Edison Electric INSTITUTE

Power by Association℠

April 17, 2023

Via Electronic Filing
National Telecommunications and Information Administration
U.S. Department of Commerce
1401 Constitution Avenue, NW
Washington, DC 20230
Attn: John Alden, Office of Spectrum Management:

Re: Development of a National Spectrum Strategy (Docket No. NTIA-2023-0003)

The Edison Electric Institute ("EEI") submits these comments in response to the Notice and Request for Comment ("RFC") issued by the National Telecommunications and Information Administration ("NTIA"),[1] which seeks comment on the development and implementation of a National Spectrum Strategy for the nation. EEI applauds NTIA for its leadership in developing a National Spectrum Strategy so that the U.S. may effectively plan for its current and future spectrum needs and for endeavoring in collaboration with the Federal Communications Commission ("FCC") and in coordination with its other federal partners to identify at least 1,500 megahertz ("MHz") of spectrum for in-depth study to determine whether that spectrum can be repurposed to allow more intensive use.

EEI supports the goal of increasing spectrum access for all users, submitting these comments to underscore that a sustainable spectrum strategy must recognize the necessity to fully address the electric power industry's needs and missions including fixed and mobile wireless broadband services, industrial and commercial applications, Internet of Things ("IoT"), climate monitoring and forecasting, long-rang inspections using unmanned aerial systems ("UAS"), and securing the nation's electric grid. It is more critical than ever to develop a robust, transparent spectrum management framework to meet the industry's clean energy goals and integrate smarter energy infrastructure and renewable and distributed energy sources, grounded in a well-coordinated pipeline of future spectrum availability, a mix of spectrum access models (licensed, unlicensed, shared, or hybrid) and rules that increase predictability of

[1] *See Development of a National Spectrum Strategy*, Notice, Request for Comment, 88 Fed Reg. 16244 (rel. Mar. 16, 2023).

spectrum access. EEI looks forward to working with NTIA as it further develops a National Spectrum Strategy.

Introduction

EEI is the trade association that represents U.S. investor-owned electric generation and distribution companies, including all the major regional electric companies. Collectively, EEI's members provide electricity for 235 million Americans, operate in all fifty states and the District of Columbia, and directly and indirectly employ more than seven million people in communities across the U.S.

Electric companies are among the nation's largest users of communications services and operate some of the largest private communications networks in the nation. Electric companies are investing in communications networks to help make the electric grid stronger, more reliable, secure, and resilient to help transition the nation to cleaner energy resources. Accordingly, EEI and its members have an ongoing interest in ensuring that this nation's electric companies have sufficient communications capabilities to meet their ongoing duty to provide safe, reliable, secure, resilient, cost-effective, and cleaner power to the public.

Sound spectrum policy is important for the electric power industry to develop a wide range of next-generation applications that will improve the reliability, safety, security, and resiliency of the electric grid. The drive to advanced automation requires access to spectrum to support the increasing communications requirements to proliferate millions of devices across electric company transmission and distribution networks.

The National Spectrum Strategy should address the urgent need among critical infrastructure industries ("CII"), including electric companies, for access to licensed, interference-protected radio spectrum for private wireless networks. For decades, electric companies have operated private wireless networks to support their operations. These networks are designed, built, and maintained to exacting standards of reliability because they support mission-critical communications that ensure operational integrity and the safety of life, health, and property. Moreover, these networks must remain operational during emergencies such as severe storms, when commercial networks can become overwhelmed due to congestion or completely fail due to damage. For this reason, it is important that the National Spectrum Strategy addresses the spectrum needs of electric companies because the private wireless networks they use must maintain grid reliability. Without the electric grid, there are no wireless services, no internet, no voice, or data communications.

The National Spectrum Strategy is also critical to America's global competitiveness. Without sufficient access to spectrum, America's electric power industry will not have the tools needed to modernize, much less maintain, their wireless networks high performance, efficiency, resilience, security, and reliability in the manner the electric companies in other nations around the world are increasingly able to achieve. If America's power industry falls

behind, then the nation's progress toward greater energy independence, efficiency, security, and resiliency will be impeded.

Comments

I. Pillar #1—A Spectrum pipeline to ensure U.S. leadership in spectrum-based technologies

In meeting their communications requirements electric companies make extensive use of privately-owned communications networks, including wireless networks and fiber optic networks, and will continue to do so because these networks support critical electric company functions. Electric companies are also significant users of commercial networks, but typically these networks are not designed or built to provide the levels of reliability, survivability, availability, and/or coverage that are necessary to meet electric company communications needs, particularly in times of emergency.

One of the primary communications needs of electric companies is, and continue to will be, the need for more spectrum. Electric companies need the flexibility to deploy the communications networks and technologies that provides their customers with the appropriate level of quality of service, which is economically priced and provides the appropriate level of access, security, and reliability needed for that application.

Spectrum access can be best achieved through adoption of a clear, well-coordinated spectrum pipeline. NTIA, the FCC, and other federal stakeholders should coordinate to identify spectrum bands that can be brought to market or allocated under specific timeframes. Also, as spectrum bands have varying propagation characteristics, it is important that a spectrum pipeline promotes flexibility of opportunities across bands. While electric companies have a significant interest in mid-band spectrum because it has the greater propagation capabilities of low band, but higher bandwidth of high band,[2] they also seek additional opportunities to access spectrum in the low and high bands to ensure reliability of these complex systems.

A. Spectrum availability and utilization of existing resources

The provision of safe, reliable, secure, resilient, cleaner, and affordable electric service is an extremely complicated endeavor and is the essential responsibility of this nation's electric companies. In in fulfilling this task, electric companies have expansive communications needs because they typically have extensive infrastructure that requires maintenance, remote control, and monitoring. Electric companies must be prepared to offer safe and reliable ubiquitous electric service at reasonable costs even in the most rugged and remote areas, many of which are not adequately served by telecommunications providers, particularly the larger carriers.

[2] For example, this is important for electric company UAS operations involving real-time inspections, natural resource management and more.

Furthermore, due to state regulatory mandates, electric companies must have one hundred percent communications coverage throughout their service territory.

Electric companies use a variety of communications services and applications, and such usage varies by company and by region (e.g., urban, rural, mountains, plains, coastlines, etc.). For example, electric companies operate an assortment of transmission, distribution, and substation facilities which they equip with fiber optic, microwave, or satellite communications. Due to redundancy requirements, many of these facilities have diverse links. At the same time, electric company field crews must have effective communications throughout service territories, and wherever individual customer meters must communicate back to the electric company. Accordingly, electric companies rely on private land mobile radio systems for crew communications performing maintenance, storm recovery, and other essential work. Electric company crews work is often difficult and dangerous, sometimes in remote areas. Therefore, the land mobile systems on which they rely must provide sufficient geographic coverage and available capacity to allow crew communications at any time, under any conditions, and particularly after severe weather events when other forms of communications are disrupted.

The electric power industry's communications needs are not effectively met by commercial service providers, which is why many critical-infrastructure industries including electric companies operate their own private wireless networks. As noted, commercial networks are subject to congestion during emergencies when a single cell site is flooded with calls in the affected area. Likewise, commercial sites may lack adequate back up power to maintain operation during extended power outages. Additionally, commercial sites may lack adequate network redundancy and/or sufficient latency to meet reliability requirements in the event of a fiber cut or other network problems. In sum, lack of commercial carrier coverage across an electric company's service territory and the survivability/sustainability or the reliability of the communication service are the main reasons why electric companies have invested in communication systems. By comparison, critical-infrastructure communications networks have much greater reliability (i.e., 99.999 percent or higher), longer back-up power, better network redundancy and diverse routing, and are not subject to the same degree of congestion and security concerns associated with sharing commercial communications networks with the public.

Such a demanding requirement for reliability means that electric company and CII operations have little or no margin for any potential interference, interruption, or diminution of their critical wireless communications services. Keeping the lights on is a core value of every electric company—before, during and after major events such as hurricanes and ice storms. It is essential that an electric company's communications services utilized for both voice communication with crews and for command and control of equipment and protective devices must remain operational. Use of communications services is essential in electric companies being able to evaluate and respond to a major event.

An essential component of the electric company system's operation is the Supervisory Control and Data Acquisition ("SCADA") system, which electric companies use to monitor and control protective devices and other equipment on the electric grid. The coverage and reliability requirements associated with a SCADA system makes it necessary for electric companies to own and operate communications networks. As a result, most electric company SCADA systems are narrow band, point-to-point communications systems that allow for remote monitoring and control of facilities and equipment.

Electric companies rely on broadband communications networks for a variety of internal uses including, but not limited to, mapping for remote locations and for pinpointing outages or other problems, transmitting schematics, blueprints, and other necessary data to field crews, such as video surveillance to prevent copper theft and providing overall security throughout the grid.[3]

Security reliability, coverage, latency, backup, and bandwidth are the basic requirements for electric company communications systems. In the past, electric companies have utilized narrowband and broadband communications equipment for both data and voice communications. Electric companies often utilize spectrum between 150 MHz to 512 MHz for voice and data communications. However, for some electric companies the sharing of voice channels with sensitive data is unsafe and unacceptable; therefore, these electric companies require more exclusive use of data channels below 512 MHz. Furthermore, in the past, electric companies utilized 2 GHz point-to-point licensed spectrum. The loss of this spectrum negatively impacted the reliability of electric company communications systems utilizing this spectrum. To make matters worse, electric companies are now facing the prospect of effectively losing interference-protected access to the 6 GHz band as unlicensed operations proliferate in that band.

B. Future spectrum requirements

Any spectrum pipeline should account for the wide range of spectrum access approaches, including licensed, unlicensed, and shared spectrum solutions to enable efficient, effective, and innovative uses of spectrum. However, the National Spectrum Strategy should prioritize the electric power industry's access to interference-protected, exclusive-use spectrum to provide reliable, safe, secure, and resilient power to the public.

Due to the advent of advanced smart grid technologies, grid modernization efforts, the transition to cleaner energy, and need to enhance grid security and resiliency, electric companies need access to additional spectrum to support increasing electric company capacity and coverage requirements. Electric companies are deploying devices more pervasively within existing networks to enable new applications and provide additional capacity, while also

[3] Recent physical attacks on electric infrastructure will likely drive the need for additional security measures that rely on wireless networks to operate.

deploying devices further outside of existing networks to expand coverage. At the same time that the number of devices is increasing, the bandwidth of the applications is also increasing because of the need for real-time HD video, imaging, audio, and other bandwidth-intensive sensing, monitoring, and inspection content. Limited legacy narrowband systems cannot reliably support the increasing amount of data that electric companies need carried over private wireless networks for two-way, real-time connectivity to these devices, which electric companies often must deploy over large geographic areas. Hence, there is a critical need for spectrum to support the increasing electric company communications needs for these new applications.

With grid modernization, the need for additional spectrum for electric companies is essential. There is explosive growth expected in the IoT market, and critical infrastructure industries are leading that growth, whether it is smart grid, or UAS, terrestrial crawlers, submersibles, robots, and other remote inspection equipment for automated operations. Over the course of the next fifteen years, electric company communications networks will need to be able to carry terabytes of data for two-way, real-time communications over large geographic areas with very low latency and very high reliability. Any failure in these communications systems could have significant adverse consequences, owing to the essential nature of the services they support and the hazardous environments in which personnel in these industries work.

To support these increasing communications needs, critical-infrastructure industries need fair opportunities to access licensed, interference-protected spectrum that is allocated in sufficient channel bandwidths and sufficiently lower frequency range to support wide area coverage and higher throughput/lower latency. Unlicensed spectrum is subject to interference and congestion, potentially threatening the reliability of electric company communications, which is harmful. Additionally, unlicensed spectrum has a limited range because of power restrictions. By comparison, licensed spectrum permits higher power and better coverage, particularly in lower frequency ranges that tend to propagate better. Consequently, electric companies need access to wideband if not broadband licensed spectrum in lower frequency ranges, but also access to mid and high band spectrum.

C. Spectrum management process

EEI supports the current roles of the FCC and NTIA in leading this process, however, there needs to be broader coordination and collaboration among federal agencies responsible for regulating and supporting critical infrastructure such as the U.S. Department of Energy ("DOE") and the Federal Energy Regulatory Commission ("FERC"). The challenge for regulators is to balance the importance of more spectrum for the commercial industry to allow critically important technology, 5G and beyond, to proliferate against the equally critical issue of keeping the electric grid safe, reliable, secure, and resilient. Inter-agency discussions need to happen early in the process so that other stakeholder agencies or departments can effectively weigh-in on spectrum policy decisions. Also, the FCC and NTIA, in collaboration with their other federal

partners, should focus on improved spectrum governance. Among other things, such an effort should involve clarifying the interference rules and accelerating resolution of the disputes, including what responsibilities users have to one another in adjacent bands. In addition to cooperation between multiple impacted federal agencies, it is important for there to be White House involvement in navigating these types of challenges.

D. Spectrum sharing, use cases, benefits, and challenges of spectrum access approaches

EEI supports a wide array of different spectrum access models including exclusive licensed, unlicensed, and shared spectrum solutions. However, as also noted, the electric power industry needs access to interference protected spectrum that is attendant with exclusive use licensed spectrum. Electric companies also operate systems using unlicensed spectrum, but these unlicensed operations do not ensure the appropriate levels of reliability and security required for companies classified as "Critical Infrastructure" by the Department of Homeland Security.[4]

Electric companies are open to and interested in federal spectrum sharing as a strategy to access additional spectrum that is suitable to provide sufficient capacity and coverage cost-effectively to meet their increasing communications needs. There are different approaches to spectrum sharing that may be applied, depending on a range of factors, including the extent to which certain spectrum bands are already being used and the proposed use of the band by new entrants. Electric companies require highly reliable communications, and spectrum sharing approaches will need to maintain certain quality of service to ensure communications reliability. In addition, electric companies need low latency communications, which again will factor into the spectrum sharing approach that could be used, so that these latency requirements can be met.

Electric companies support broader spectrum sharing including sharing with unlicensed operations, provided that these approaches are implemented in a way that protects incumbent operations from interference. Any sharing techniques must be tested and proven to be effective at protecting electric companies' use of a band before being put to use. Electric companies must not be placed at risk by new, unproven spectrum sharing methods. Furthermore, the introduction of any spectrum sharing techniques that could impact electric company communications should be accompanied by mechanisms that help incumbent electric company licensees identify and resolve potential sources of interference. Thus, EEI strongly disagrees with characterizing unlicensed use of the 6 GHz band as a successful model for unlicensed access to other bands. To the contrary, the 6 GHz model and process entailed for opening that band to unlicensed operations demonstrate that lack of transparency regarding

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[4] *Critical Infrastructure Sectors*, Cybersecurity & Infrastructure Security Agency, https://www.cisa.gov/critical-infrastructure-sectors.

the commercially driven modeling of the interference impact of unlicensed low power devices operating in that band, has resulted profound lack of consensus among stakeholders regarding the risks presented to incumbent 6 GHz links. Thus, in absence of sufficiently robust, transparent, and reproducible interference impact studies,[5] electric companies have elected to conduct real-world testing of the interference impact of 6 GHz low power devices. This real-world testing has repeatedly demonstrated that the risk of harmful interference is significant, and as devices proliferate the field, that they will have potentially disastrous consequences for the safe, reliable, and secure delivery of essential electric services, as well as public safety services to the public at large.

Quantitative analyses of interactions between services should be fact- and evidence-based, sufficiently robust, transparent, and reproducible to better inform spectrum management decision-making. Transparent and reproducible quantitative analyses best inform decision-making and give stakeholders and regulators the ability to validate the fidelity of interference models and ensure that they represent realistic operating conditions and scenarios, with balanced protection criteria. The National Spectrum Strategy should actively encourage cross-industry information sharing and collaboration[6] as well as for regulatory processes to require analytical models to be reproducible so that multiple diverse stakeholders can validate the conditions and results of such models.

II. Pillar #2—Long-term spectrum planning

To plan networks, raise capital, develop ecosystems, and deploy networks requires the government to provide private markets with predictability and reliability with respect to spectrum availability. A consistent and predictable framework aids electric companies in making appropriate capital allocation plans for deploying and operating networks. Electric companies are cost-regulated entities.[7] Within their regulatory framework, they need certainty and predictability to justify the prudency of investments over long time frames. Certainty and predictability with regards to wireless networks means that electric companies need interference-protected spectrum as an essential component of a solid foundation for the deployment of advanced technology that is essential to grid modernization, and enhancing reliability, security, and resiliency of the electric grid. Electric companies need certainty that

[5] Electric companies and other incumbent users of the 6 GHz band have sought transparency and protection from harmful interference from new unlicensed use of the 6 GHz band. EEI and other affected trade associations have repeatedly requested that the FCC require submission of all simulation information (not just inputs/outputs) relied upon to determine whether incumbent systems would be protected from harmful interference by new unlicensed operations in the 6 GHz band.

[6] While EEI does not expect government entities to necessarily share sensitive information, commercial parties should share information with appropriate confidentiality protections recognizing that the electric industry does not compete in providing communications products or services.

[7] Electric companies are regulated by their states for prudency of their investments.

investments in licenses or sharing arrangements will provide sufficient bandwidth and guard against problems like interference and congestion over the long-term.

A. Stakeholder engagement and fostering trust among spectrum stakeholders as well as driving consensus among all parties regarding spectrum allocation decision is crucial.

As discussed above, the electric power industry utilizes and relies on spectrum for a wide variety of essential purposes that serve important economic, security, and safety objectives. NTIA should be proactive in stakeholder engagement and ensure that the electric power industry is engaged in a long-term spectrum planning process.

The key for success is to ensure that a transparent dialogue is maintained where all spectrum stakeholders can clearly articulate their communications needs and requirements. The dialogue should not simply be focused on how much revenue can be derived through auction mechanisms, because it is without question that the public interest is well served by the proliferation of services and user communities like the electric power industry with needs that cannot be fully realized over commercial wireless networks. Similarly, undue focus should not be placed on identifying additional spectrum for unlicensed use, simply because that approach satisfies the business case of certain commercial interests. As NTIA considers opportunities to reallocate spectrum, it must recognize that evaluations of efficiency and effectiveness for CII such as the electric power industry will differ from other types of spectrum users. Indeed, electric companies' communications needs more closely resemble those of public safety entities because their communications systems are designed for worst-case, highest use scenarios and therefore also require a much greater surge capacity than commercial systems. By ensuring that CII, public safety, and government services have a strong voice in the coming discussions on spectrum access, NTIA will be providing a balanced process that best serves the interests of the American people.

B. The National Spectrum Strategy should provide alternatives to auctions to make additional spectrum available for critical infrastructure entities.

NTIA should recognize spectrum auctions that are intended to increase efficiency for commercial spectrum use are not well-suited to incumbent electric company licensees. Spectrum auctions have not typically resulted in electric companies obtaining spectrum they need. Obtaining spectrum at auctions can cost millions of dollars, depending on the frequency range, the geographic area of the license and the degree to which the spectrum is free of encumbrances (i.e., incumbents). Moreover, commercial carriers have deeper pockets for speculative expenditures; or they can at least more easily pass their auction costs onto their subscribers than electric companies. While electric companies have typically been unable to enter many spectrum auctions or have been frequently unsuccessful in offering winning bids in others, some electric companies have had success, particularly in some of the smaller blocks/geographic areas.

Electric companies have often struggled to gain access to licensed spectrum in a cost-effective or site-specific manner through auction mechanisms largely because past spectrum auctions rules entailed large geographic licensing areas that may not align with electric company service areas. For their site-specific private wireless networks, electric companies cannot realistically bid on an entire county or Partial Economic Areas, let alone compete with the traditional carriers on spectrum acquisition. Even counties, the smallest geographic component used by the FCC, often encompass more geography than needed for electric companies. Spectrum utilization should be evaluated based on the investments electric companies make in their wireless network deployments under prudency oversight from their regulators whereby they must be able to demonstrate that this investment will provide the public with reliability, resiliency, efficiency, security, and/or safety of operations to support the electric service on which the public relies.

III. Pillar #3—Unprecedented spectrum access through technology development

With regard to the role government should play in promoting research into, investment in, and the development of technological advancements in spectrum management, spectrum-dependent technologies and infrastructure, the communications requirements for critical infrastructure like the electric grid, require careful consideration in internal federal government discussions related to spectrum management and emergency network operations support, and should be considered in federally sponsored committees made up of representatives from industry that address issues of spectrum management and communications network reliability. Given that wireless communications will play a key role in grid modernization, security and resiliency, consistent with above, NTIA should work within the auspices of a larger federal agency effort to identify additional spectrum for wireless broadband that includes not only the FCC but also the DOE and FERC so as to review possibilities for spectrum access to accommodate energy infrastructure such as the electric grid, either though sharing frequencies with other users, leasing, or other alternatives. In addition to cooperation between multiple impacted federal agencies, it is important for there to be White House involvement in navigating this type of challenge.

Finally, EEI supports the National Spectrum Strategy prioritizing research and development, testing and evaluation to promote spectrum access.

Conclusion

EEI appreciates the opportunity to provide comments in response to NTIA's Request for Comment to urge that the National Spectrum Strategy promote access to additional licensed spectrum to enable more effective and intensive use of spectrum by the electric companies to support their private wireless communications networks that are used to ensure the safe, reliable, secure, and resilient delivery of power to the public. EEI looks forward to working with NTIA as it further develops the National Spectrum Strategy.

Please contact the undersigned with any questions.

Respectfully submitted,

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Dated: April 17, 2023