Statement of Joy Ditto, President and CEO,
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Before the Federal Energy Regulatory Commission
Annual Reliability Conference
Docket No. AD19-13-000
Panel on "Managing Changes in Communications Technologies on the New Grid"

June 27, 2019

Chairman Chatterjee, Commissioner LaFleur, Commissioner Glick, Commissioner McNamee, and Senior Commission Staff:

Thank you for the opportunity to testify on "Managing Changes in Communications Technologies on the New Grid" during today's Annual Reliability Conference. On behalf of the Utilities Technology Council (UTC), I want to thank the Commission for including this discussion in this conference. UTC has encouraged greater interaction between this Commission and the Federal Communications Commission (FCC), and we believe this discussion is an important first step. The interdependencies between the energy and telecommunications industries are growing by the day. These interdependencies demonstrate the need for enhanced dialogue between the FERC and the FCC, particularly as decisions made by one entity—the FCC—impact the utilities regulated by this Commission.

My name is Joy Ditto and I have the honor of serving as President and CEO of the Utilities Technology Council. As my testimony details, the utility industry is deploying different levels of technology to make its infrastructure stronger, more robust, more resilient, and more responsive to customer demands. Most, if not all, of these enhancements are enabled by the information and communications technology (ICT) networks built, owned, and/or managed by utilities themselves – also known as "private" networks. Utilities deploy their own ICT networks to assist in storm response and recovery, managing the reliability of the Bulk Electric System[1], deploying distributed energy resources, and enabling utilities to recover from so-called catastrophic "Black Sky" events.

[1] As defined by FERC, the Bulk Electric System refers to all transmission elements operated at 100 kV or higher and Real Power and Reactive Power resources connected at 100 kV or higher. This does not include facilities used in the local distribution of electric energy. https://www.nerc.com/pa/RAPA/BES%20DL/bes_phase2_reference_document_20140325_final_clean.pdf

Founded in 1948, the Utilities Technology Council (UTC) is the international trade association for the telecommunications and information technology interests of electric, gas, and water utilities. UTC's membership includes approximately 300 utilities across the U.S. and Canada, including large, for-profit, investor-owned electric and gas companies that serve millions of customers across multi-state service territories, as well as smaller, not-for-profit, rural electric cooperative and public power utilities, which may serve only a few thousand customers in isolated communities or remote areas. In addition, UTC has affiliate organizations in Europe, Africa, and Latin America. UTC's core utility members own, manage, and control extensive communications infrastructure that they use to support the safe, reliable, and secure delivery of essential energy and water services to the public.

Although our members are diverse in size, service territory, and ownership structure, their commonality is their use of, and reliance upon, their communications systems for reliability, resilience, storm recovery, and grid modernization. Such networks, and the technologies they empower, are critical to ensuring reliable utility service and prompt restoration after damaging storms. They also enable the higher levels of granularity required to balance the electric grid as distributed energy resources and other cutting-edge technologies sought by customers become more prevalent at both the Bulk Electric System and the edge-of-the-grid distribution levels.

Before I detail the convergence between the energy and telecommunications industries, it is important to understand why utilities build and operate their communications networks in the first place. UTC was founded in 1948 as utilities began expanding their service territories during the post-World War II economic boom. As utility line-workers put up transmission and distribution towers, they needed telecommunications networks—often wireless, land-mobile radio push-to-talk devices—to communicate with each other. Given the inherent dangers of working with electricity, these networks needed to be as reliable—if not more so—than the electric power systems they were building. Indeed, if a utility worker

needs to know whether a power line on the ground is electrified, the only way to find out is by communicating with another worker. If that communication fails, the consequences can be life-threatening.

A question often asked of utilities is why they choose to build their own communications networks rather than rely on the commercial telecommunications companies. The answer is twofold. First, many elements of utility infrastructure are located in rural or remote areas. These areas are typically underserved by telecommunications companies, as members of this Commission heard at last year's Annual Reliability Technical Conference[2]. Second, commercial telecommunications networks are not reliable enough for utility operations. According to UTC's 2019 Network Baseline Survey, a majority of utilities reported that they own at least 80% of their communications networks, relying on telecommunications companies for only small portions of their systems, if any at all[3]. There are situations where utilities do partner with the telecommunications industry for elements of their ICT networks, often by leasing lines. However, according to our Network Baseline Survey, the use of these so-called "leased" lines is anticipated to diminish going forward[4]. Additionally, most utilities use telecommunications providers for their public-facing "corporate" or "enterprise" IT network needs (websites, telephone services). While these services are important, they are not tied to the reliability of the electric, gas, or water systems. Private networks, in contrast, are used to support utility operational technology (OT) networks and to communicate with personnel in the field.

New Technologies/Utility 2.0

Utilities have operated private networks – including wireless and wireline communications systems – for

[2] Written Statement of Jay Bartlett, President and Chief Executive Officer, Wabash Valley Power Association, FERC Reliability Technical Conference, FERC Docket No. AD18-11-000 (Jul. 31, 2018), visited at https://www.ferc.gov/CalendarFiles/20180731084531-Bartlett,%20Wabash%20Valley%20Power%20-%20NRECA.pdf

[3] Utilities Technology Council Network Baseline Survey—April 2019 Update, page 17

[4] Ibid., page 13

decades. Initially, these private networks were used for voice communications, but over time, data traffic on the networks increased as utilities implemented Supervisory Control and Data Acquisition (SCADA) systems to remotely monitor and control their infrastructure. In order to support their growing communications needs, utilities began increasing the capacity of their networks, deploying fiber and microwave radio technologies. Today, utilities use private networks for a variety of applications that help to protect the grid from faults and deliver energy and water services safely and effectively. These applications include:

• Real-time monitoring of medium and high-voltage networks

• Protective relays

• Energy management

• Outage management

• Distribution management

• Smart metering

• Substation automation[5]

Utility ICT networks are characterized by high reliability and low latency to enable utilities to monitor and control operations in real-time. For example, if there is a fault on a power line, it can be quickly isolated and power can be rerouted, thereby avoiding widespread and extensive outages and damage. At the same time, utility networks continue to support voice communications with personnel in the field, facilitating safe, reliable and secure energy and water operations, maintenance and restoration.

Resilience of Utility ICT Networks

Utility crews must remain in constant communication when restoring power, so their ICT networks are built to withstand and quickly respond to the most severe weather and other disasters, even when electricity is out of service across a wide area. Over the last two hurricane seasons, utility

[5] Ibid.

communications systems proved their resilience again. For example, UTC member utility JEA, based in the Jacksonville, Florida, was affected by both Hurricane Irma in 2017 and Hurricane Michael in 2018. In response to an informal survey of UTC members, JEA told UTC that its privately owned and operated wireline and wireless networks remained online and operational throughout both storms, providing continuous situational awareness of the state of its electric grids throughout both storms. They attributed this success to the resiliency engineered into their private communications network, with a "ring" topology so that any site can communicate to the central site via two completely different paths. JEA's wireless microwave telecommunications performed throughout both storms, providing situational awareness of non-electric sites such as water distribution and wastewater treatment plants. That wireless system also supported the city's Police and Fire/Rescue services during and after the two storms. JEA experienced minor outages of several hours in some wireless links, due to loss of power at the microwave station.

Southern Company was also heavily impacted by Hurricane Michael last year. It reported that its privately owned and operated wireless network remained operational during and after the hurricane. Although its network experienced the same difficulties of damage and disruptions to its fiber transport as other carrier networks, the redundancy-by-design meant that there was never any loss of service. Southern also experienced damage to several towers that had microwave antennas located on them and also had other microwave antennas blown out of alignment by the high winds. But once the storm had passed, Southern Company had recovered virtually all of its private wireless network, and within six days after the storm its wireless network actually had wider coverage than had been in place before the storm.

Characteristics of Utility Private Networks

Utility communications networks consist of both wireline and wireless features. As multiple witnesses at this Commission's March 28, 2019, "Technical Conference Regarding Security Investments for Energy Infrastructure" (Docket No. AD19-12) testified, several utilities are increasingly using fiber-optics lines to

connect their infrastructure.[6] However, laying fiber is expensive and it is not always an option because of access restrictions to laying fiber or sheer remoteness.

To that end, utilities also rely on wireless communications for mission-critical functions. Like any wireless network, utility wireless systems need radio frequency spectrum to function, and the reliability of such wireless communications can be affected by radio frequency interference. Because electricity is generated and consumed instantaneously, the electricity grid requires a delicate balance between supply and demand. This means that electric utility ICT networks must transmit data at high speeds. Radio frequency interference to communications can displace and disrupt signals, potentially disabling the ability of a critical wireless transmission to reach its destination. Because of the critical nature of utility services, interference to mission-critical communications within their ICT networks is intolerable. Therefore, access to adequate and interference-free spectrum is required if these networks are to work as intended.

Spectrum

While utility communications networks are vital to grid reliability and safety, a critical element of these networks is regulated not by this Commission, but rather by the FCC. The FCC is authorized under the Communications Act of 1934[7] to manage spectrum in the public interest. In the Balanced Budget Act of 1997,[8] Congress authorized the FCC to award spectrum through auctions, although it also exempted utilities from competitive bidding of spectrum, given the importance of utility services to the country.[9]

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[6] *See e.g.* Written Statement of Jay Bartlett, President and Chief Executive Officer, Wabash Valley Power Association, FERC Reliability Technical Conference, FERC Docket No. AD18-11-000 (Jul. 31, 2018), *visited at* https://www.ferc.gov/CalendarFiles/20180731084531-Bartlett,%20Wabash%20Valley%20Power%20-%20NRECA.pdf.

[7] *See* Communications Act of 1934, as amended, 47 U.S.C. § 151 et seq.

[8] Section 3002(a), Balanced Budget Act of 1997, Pub. L. 105-33, 111 Stat. 251 (1997); 47 U.S.C. § 309(j).

[9] H. Rept. No. 105-217, Section 3002(a) at 572 (1997)(stating that "the exemption from competitive bidding authority for 'public safety radio services' includes 'private internal radio services' used by utilities, railroads, metropolitan transit systems, pipelines, private ambulances, and volunteer fire departments.") *See also Id* (explaining that "[t]hough private in nature, the services offered by these entities protect the safety of life, health, or property and are not made commercially available to the public.")

Despite Congress's recognition of the importance of utilities' private communications networks, the FCC has treated utilities the same as any other commercial entity when it comes to spectrum acquisition. As a result, utilities often find themselves unable to compete at auction with other enterprises for access to interference-free spectrum. Spectrum is one of the key resources to private utility ICT networks, which also means spectrum is essential to the reliability of our nation's Bulk Electric System.

Agency Cross-Coordination Needed

FERC's regulations require electric utilities to meet stringent reliability standards in order to provide the highest levels of reliable service as demanded by the government and, more importantly, the industry's customers. Integral to the utility industry's compliance with these regulations is access to interference-free spectrum. Without access to adequate interference-free spectrum, private wireless communications networks owned and operated by utilities will not be as reliable and resilient as they are now. Yet, the FCC has pending proceedings that threaten to compromise the safety, reliability and security of these wireless utility networks.

One proceeding would permit unlicensed operations in the 6 gigahertz (GHz) spectrum band (5925-7125 MHz) that is heavily used by utilities and other critical infrastructure industries (CII) for tens of thousands of licensed, fixed point-to-point wireless microwave links that carry mission-critical communications. Many utilities use the 6 GHz band for day-to-day reliability monitoring and emergency response. Our strong concern is that letting new commercial users into the band will cause interference to utility mission-critical communications networks.

To date, the 6 GHz band has only been available for licensed operations, and these operations undergo a rigorous process of frequency coordination prior to allowing any operations to commence. Through this process, each proposed microwave link is carefully analyzed so as to prevent interference from occurring.

Because of its reliability, speed, and ability to quickly transmit data over long distances, hundreds of utilities have licenses in the 6 GHz band to perform such vital functions as SCADA and teleprotection[10].

In February 2019, UTC led an industry coalition joined by the American Petroleum Institute, the American Public Power Association, the American Water Works Association, Edison Electric Institute, and the National Rural Electric Cooperative Association in filing comments against the FCC's proposal to open the 6 GHz spectrum band to unlicensed use. This coalition represents nearly every electric utility in the U.S., along with thousands of water and wastewater systems in the country, and major oil and gas companies. These comments explicitly stated the kinds of mission-critical functions utilities use their 6 GHz microwave networks for, including, as already referenced, for SCADA and teleprotection[11]. Any interference or disruption to these communications could have impacts on electricity infrastructure, reducing a utility's situational awareness. Utilities deploy sophisticated communications networks around multiple technologies and spectrum bands, depending on the importance of the traffic being carried. Systems using the 6 GHz band are often classified as "Tier 1" networks, essentially the "backbone" of utility communications.[12] Tier 1 systems are built to function 99.999% of the time. Any threat of interference to these Tier 1 networks reduces their ability to operate at Five-9's.[13] If a system does not meet those stringent requirements, utilities will be forced to look to alternatives, often at great expense.

Importantly, utilities seek to engineer communications systems with multiple redundancies and backups to ensure that, in the event that interference occurs, utilities can manage and operate their infrastructure without a significantly negative impact on the grid. However, there are some situations where remote

[10] Spectrum and Utility Communications Networks: How Interference Threatens Reliability; McGinnis, Doug https://utc.org/wp-content/uploads/2019/02/Spectrum-and-Utility-Communications-Networks-2.pdf
[11] Comments of the Utilities Technology Council, et al., In the Matter of Unlicensed Use of the 6 GHz Band, Federal Communications Commission Docket No. 18-295
[12] McGinnis, Doug, page 9
[13] Ibid., page 16

access to other forms of communications technologies such as wireline networks is limited and the 6 GHz network must be relied on for situational awareness.

It should be noted that interference can occur in the 6 GHz band currently, but because the spectrum is **licensed**, it means that other entities operating in the band are known and can identify each other and make arrangements to reduce interference. The problem with the FCC's proposal of allowing **unlicensed** operations in the band is that utilities would not know who is causing interference in order to remediate and mitigate it in the future. Instead, they would need to track down interference all over their 6 GHz network and make any necessary adjustments for an event that may never occur again. This is a highly technical and time-consuming proposition without any guarantee that the interference mitigation efforts would be successful. Also, this process is all backward – the incumbent, licensed entities that represent a large swath of the critical electric and other infrastructure in the country should not be the ones expected to protect themselves against interference or serve as guinea pigs for spectrum sharing. Rather, the burden should fall on the entities proposing unlicensed operations to prove that they can prevent interference from occurring to licensed operations in this band. Fixing interference after the fact will be far too late to undo the damage that might result.

In addition, our comments to the FCC express significant concerns about the FCC's proposed methodology to protect utility systems from interference by these unlicensed mobile operations. In their October 24, 2018 Notice of Proposed Rulemaking (NPRM) calling for unlicensed operation in the 6 GHz band,[14] the FCC suggests that interference can be mitigated through an Automated Frequency Coordination (AFC) system. Unfortunately, the AFC system remains untested, unproven, and hypothetical. As UTC's comments to the FCC explained, the AFC system "is far more difficult in practice to implement." Moreover, unlicensed operators have a history of circumventing the FCC's rules

[14] Unlicensed Use of the 6 GHz Band, Notice of Proposed Rulemaking, ET Docket No. 18-295, 33 FCC Rcd 10496 (2018), *available at* https://docs.fcc.gov/public/attachments/FCC-18-147A1.pdf.

regarding AFC and modifying equipment which has thereby caused interference in other circumstances[15]. Essentially, the FCC is proposing to introduce unlicensed operations into a critical and heavily used licensed band with a protection methodology which may not work.

It is important to clarify something I stated earlier—interference to our wireless systems alone is unlikely to have a cascading impact on electric reliability. The issue is that we use the 6 GHz band for critical communications underpinning electric operations; we have invested millions of dollars into these systems and any interference experienced on these systems will temporarily degrade our situational awareness, along with other communications services. If we can no longer rely on 6 GHz to provide these services, we will essentially be forced out of the band to seek alternatives, and there are few, if any, spectrum bands with the same qualities as 6 GHz, which provides wireless transmissions across longer geographic areas (propagation) very quickly (low latency). In fact, all non-federal utilities were forced to move out of the 2 GHz band in the late 1990s to satisfy FCC policies at that time. While they were provided some stranded cost recovery in that circumstance, most chose to move to the 6 GHz band because it was recognized as one of the only other bands of similar quality. While there are a couple of other bands– 8 GHz and 11 GHz -- the propagation in those bands is more limited and thus does not meet the high levels of reliability required for our operations.

Importantly, because of the way spectrum is allocated, many of our members do not have suitable alternatives to the 6 GHz band in their service territories, leaving them with no options to relocate should the FCC proceed as planned. Even for those who do have alternatives, redesigning and reengineering their communications systems, we have been told, will be a lengthy and highly technical process, taking perhaps up to 10 years in certain instances. In addition, should the FCC proceeds as planned, its action will prevent us from using the 6 GHz spectrum band for future communications needs.

[15] Comments of APPA, API, AWWA, EEI, NRECA, and UTC https://utc.org/wp-content/uploads/2019/02/FINAL_6-GHz-Comments_with_addendum.pdf

Because spectrum policy is managed by the FCC, and because the deployment of ICT networks is interwoven into the deployment of electric service, we believe it is time to hold cross-agency and cross-jurisdictional discussions between the FCC and FERC about the growing interdependencies between the energy and telecommunications industries. Such meetings would build understanding between the two regulatory bodies and the industries they regulate. We believe today's discussion is an excellent opportunity to discuss these issues and we again commend FERC for providing this forum.

As stated earlier, utilities rely on commercial telecommunications firms for their external communications with their customers through their websites, billing, phone calls, and other enterprise needs. These needs become heightened during storms and other high-impact events that may result in power disruption over a wide area. Utilities use their websites and social media accounts to communicate with customers to report outages and relay status reports on repair and restoration. These communications occur on communications systems owned and operated by third parties, thus demonstrating another element of the growing interdependencies between the two industries.

In addition, we are aware, and supportive, of efforts to convene high-level discussions between the industries through the various Sector Coordinating Councils, such as the Electricity Subsector Coordinating Council and the Communications Sector Coordinating Council. The industries, along with others, are developing a Strategic Infrastructure Coordinating Council (SICC) to identify mutual priorities and develop cross-sector incident response plans.[16] We believe these discussions underscore the need for FERC and the FCC to discuss the growing interdependencies between the energy and telecommunications industries. We also urge the Departments of Energy and Commerce to embrace cross-sector and cross-

[16] http://www.electricitysubsector.org/ESCCInitiatives.pdf?v=1.8

agency coordination through providing forums for their agencies to interact on these topics and encourage the regulatory agencies to do so.

5G

Regarding the development of 5G communications networks, it remains unclear just how much utilities will directly benefit from the deployment and adoption of 5G networks. While promoted as being the next evolution of wireless communications technology, promising faster speeds and greater interconnectivity for all kinds of Internet of Things use cases, to date 5G remains mostly a vision that has not yet been realized. This kind of connectivity might be useful for some utility applications, such as more robust drone use or virtual reality system maintenance. The key question for utilities is whether a network – wireless or wireline – can support the reliability requirements demanded by electric utility customers and regulators.

It is important to note that, because of the sheer number of towers and other related cellular infrastructure needed to run a 5G system, 5G is likely to be focused in urban and suburban areas. Rural areas will likely be the last to receive 5G services, if they receive them at all[17]. However, it is clear that in order for 5G to become a reality even in urban areas, electric utility infrastructure will be impacted, and the FCC has already adopted rules to fast-track the deployment of so-called "small cellular devices" to be attached to utility poles or other infrastructure. Because these rules put deployment above due process, many utilities and municipalities are litigating the final rules. This inclusion of this information is solely for your reference, since most of the utility assets envisioned to be used for 5G devices are at the distribution level and therefore not subject to this Commission's jurisdiction.

[17] https://arstechnica.com/information-technology/2019/04/millimeter-wave-5g-will-never-scale-beyond-dense-urban-areas-t-mobile-says/

In order to better understand how 5G may impact utilities, UTC commissioned a report to level-set the industry on a global scale. The report, "Cutting Through the Hype—5G and Its Potential Impact on Utilities," provides a list of challenges and opportunities for utilities to consider when and if 5G services are deployed. As the report notes, because 5G networks are not likely to be built in rural areas, these systems will have to be integrated within existing wireless networks. Given the sensitive and critical nature of information being relayed on utility networks, if utilities embrace 5G connectivity, they will likely prefer to build out their own 5G services rather than to rely on commercial carriers

Cybersecurity concerns are also raised by 5G, according to the report. This is another topic that this Commission and the FCC could potentially discuss, given both agencies' interest in supply chain matters, particularly as utilities are required to provide access to their infrastructure to deploy 5G, as mentioned above. If products contained in the carriers' small cell or other 5G device may provide a vector to utilities' networks, that would be problematic in addition to the vector into a communications carrier's commercial network itself. Both agencies and industries should be interested in addressing this challenge at the beginning of the roll-out.

There are potential opportunities for 5G deployment to be a benefit for utilities, according to our report. The vast number of cellular devices required to make 5G work will all require a near-constant flow of electricity to each of these devices. This is both a challenge and a potential opportunity, as the cost of maintaining and powering these devices reliably "may create a significant overhead cost," but joint ventures between utilities and telecommunications providers could be reached to appease these concerns, the report said.[18] Additionally, just as some rural utilities are already promoting rural broadband by using the extra bandwidth from their utility networks to provide broadband services to their customers or are

[18] Ibid., page 18

partnering with telecommunications firms to bring broadband services to rural locations, utilities could also contemplate building their own 5G networks in rural areas to bring these services to unserved, remote areas of the country[19].

In summary, electric utilities must be part of the discussions on 5G at the beginning of the evolution rather than at the end. Telecommunications networks of all kinds – 5G or otherwise – simply do not function without electricity. Why not have the discussion now between utilities, telecommunications carriers, vendors and the government when there is time to troubleshoot any unexpected engineering challenges, cybersecurity concerns or infrastructure needs? Such discussions will only enhance this Administration's efforts to win the global, 5G race.

Conclusion

On behalf of UTC and our diverse membership, I applaud this Commission for holding today's important discussion. This panel demonstrates that FERC is willing to lead on the growing nexus between the energy and telecommunications industries. While we understand and appreciate the jurisdictional limitations that may apply in some of these proceedings, we greatly value the opportunity to discuss these issues at this high-level conference. We look forward to continued engagement between FERC, the FCC, and the entities who are impacted by decisions made by both agencies.

Thank you for the invitation to be here. I look forward to your questions.

[19] Ibid., page 20