Prepared Statement of Allison Clements
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Good morning Chairwoman Murkowski, Ranking Member Cantwell, and distinguished Members of the Committee. Thank you for the opportunity to speak today. My name is Allison Clements and I am president of goodgrid, a firm specializing in energy law and policy. In 2016, I served on a National Academies of Sciences, Engineering, and Medicine committee that produced a consensus report, "*Enhancing the Resilience of the Nation's Electricity System*." While I will talk about the report's findings, the views I express today are my own and do not represent the committee.

The national dialogue about resilience comes at a critical moment. The U.S. electricity system is the backbone of an increasingly electrified and fast-paced economy. The National Academies Report notes that the U.S. electricity grid is vulnerable to the risk of cyber and physical attack and increasingly severe weather events expected as the climate changes and hurricanes, blizzards, floods and other extreme weather events increase in intensity and frequency. Recent hurricanes in the Southeast and Puerto Rico provide the most vivid examples of the health and safety impacts prolonged electricity outages can have on our population, especially on our already most vulnerable communities. These hurricanes and other natural disasters reportedly caused $306 billion in damage last year, making 2017 the costliest natural disaster year on record by a significant margin.

As the Federal Energy Regulatory Commission (FERC) most recently defined it, resilience is "*[t]he ability to withstand and reduce the magnitude and/or duration of disruptive events*" on the electric grid, including management and recovery from such events.

I would provide two footnotes. First, resilience is a transmission and distribution system concept, not one that focuses on specific power generation types. Second, resilience occurs at distinct levels of the electrical system, from interconnection-wide down to end-use where real people actually experience the impact.

We must be disciplined to distinguish between the related but separate concepts of *resilience* and *reliability*. Grid reliability involves two aspects: ensuring enough generation and transmission exists to satisfy all customers' electricity demand at all times, and that the transmission system keeps operating without blackouts when any particular transmission line or power plant fails. While implementing rules, procedures, and processes to ensure reliability is complex, the concept itself is relatively straightforward and amenable to standards measuring its sufficiency.

Our focus on resilience, separately, has emerged with the massive new risk brought on by climate change and the threat of attack. Although the unpredictable nature of the threats makes defining and developing resiliency metrics difficult, existing North American Electric Corporation (NERC) and regional reliability standards and practices do provide resiliency value.

The recent winter conditions in the Northeast and Mid-Atlantic provide a ready case study to examine what resilience means for our country's transmission and distribution systems. I offer three takeaways to inform your resilience-related policy efforts.

First, the transmission system is reliable and resilience is improving. Incorporating lessons learned from the 2014 Polar Vortex, regional transmission organizations reliably managed unexpected generation and transmission outages during the bomb cyclone and prolonged cold, like the manual shut down of the Pilgrim Nuclear Plant in ISO-NE resulting from the failure of a transmission line supplying the plant power.

Before we rush to establish resilience rules for the transmission system, we should do more work to determine what infrastructure, operating and communication protocols support resilience and whether additional metrics are necessary. The National Academies Report cautions about the difficulties of creating cost-effective and non-redundant rules for something as unpredictable and varied as resilience needs. FERC's new docket requiring the regional transmission organizations to report on resilience can play an important role and Congress can support this effort.

Second, efforts to ensure resilience should focus on protecting vulnerable communities and ensuring access to hospitals, fire stations and other critical services. Success in maintaining transmission reliability likely provided little comfort to the 80,000 homes and businesses across the East Coast that lost power during the prolonged cold. Distribution and substation failure are at least partially to blame. To tackle end-use resilience needs, we depend on resilience planning and emergency preparedness at the local and state level. Congress should support local and state planning for these disruptions. Proactive support outlined in the National Academies Report, especially via public-private partnerships, can go a long way to improve resilience and mitigate damage.

Third, renewable energy and distributed energy resources are critical components of a reliable grid. The extreme cold and bomb cyclone affirmed wind power's role as a critical cold-weather reliability resource; a role demonstrated earlier during the 2014 Polar Vortex when wind power performed well above its allotted capacity value, helping to avoid price spikes and outages. Renewable energy contributes to reliability thanks to improved forecasting, transmission planning processes, market rules and improvements in wind, solar and distributed resource technology.

Distributed energy resources, especially demand response or customers getting paid to reduce their power use, can provide significant contributions to extreme weather reliability. At one point during the Polar Vortex, voluntary participants provided nearly 3,000 MW in demand reduction, playing a key role in avoiding reliability issues. Unfortunately, current ISO-NE and PJM rules for demand response to not provide incentives for economic reductions in demand and, as I understand it, did not facilitate significant demand response participation last month.

FERC should ensure that all NERC and regional reliability standards, practices and protocols do not discriminate against the ability of renewable energy and distributed energy resources to contribute and be compensated for their full reliability value. To do otherwise not only risks violating the Federal Power Act but leaves value and customer benefits unrealized. This

Committee should encourage FERC to finalize its outstanding proposed rule that breaks down remaining barriers to both storage and distributed energy resource participation in all wholesale markets.

These takeaways affirm the value of competitive wholesale markets and the Commission's ability to continue its long tradition of technology-neutral support for competitive electricity markets. FERC's decision to reject DOE's proposed resilience rule rebuffs the idea that the "baseload" nature of older, inflexible fossil-fueled and nuclear units arms them with any particular resilience or reliability value. This Committee should be wary of other supposed in- or out-of-market proposals, including some underway in the Northeastern regional transmission organizations, intended to sustain income for specific types of power generation in contravention of FERC's technology-neutral obligation and traditional approach.

Through continuing support for competitive markets without preference, this Committee and Congress can support a cleaner, more reliable and more affordable energy future.