Testimony of

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before the
U.S. Senate Committee on Commerce, Science & Transportation
hearing on
"Unmanned Aircraft Systems:
Innovation, Integration, Successes, and Challenges"

March 15, 2017

Thank you, Chairman Thune, Ranking Member Nelson, and members of the Committee for the invitation to speak at this important hearing.

My name is Ben Fowke, and I am the CEO of Xcel Energy, an integrated energy company serving 3.5 million electric customers and 2 million natural gas customers across eight Western and Midwestern states. Headquartered in Minneapolis, Minnesota, we have a balanced energy mix that includes natural gas, coal, nuclear and renewables. We are also the nation's No. 1 utility wind energy provider with more than 8,000 megawatts on our system.

A big part of my job is ensuring that we can protect our power plants, transmission lines, substations and the rest of the electric system from natural disasters and criminal attacks. I am also a member of the National Infrastructure Advisory Council where I join with other leaders in the private sector to advise the President on ways that the nation can protect its critical infrastructure. For that reason, I am delighted this morning to talk about our experience using unmanned aerial systems, or UAS, to protect electric infrastructure and advance our mission of safely delivering reliable energy to our customers.

Beginning in 2013, we started using UAS to inspect boilers at various power plants in Minnesota and Colorado. We later expanded the use of this technology outdoors to inspect other infrastructure, including energized substations, transmission lines, wind farms and natural gas pipelines.

In February of 2016, Xcel Energy became the first utility in the nation to fly a research and development mission that was beyond the operator's line of sight. The research flights used two different types of UAS – fixed wing and rotor-style – and assessed 22 miles (32 km) of 69-kV transmission line near Amarillo, Texas.

Last year we also began a research project in partnership with the state of North Dakota, the University of North Dakota, and other partners, to use UAS technology to assess damage after severe weather events. Under that project, disaster scenarios were staged throughout the city of Mayville, ND that simulated causes of power outage. We used different types of UAS to test the best way to survey and assess damage in order to restore service.

Benefits of UAS Technology

Based on our early experiences, we see great potential for using UAS technology in our industry to enhance safety, efficiently facilitate infrastructure inspection, and improve storm recovery.

For example, Xcel Energy serves parts of the Colorado Rocky Mountains, including some of the most rugged and remote country in America. Our transmission lines run through inaccessible, mountainous terrain. For years, we could access those transmission lines only by helicopter or on foot, both of which are expensive and increases risk of injury. UAS technology can help us inspect these remote transmission lines, identify problems and restore service more quickly and with less impact on the environment.

There are clear savings opportunities for our customers as well. When beyond-line-of-sight UAS operations become available, we estimate using UAS for transmission line inspection will cost a fraction of traditional methods – about $200 per mile using UAS as compared to $1200 a mile with a manned helicopter or $300-$600 with foot patrol inspections. In addition to being less costly, UAS data is more robust and accurate than the traditional inspection methods.

UAS technology will also improve efficiency and safety within our power plants. Our largest power plants include boilers and other equipment that are ten stories tall and difficult to access, and inspection and maintenance of these facilities is challenging. We have recently conducted more than 30 UAS indoor inspection flights, and the benefits of the technology are obvious: we save money and can maintain our equipment more safely. UAS technology allows us to avoid building scaffolds, and exposing workers to heights and hazardous environments. We conservatively estimate direct savings for each plant that uses UAS inspections at almost $1 million over two years.

Xcel Energy is committed to helping policymakers capture the benefits of this technology while protecting public safety.

2016 FAA Reauthorization

I want to thank this Committee for working so hard to enact the FAA reauthorization legislation last year. That legislation included language that recognized the great potential of UAS technology for the utility sector.

I want to highlight a couple of provisions in particular:

- Sections 2204 and 2207 allow the FAA to facilitate the expeditious authorization of UAS use to support utility service restoration efforts. This authority was used in the aftermath of Hurricane Matthew in October 2016. In that case, two electric companies received permission to fly within hours of their request to assess damage.

- Section 2210 allows the FAA to approve the use of UAS beyond visual-line-of-sight day or night to inspect, repair, construct, maintain, and protect critical infrastructure. This

provision specifically includes pipelines and all aspects of the electric power system-generation, transmission, and distribution.

We thank this committee for including these important sections in the bill last year, which clearly signal to the FAA that protection and maintenance of critical infrastructure in the utility sector must be a focus of UAS policy. UAS technology can be invaluable to the safe and efficient operation of the nation's power system. Electricity and natural gas are essential services to the American people, and we believe it is appropriate for federal policy to recognize that utilities warrant different regulatory treatment than other commercial users of UAS.

We have two priorities as regulations are further developed:

- First, expanding the authority of utilities to us UAS in beyond-visual-line-of-sight operations so we more fully capture the benefit of this technology in our industry.

- Second, preventing unauthorized use of UAS around our critical infrastructure.

On the second point, let me give you an example of the kinds of threats that we may face with unauthorized use of UAS. Last May, an unauthorized UAS landed in one of our substations in the Denver area. Although the UAS in this circumstance flew into the substation by accident, had it landed any closer to our energized equipment, just a few feet away, it could have easily caused a power outage affecting more than 20,000 customers. A malicious attack by a UAS could have catastrophic consequences.

As it stands today, the rules of the engagement are unclear at best as to what companies should do when unauthorized drones pose a threat. More work must be done to educate public sector first responders, as well as the private sector – especially critical infrastructure industries. There are also policy and regulatory hurdles in existence that limit counter drone technology from being widely available, legal, and effective.

Preventing unauthorized use of UAS around critical infrastructure is a broadly shared goal. The committee recognized this, and included language in Section 2209 of the FAA law to establish a process to apply for restrictions around fixed site critical infrastructure. To comply with the law, FAA is developing an interim process in advance of a required rulemaking. We are interested in the outcomes of both the interim process and the final rule and will work closely with FAA, in coordination with our trade association, EEI, to ensure the best possible outcome.

Partnership for Safety Plan

Fortunately, working with the FAA, we are beginning to make progress toward achieving both of our UAS priorities. In January of this year, Xcel Energy entered into a first-of-its-kind safety partnership with the FAA to help inform the regulatory process and to demonstrate the safe operation of UAS technology to inspect critical infrastructure.

This agreement, known as the "Partnership for Safety Plan," involves using UAS to inspect more than 20,000 miles of Xcel Energy transmission lines in 10 states.

Over the next 24 months the FAA and Xcel Energy will be working together to plan and develop safety measures, gather data, and evaluate outcomes.

This research will examine ways to enable safe flight over people and roads using “sense and avoid” and “command and control” and other technologies. This research will also look at communication needs to support long-range beyond-visual-line-of-sight operation. I’ve included the full MOU in my written statement, which includes more detail on the partnership.

We hope this partnership will further the development of policies that unleash the game-changing potential of safe and routine beyond-visual-line-of-sight operations.

As you consider the federal policy issues affecting this emerging technology, I look forward to working with you and the FAA to ensure we are able to use UAS to improve emergency response, enhance safety, increase reliability and help protect the nation’s electric grid.

Thank you again for the opportunity to be with you today. I would be happy to answer any questions.