once in Iowa, and the continuing accumulation of heat and moisture in the atmosphere due to increases in greenhouse gases is increasing the likelihood of such an event recurring. This year's Iowa climate statement addresses the need to strengthen Iowa's electric infrastructure while at the same time reduce statewide greenhouse gas emissions.

End

**Jim McCalley**, Anson Marston Distinguished Professor, London Chaired Professor of Power Systems Engineering, Department of Electrical and Computer Engineering, Iowa State University.

We have a very well-designed grid in Iowa; MidAmerican, Alliant, ITC Transmission, and the cooperatives and municipals have done their jobs.

They have done their jobs in developing generation resources to make us the number 2 state in the nation for wind generation capacity and to ultimately have a significant solar supply;

They have done their jobs in developing high voltage transmission to move power from remote wind and solar sites to load centers;

And they have done their jobs in providing the lower voltage distribution lines to bring that power into our homes and businesses and interconnect with rooftop solar.

However, the future is going to bring high winds, extreme temperature events, floods, and droughts, at a frequency and severity exceeding conditions for which much of this equipment was designed. To address this, we need to take three kinds of strategic actions:

First, we need to make the system and its components stronger and better able to withstand extreme events – this is called ***hardening***. This means, for example,

- increasing transmission and distribution line structural strength,
- and undergrounding distribution lines where flooding is not a risk.

Second, we need to reduce impact and increase speed of restoration and recovery during extreme events – this requires ***diversifying*** the ways we supply power. This means, for example,

- deploying microgrids for loads providing critical services such as hospitals and grocery stores;
- expanding the number of different generation technologies we use;
- and, most of all, increasing transmission, a step that provides options under extreme events, strengthens the grid in fundamental ways, and facilitates the interconnection of more wind and solar resources.

Third, and finally, we need to be cost-conscious while identifying solutions that provide effective hardening and diversification.

Our communication encourages Iowans to work together in identifying effective ways to harden and diversify our power grid, paving the way for growing wind and solar resources while using those resources in concert with strengthened and expanded transmission and distribution infrastructure to reach goals of clean energy, transportation electrification, and decarbonization.

I want to now introduce Jerry Schnoor who is the Co-Director of the Center for Global and Regional Environmental Research at the University of Iowa.

End

**Jerry Schnoor**, Co-director, Center for Global and Regional Environmental Research, University of Iowa.

We are running out of time. In the next 9 years, to do our part, we must reduce greenhouse gas emissions by at least 45% -- a monumental effort is needed. Socio-economically disadvantaged people are the most affected by the increased heat and humidity, intense precipitation events, power outages and flooding that we are experiencing, and which will only become worse without climate action. We should protect vulnerable people and safeguard the future of entire communities.

Iowans have done extremely well to move from reliance on coal-fired power to 57% of our electricity generated by wind. In so doing, we have created thousands of high-quality jobs, income for farmers, and taxes for the State. In short, we prosper mightily by transitioning to renewable power for our homes, schools, factories and transportation. This Iowa Climate Statement emphasizes the need to “Strengthen Iowa’s Electric Infrastructure” to facilitate this historical and strategic transition.

Enhancing the grid will also aid our movement towards electric vehicles and the increased generation capacity necessary to charge them. We benefit in so many ways from strengthening our energy infrastructure and, at the same time, we help to address the climate crisis.