Edison Electric Institute
Power by Association℠

October 12, 2011

U.S. Department of Commerce
National Institute of Standards
and Technology
ATTN: Notice and Request for Comment
on the Public Safety Broadband Network
325 Broadway
Boulder, CO 80305

RE: DOCKET NO. 110727437-1433-01
SOLICITING INPUT ON RESEARCH AND DEVELOPMENT PRIORITIES FOR DESIRABLE FEATURES OF A NATIONWIDE PUBLIC SAFETY BROADBAND NETWORK.

The Edison Electric Institute ("EEI"), on behalf of its member companies, hereby submits the following comments in response to the request of the National Institute of Standards and Technology ("NIST") for information on features and requirements designed to promote resiliency, availability and reliability, security, and affordability/commercial alignment in a new nationwide interoperable public safety broadband network ("PSBN").[1]

EEI is an association of the United States investor-owned electric utilities and industry associates worldwide. Its U.S. members serve almost 95 percent of all customers served by the shareholder-owned segment of the U.S. industry, about 70 percent of all electricity customers, and generate about 70 percent of the electricity delivered in the U.S. EEI frequently represents

[1] *See* Notice and Request for Comment: Soliciting Input on Research and Development Priorities for Desirable Features of a Nationwide Public Safety Broadband Network, Docket No. 110727437-1433-01, 76 Fed. Reg. 56,165, Sept. 12, 2011 ("Notice").

its U.S. members before federal agencies, courts, and Congress in matters of common concern. EEI's members rely on communications networks to carry out their core mission of safely and reliably delivering electric service and, therefore, EEI has a strong interest in this proceeding and in NIST's efforts to examine features and requirements of an interoperable public safety communications network.

I. Introduction and Summary of Position.

In this proceeding NIST seeks input on a series of possible features and requirements to promote a new nationwide interoperable PSBN designed to improve public safety communications. NIST in particular is considering how these features and requirements can be satisfied either through existing technologies or through research and development of new technologies in the near-term. NIST indicates that it is working with industry, the Federal government and public safety organizations to conduct research and development to support new standards, technologies and applications to advance public safety communications.[2]

EEI welcomes NIST's inquiry into these matters and agrees with NIST's assessment that certain unique communications needs are not currently reflected in broadband technologies. EEI further believes that NIST is well suited to drive the discussion of interoperability and the creation of technical rules for the PSBN. To this end, EEI supports NIST's efforts in this proceeding to identify overarching themes and to better understand possible features and operational requirements of public safety communications and a nationwide PSBN. However, EEI is concerned by the limited focus of NIST's inquiry on commercial and public safety solutions to these issues and, in particular, on the Notice's narrow consideration of shared use of

[2] Notice at 56,165.

infrastructure between commercial and public safety users.[3] As discussed below, any NIST inquiry into the PSBN should carefully consider how to promote shared use of the network between electric utilities and public safety entities, and should bear in mind the unique communications needs of electric utilities which in many ways are aligned with the communications needs of public safety entities.

Electric utilities rely on communications networks and services to carry out their core mission of safely and reliably delivering electric service to most, if not all, of the nation's residential and business consumers. In this regard, reliable and resilient communications networks are essential to utility operations, and are necessary for the provisions of safe, reliable electric service in even the most inclement weather. While electric utilities rely in part on commercial communications networks, these networks at times fall short of meeting the exacting reliability needs of the electric utility industry in its provision of critical services in all environments. Often, these reliability shortfalls occur during or in the immediate aftermath of natural or man-made events – when utilities are most reliant on communications in order to restore critical services and to protect the safety of utility field crews and the public. Electric utilities simply require more reliable communications which enables them to restore services and systems quickly and safely. In many ways, these distinct communications needs mirror the needs of public safety entities, making all the more apparent the importance of permitting utilities to share use of the PSBN in order to develop communications solutions which satisfy the mutual needs of the utility industry and public safety community.

[3] See Notice at 56,166. NIST's "Feature List" looks are network sharing in the noticeably limited context of "shared use of infrastructure between commercial and public safety users."

As discussed below, EEI believes that NIST has an important role to play in coordinating the development of a new PSBN by facilitating the creation of technical rules, principles and features of the network in a manner that ensures interoperability. In considering what features best promote development of an interoperable PSBN – one which may be used by electric utilities on a shared basis – EEI submits that a focus on several key architectural principles, including Quality of Service ("QoS"), priority access and coverage reliability, will go far to put into place incentives and efficiencies that drive creation of such a shared network. In connection with these principles and with shared use of the PSBN, network sharing arrangements between electric utilities and public safety entities are vital to ensure availability of service for utilities and to create assurances which are essential to the potential development and construction of joint infrastructure.[4]

II. NIST Should Work to Promote Shared Use by Electric Utilities of the PSBN, Which is Vital to the Public Interest.

Given the unique needs and requirements of the electric utility industry for reliable and resilient communications networks, EEI urges NIST to take steps to promote shared use of the PSBN between public safety entities and electric utilities. Shared access to this network by electric utilities will ensure that utilities are able to work with public safety entities to use and, possibly, to jointly develop communications networks that satisfy their reliability needs – needs which are largely shared by the public safety community. A shared network will facilitate improved communications between electric utilities and traditional public safety entities (e.g., fire and police) during and in the immediate aftermath of emergency situations and other major events – communications which today is hampered by disparate systems and which has long

[4] EEI notes that in some instances network sharing arrangements between electric utilities and public safety entities will involve utilities constructing certain facilities and components on the network. The existence and scope of such arrangements will vary based on the individual utility.

been identified as a critical need. In addition, as indicated above, commercial communications networks generally do not meet the reliability (including coverage) and security standards of utilities, in turn making the development of separate networks essential in some areas. Shared use of the PSBN will address many of these reliability concerns, and will provide electric utilities with needed flexibility to make use of the PSBN as well as commercial communications networks, as their individual communications needs may require.

Utilities' shared use of the PSBN will benefit the public at large and will be instrumental in satisfying electric utilities' mandate to serve the public interest and to provide critical services relied on by most, if not all, of this nation's government agencies, military bases, public safety and emergency health care services, as well as business and residential users. EEI and its members further believe that shared use of the PSBN by electric utilities is in the public interest due to utilities' unique status as critical infrastructure, and will go far to address many of the communications network reliability issues currently experienced by electric utilities as end-users of commercial communications systems. In particular, utilities rely on communications networks to facilitate the natural recovery of infrastructure, and to more effectively dispatch field crews. To this end, shared use of the PSBN by utilities is of great benefit to the general public to the extent it permits utilities to use and, potentially, to develop networks in line with their unique needs, and enables utilities to operate and to restore critical services in a safe, timely manner.[5] Shared use of the PSBN also will assist electric utility efforts to improve their core infrastructure, thereby providing greater service reliability and network security, in turn better protecting the grid from cyber attack.

[5] As noted by EEI in prior filings before the Federal Communications Commission, the principal, if not sole purpose of utilities' communications is to protect the safety of life, health and property. *See* Comments of the Edison Electric Institute, Federal Communications Commission, WT Docket No. 06-150, at 5 (Apr. 11, 2011).

It is of some significance that electric utilities and public safety entities have a long track record of working closely together in the public interest. This relationship further underscores the importance of a shared network and the need for NIST to look closely at how best to promote shared use of the PSBN between electric utilities and public safety entities – an arrangement which is consistent with the National Infrastructure Protection Plan[6] and which will ensure both short- and long-term affordability of the PSBN by achieving a level of efficiency and cost savings only obtainable through joint use of infrastructure and equipment by two groups that share many related communications needs and requirements.[7] Further, an approach which allows utilities shared use of the PSBN will go far in advancing the interests of the public generally by ensuring against the creation of interdependencies between key components of the nation's critical infrastructure: namely, between the electric power industry and the commercial communications industry.

EEI notes that while shared use of the PSBN is an important component in satisfying electric utilities' communications requirements, multiple options must be available to utilities in meeting their communications needs, including use of private wireless as well as commercial network solutions.[8] EEI urges NIST, in developing recommendations as to shared use of the

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[6] *National Infrastructure Protection Plan*, Department of Homeland Security (2009), available at http://www.dhs.gov/xlibrary/assets/NIPP_Plan.pdf.

[7] EEI notes that sharing arrangements with public safety entities may call for electric utilities to build communications facilities for joint use with public safety entities. However the scope of these arrangements and agreements to construct facilities will necessarily vary as between electric utilities.

[8] EEI has discussed in detail this need for additional private spectrum in several prior proceedings before the Department of Energy and the Federal Communications Commission. EEI underscores that it remains critical for utilities to have access to suitable, auction-exempt spectrum to support their private internal wireless communications networks. *See* Comments of EEI, Department of Energy, *Implementing the National Broadband Plan by Studying the Communications Requirements of Electric Utilities to Inform Federal Smart Grid Policy* (July, 2010), available at http://www.gc.energy.gov/documents/EdisonElectric_Comments_CommsReqs.pdf; *see also* Reply Comments of EEI (August 2010), available at http://www.gc.energy.gov/documents/Edison_Reply_Comms.pdf. EEI reaffirms its position taken in those

PSBN, to avoid taking any approach which may inhibit or prohibit the array of communications options available to electric utilities. Ultimately, utilities will continue to make sound business decisions when choosing communications options to meet their critical needs, and shared use of the PSBN, as well as development of private internal networks, must be included in that consideration.

III. Electric Utilities Require Reliable Communications in Their Provision of Critical Service and Share Much in Common with Public Safety Entities, Further Emphasizing a Need for Shared Use of the PSBN.

Reliable and resilient communications networks are essential to electric utilities' operations as they carry out their core mission of providing safe, reliable electric service, and are necessary to meet public safety needs. Electric utilities have a mandate to serve the public interest and provide critical utility services that are relied on by most, if not all, of the nation's residential and business consumers. Not only must electric utilities be prepared to provide these services under normal conditions, in times of disaster utilities must maintain or quickly restore critical services. Maintaining an adequate level of reliability during major events which impact the electric grid – natural or otherwise – is in the interest of public safety, as reliable power is needed for government and public safety facilities, hospitals, transportation, military facilities and other critical infrastructure. It is in the national interest, then, that communications networks used by electric utilities remain reliable at all times.

Reliable communications systems are vital to support utilities' critical operational needs, and to support maintenance, remote control and monitoring, as well as dispatch of, and communication with, utility field crews in service territories. Electric utilities depend on

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comments regarding electric utilities' need for dedicated spectrum to meet their current and future communications needs.

communications networks for locating outages as well as for communicating internally between utility offices to improve operational efficiency and to quickly and effectively respond to major events. Reliable networks are essential to support utility responsibilities during emergencies when utility service crews in the field are working to maintain or restore electric service. In these instances, utilities work closely with public safety entities and first responders and, therefore, require communications networks to operate with a high level of reliability. Electric utilities and public safety entities also must communicate with one another in these situations, given that often a utility must be present to control the electric network for the safety of public safety personnel who often operate in dangerous environments (e.g., public safety personnel responding to an accident or fire may be put at risk by downed power lines, and rely on the local electric utility to control or stop the flow of electricity accordingly). As indicated above, electric utilities and public safety entities have a long track record of working closely together in the public interest and it is reasonable, then, that the reliability of the their communications be better aligned. To this end, electric utilities should be permitted to use the PSBN on a shared basis in order to meet these high reliability needs and to permit electric utilities to carry out their core mission of safely and reliably delivering electric service. Utilities also require reliable communications systems to enable their coordination with other utilities and public safety entities during and immediately following major events as they engage in mutual assistance and coordinated response efforts.

To meet these stringent reliability needs, EEI and its members submit that shared use of the PSBN for purposes such as service restoration and emergency response – activities which protect life and property, including the safety and protection of electric utility service personnel and consumers – is vital and should be given careful consideration by NIST in this and related

proceedings. In addition, electric utilities' unique reliability requirements serve to underscore the need for utilities, in addition to shared use of the PSBN, to have access to suitable spectrum to develop their own private internal wireless communications networks.

IV. NIST Has an Essential Role to Plan in Coordinating Development of the PSBN by Facilitating the Creation of Common Rules, Principles and Features in a Manner That Ensures Interoperability.

In its Notice, NIST inquires as to several possible key features and requirements of the nationwide PSBN, and seeks comments on issues related to development and implementation of these features. As a general matter, EEI believes that NIST is the governmental organization best situated to drive the development of technical rules and principles essential to the development of a reliable, resilient and interoperable PSBN. NIST is well suited to lead this effort given its technical expertise, its experience with interoperability standards development, and its ability to objectively assess and develop network standards and features which will apply across several industries. NIST is also best positioned to serve as the venue for convening relevant stakeholders to evaluate these issues, and for ensuring that the electric utility industry has a seat at the table. The instant proceeding is a good first step in this direction, though EEI proffers the following recommendations to guide NIST's PSBN activities going forward.

A. NIST Should Facilitate Creation of Technical Rules and Requirements to Drive Interoperability of the PSBN.

In view of NIST's central role in the development of the PSBN, EEI and its members submit that NIST first and foremost should facilitate interoperability of the PSBN by defining common sets of features and parameters at various communications layers – within all networks and on every device. Importantly, NIST as part of this effort should facilitate technical rules for the PSBN by coordinating the development of a uniform, nationwide architectural framework to promote comprehensive understanding of interoperability and the steps that must be taken by

various entities to achieve that objective. This is best accomplished through the development of architectural principles to guide development of the network in a manner that ensures interoperability, and will require identification of all services and capabilities that a network must be capable of supporting to ensure interoperability, and on-going accounting of how the network will evolve over time.

Among the specific architectural principles upon which NIST should focus are support for QoS and priority access to the PSBN, security schemes, a minimum level of coverage reliability, interference mitigation schemes, as well as conformance and interoperability testing. Beyond this, NIST should assist in the identification of requirements necessary to support mission-critical voice and data communications. To support mutual assistance efforts between public safety entities and electric utilities, NIST should work to establish technical and operational requirements for roaming, including authentication and clearing functions. NIST also should support the evolution of standards and the forward compatibility of technology that support both voice and mission-critical data, to ensure that the PSBN will keep pace with technological developments in the competitive commercial marketplace. Similarly, NIST should ensure backwards compatibility of such technologies. NIST also has a vital role to play in examining how best to maximize network efficiencies through the sharing of network resources.

B. NIST Should Focus Particular Attention to Such Key Features as Prioritization, Quality of Service and Sharing Arrangements.

In its Notice, NIST identifies several important features which will go far to promote efforts to develop an interoperable PSBN which may be used by electric utilities on a shared basis. While each of these may be useful, central to NIST's efforts, and among the features identified by NIST as necessary to ensure network reliability and availability, are prioritization

of network traffic based on assigned priority schemes and QoS. Similarly important are network sharing arrangements between public safety entities and utilities.

Prioritization of network traffic on the PSBN is a essential for electric utilities, whose critical operations require some level of assurance from the network that utilities' most critical applications will be given priority, especially during or in the immediate aftermath of a major event. While electric utilities can work with public safety entities to develop methods of prioritization to ensure that the PSBN will benefit the public at large and will satisfy electric utilities' mandate to serve the public interest and to provide critical services, NIST has an important role to play in this process. EEI urges NIST to work to identify classes and applications, as well as common performance attributes and objectives to support standards for prioritization and QoS. As part of this process, NIST should work with industry, including the electric utility industry, first to determine the various classes of users of the PSBN in addition to the relevant applications to be used on the network. NIST also should map performance objectives and attributes to create a common standard or standards to address issues of prioritization.

EEI and its members believe that the PSBN can be used on a shared basis provided public safety entities and electric utilities are permitted to enter into network sharing agreements which outline reasonable terms for prioritization of network traffic based on common sets of priority schemes. A threshold issue for utilities is a need for assured access to some level of network service that cannot be terminated regardless of the circumstance. If utilities cannot be assured of such access to the PSBN as well as prioritization of critical utility traffic on that network, the shared service on the PSBN likely will perform no better for utilities than existing commercial service provided by communications common carriers. The ability to successfully prioritize

network traffic, then, will ensure both short- and long-term affordability of the PSBN by achieving a level of efficiency and cost savings only obtainable through joint use of infrastructure and equipment by electric utilities and public safety entities – two groups that share many related communications needs and obligations.

In order for shared use of the PSBN to work effectively, electric utilities must be assured that sufficient amounts of network capacity will be available at all times to support certain critical utility services and applications, including during and immediately following severe weather events and other emergencies. As noted above, maintaining a stable grid during numerous types of events – natural and otherwise – is in the interest of public safety, as reliable power is needed for military bases, government and public safety facilities, as well as for hospitals and other critical infrastructure. Therefore, in the interests of public safety, utilities as shared users of the PSBN must be provided priority service for certain critical applications, and any limitations in access to the PSBN should be reasonable.

To aid in achieving this objective, EEI encourages NIST to develop general guidelines to serve as a default mechanism for prioritizing network traffic on the PSBN. Notably, however, any such guidelines should provide sufficient flexibility to allow public safety entities and electric utilities to work together to establish terms and protocols for prioritizing traffic on the network based on their unique needs. NIST should avoid establishing detailed, proscriptive priorities, and instead should allow priorities to vary between regions and as different types of entities seek to use the shared network. For example, some municipal governments may desire to use the PSBN for all city services, which might include non-critical use traffic.[9] Such traffic

[9] As a general matter, EEI believes that practices such as these should be discouraged. Allowing the private, secure network to be polluted with such non-critical use traffic would place the system on par with commercially-available networks, and discourage electric utility investment in the PSBN.

from government entities should not receive priority over all non-government traffic, as some low-priority government uses (e.g., management of a municipal golf course) should be outweighed by essential non-government uses (e.g., private ambulance services or electric utility service). In all instances, however, public safety services should receive priority access in times of emergency.

EEI notes that not all traffic from electric utilities would require priority service.[10] Utilities, as well as public safety entities, operate both critical and non-critical services, and require priority access to the PSBN only for critical services with public safety impacts. What constitutes a critical utility service may vary between regions and, therefore, prioritization guidelines for shared use should remain flexible to permit utilities and public safety entities to work together in determining how best to manage prioritization based on their needs.

It is of further importance to EEI and its members that electric utilities, as shared users of the PSBN, be permitted to use the network in accordance with an established prioritization framework, based on a users' priority level and need to access the system at any given time. Utilities should not be required to accept preemptible network status as a default condition of use – requiring electric utilities who rely on the PSBN to accept preemptible service as a condition of use likely will force utilities to use the network only for lower priority traffic (*i.e.*, traffic which otherwise could be placed on commercial networks). This in turn may hinder utilities' willingness to invest in the PSBN, to the extent that that their most critical traffic could be preempted at times when utilities are most reliant on the PSBN. This approach would place the

[10] For example, utilities' distribution and supervisory control and data acquisition ("SCADA") activities will require a higher level of prioritization than advanced metering infrastructure ("AMI").

PSBN on par with commercially-available services, and negate much of the inherent advantages of a shared network.

To address issues and challenges with regard to network prioritization, EEI submits that a two-tiered routing priority methodology may serve as a useful model. Under this approach, the first tier would route priority for all traffic across the network under normal operations; the second tier would be implemented during a declared emergency and would curtail certain services. This model could also ensure that certain core services (e.g. voice and data services necessary for electric system operation and restoration) are not disrupted under any circumstance. EEI further notes that there likely will be sufficient bandwidth for identified parties to the shared network if proper technology is used, and the network is properly managed. Such technology could manage co-existence of parties seeking to share network infrastructure, and make it easier to coordinate shared usage of the PSBN. Long-Term Evolution ("LTE") technology in particular has the ability to provide allocation capabilities as well as a convergence of voice, data and video over a shared infrastructure, and could be used to regulate usage. Beyond this, and as indicated above, QoS capabilities can be used to manage and facilitate priority queuing of traffic based on designated application priority. NIST in its Notice correctly identifies QoS as one feature of the public safety network.[11] EEI agrees with NIST that QoS may be an important component to ensure reliability and availability of service to the extent this technology enables shared usage of the PSBN through configuration management. Low-priority applications could be assigned lower QoS values to permit critical traffic, as defined by the primary user, to always maintain priority.

[11] *See* Notice at 56,166.

C. NIST Should Work to Develop Performance Requirements for the PSBN.

Finally, NIST should work to develop performance requirements for the PSBN taking into account potential partners with public safety entities such as electric utilities and other similarly-situated operators of private radio networks. These performance requirements should include baseline operability and spectral efficiency, and should establish defined coverage and service quality targets from an end-use perspective (*i.e.*, based on how end users will experience the network). As part of this effort, NIST should take steps to develop common guidelines regarding backup power and facilities and procedures to harden the PSBN to ensure that the network offers a minimum adequate level of reliability for all network users

V. Conclusion

EEI respectfully requests that NIST consider these comments and ensure that any actions taken or recommendations made by NIST with regard to features of a nationwide PSBN are consistent with them.

Respectfully submitted,

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