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EDISON ELECTRIC INSTITUTE

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U.S. Department of Energy
Office of the General Counsel
Attn: NBP RFI: Communications Requirements
1000 Independence Avenue, SW
Room 6A245
Washington, DC 20585

Re: DOE Request for Information – Implementing the National Broadband Plan by Studying the Communications Requirements of Electric Utilities to Inform Federal Smart Grid Policy

The Edison Electric Institute ("EEI"), on behalf of its member companies, hereby submits the following reply comments in response to the Request for Information ("RFI")[1] by the Department of Energy ("Department" or "DOE") regarding the current and future communications requirements of utilities, including, but not limited to, the requirements of the Smart Grid, in an effort to implement certain recommendations of the National Broadband Plan.[2]

[1] *Implementing the National Broadband Plan by Studying the Communications Requirements of Electric Utilities to Inform Federal Smart Grid* Policy, Department of Energy, 75 Fed. Reg. 26206 (May 11, 2010).
[2] Fed. Commc'n Comm'n, *The National Broadband Plan: Connecting America*, www.broadband.gov ("NBP").

Introduction

In the comments that have been filed in response to the RFI, there was general agreement among the parties that electric utilities needed dedicated spectrum to meet their current and future communications needs. There was, however, less consensus that electric utilities cannot rely exclusively on commercial carriers to meet all their needs. Nevertheless, the comments clearly demonstrated that a wide variety of private and commercial networks, as well as differing technologies and applications, will be used in the future to meet the Smart Grid and other communications needs of electric utilities, and that electric utilities will differ in how they utilize these networks, technologies and applications.

In making its recommendations, DOE should recognize that the fundamental propositions put forward by EEI and its electric utility members are supported by the weight of the comments. It is clear that although electric utilities vary greatly in structure, geography, population/demographics, state/local regulation and economics, they share the same fundamental obligation to provide safe and reliable service to their customers on a ubiquitous basis. The record in this proceeding demonstrates that in order to fulfill this obligation, electric utilities make extensive use of communications networks, technologies and applications, and have—and will continue to have—a variety of communications needs. In order to meet these needs, electric utilities rely on both private and commercial communications networks including licensed wireless radio, licensed wireless microwave, unlicensed wireless, fiber, other private network commercial wireless (licensed), commercial wireless (unlicensed) and commercial wireline. The lack of dedicated spectrum is the most critical communications issue facing electric utilities and

it must be addressed.[3] EEI urges the Department to recommend in its anticipated Report that electric utilities must have access to dedicated spectrum as well as continue to have the flexibility necessary for them to plan and deploy communications networks without restriction.

I. Electric Utilities Need Dedicated Spectrum

There was general agreement among the parties that electric utilities needed "dedicated spectrum for fast power restoration in an emergency or natural disaster, reliable service, and for protection from a cyber attack on the electric grid."[4] In its initial comments, EEI made clear that the spectrum needs of electric utilities are critical today and will only become more significant as Smart Grid systems and technologies are deployed.[5] This position was supported by electric utilities and vendors,[6] and only opposed by a few parties such as CTIA-The Wireless Association.[7]

As the Utilities Telecom Council indicated in its comments, utilities and other critical infrastructure industries ("CII") will need access to 30 MHz of spectrum that is either dedicated for utility and other CII purposes, or shared with other compatible users to meet their current and future communications needs. The spectrum should be in frequency ranges under 2 GHz in order to provide optimal propagation characteristics, which, in turn, enhances the overall cost effectiveness of the network.[8]

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[3] *See* NBPat at 252.
[4] RFI at 26208.
[5] EEI Comments at 24-28; *see also,* ALU Comments at 4 ("the bandwidth requirements of a smart grid control network will increase dramatically—much as the Internet has done.").
[6] The electric industry is not the only critical industry which faces this problem. Commercial systems are likewise not designed for the highly special needs of the oil and gas industry for security and coverage in remote locations and for "mission-critical applications for which guarantees of interference free operation must be rock solid." Comments of the American Petroleum Institute, Summary ("API Comments").
[7] Comments of CTIA-The Wireless Association at 14. ("CTIA Comments").
[8] Comments of Utilities Telecom Council at 7 ("UTC Comments").

The electric utilities' need for dedicated spectrum was supported by companies such as GE MDS, LLC ("GE MDS") and Motorola. According to GE MDS America's "electric… utilities are operating under potentially damaging radio spectrum shortfalls. These shortfalls threaten the reliability of utility services and leave essential services vulnerable to external attacks… Additionally, it may force utilities to deploy Smart Grid infrastructure on a less secure and less reliable public infrastructure. Allocating wireless spectrum to national utilities would provide an interference free spectrum that will allow them safe, reliable, and secure wireless communications, enhancing the infrastructure's efficiency, security and reliability."[9] Similarly, Motorola indicated that "some elements of the Smart Grid communications can be addressed on commercial systems, but that many other communications for Smart Grid as well as utilities' other communications requirements, require dedicated spectrum."[10]

These observations were borne out in the comments of electric utilities. For example, the spectral bands used by SDG&E are not expected to be sufficient to meet the communications needs of its planned smart grid strategy and analyses of the traffic that it expects to carry over its smart grid communications network, leading it to believe that it will need access to at least two MHz of licensed spectrum, and ideally, at least five MHz of spectrum.[11] According to DTE, the "most critical factor that could hamper Smart Grid Growth is access to bandwidth at all tiers of the communications hierarchy…Utilities need RF spectrum options in several bands in order to

[9] Comments of GE MDS, LLC at 4 ("GE MDS Comments").
[10] Motorola Comments at 2.
[11] SDG&E Comments at 10.

fit the geography of their service territories."[12] This notion was also supported by companies such as Baltimore Gas & Electric ("BGE")[13] and FPL.[14]

Pepco Holdings, Inc. (Pepco) specifically weighed the advantages of using commercially available wireless services versus that of using dedicated spectrum. In choosing the dedicated spectrum option, Pepco said that it has "learned from experience that when it really counts, carrier services are often unavailable or unreliable during those critical moments when our applications need stable communications most. Most consumers would not even notice these minor system glitches, nor would these events negatively impact availability statistics for a Commercial Carrier. For an electric grid, however, those fractions of seconds mean the difference between reliable and unreliable electric service."[15]

Contrary to the vast majority of the comments, CTIA asserts that the Federal government should not allocate dedicated spectrum to electric utilities and instead force electric utilities to rely on existing commercial networks.[16] At the core of this argument is CTIA's belief that "commercial wireless networks provide ubiquitous, robust and secure solutions for all elements of the Smart Grid." [emphasis supplied][17] However, as noted by both ALU and Motorola, use by electric utilities of commercial wireless networks for certain communications needs is particularly problematic because they are only built to "best effort" standards of reliability regarding availability, do not provide coverage at all parts of a utility service area, and during

[12] DTE comments at 9.
[13] Comments of Baltimore Gas & Electric at 5 (spectrum allocation "would help ensure the availability, capacity, reduced latency and security of utility specific, wide-area-network requirements").
[14] FPL Comments at 23.
[15] Comments of Pepco Holdings, Inc. at 3-4 ("Pepco Comments").
[16] CTIA Comments at 14.
[17] *Id.* at 7.

emergencies can become unavailable or clogged with consumer communications.[18] The fact that mobile broadband providers serve approximately "280 million people, or 98.1 percent of the U.S. population"[19] is not sufficient to meet utility needs because electric utilities must serve all (not simply most) of their customers and all of their service territories, including those remote areas not covered by wireless networks.

Some of the difficulties with relying solely on commercial wireless systems are borne out by FPL's experience during the 2004/2005 hurricane restoration where FPL private radio was consistently the most reliable service throughout the devastated areas.[20] As FPL noted "[o]n a daily basis, 'can you hear me now' is not good enough for field crews facing potentially life-threatening conditions while working with high voltage."[21]

CTIA's arguments that electric utilities can rely on wireless networks were also undercut by various comments filed recently in the Federal Communications Commission's (FCC) "Network Survivability Inquiry."[22] Through its comments in that proceeding, AT&T indicated that with regard to the Katrina restoration, "the majority of the adverse effects and outages encountered by wireless providers were due to a lack of commercial power or a lack of transport connectivity to the wireless switch."[23] In the same proceeding Qwest stated:

"The larger issue [regarding network disabling events], though, is the loss of commercial power over a large geographic area which can impact a significant number of end users for an extended

[18] *See* ALU Comments at 3; *see also*, Motorola Comments at 3.
[19] CTIA Comments at 8. In actuality, the U.S. population is estimated to be 309,897, 250 *see* U.S. Census Bureau, U.S. & World Populations Clocks http://www.census.gov/main/www/popclock.html (last visited 20:23 UTC August 3, 2010).
[20] FPL Comments at 3.
[21] *Id.* At 23.
[22] *See* NBP Notice of Inquiry, In the Matter of Effects on Broadband Communications Networks of Damage to or Failure of Network Equipment Or Severe Overload, PS Docket No. 10-92 (April 21, 2010)
[23] *See* Comments of AT&T Inc., FCC PS Docket No. 10-92 at 7, n.12 (filed June 25, 2010) (quoting Independent Panel Reviewing the Impact of Hurricane Katrina on Communications Networks, *Report and Recommendations to the Federal Communications Commission*, at 9 (June 12, 2006)).

period of time. Depending upon the scope and duration of a massive power outage, and irrespective of the cause, it can impact the operability of customer premises equipment…Such an occurrence goes beyond the bounds of reasonable disaster/contingency planning for a broadband network service provider."[24]

Taken to its logical conclusion, adoption of CTIA's argument would place electric utilities in a virtual "Catch 22," whereby they would be reliant, for mission-critical power restoration purposes, on commercial wireless networks which were themselves inoperable due to the loss of the power which the utilities were seeking to restore. The reality is that utilities do need dedicated spectrum "for for fast power restoration in an emergency or natural disaster, reliable service, and for protection from a cyber attack on the electric grid."[25]

II. There Is No "One-size fits all" Communications Solution

In the RFI, DOE indicated that it did not "expect any 'one-size-fits-all' communications solution to accommodate all reasonable Smart Grid implementations and applications."[26] The pure number and variety of the comments which the Department has received in response to the RFI demonstrates that it was correct in this assessment.

Overall, the comments demonstrate that one of the primary reasons that there can be no "one-size-fits-all" communications solution is that there is no one type of "Smart Grid" network, application or technology. Different parties have different visions, needs or telecommunications networks to deploy. This has affected their view of what networks, services and technologies should be utilized and how. The Department previously recognized this when it observed that "[d]efining the Smart Grid is in itself tricky business. Select six stakeholders and you will likely

[24] *See* Comments of Qwest Communications International Inc., FCC PS Docket No. 10-92 at 8-9 (filed June 25, 2010)
[25] RFI at 26208.
[26] RFI at 26207.

get at least six definitions."[27] As Alcatel-Lucent ("ALU") stated in its comments, the "smart grid is not an individual application or solution, rather a collection of distinct applications that have varying degrees of latency, market availability, interference issues and power requirements…[the]smart grid is platform-agnostic and a wide variety of broadband platforms will be employed (e.g. wireless, wireline, etc.)…"[28]

This difference in visions as set forth in the comments also demonstrates that the term "Smart Grid" is perhaps to some extent a misnomer. The electric grid is already, to a great extent, "smart" and in many instances what the electric industry is attempting to do is to develop an even "Smarter Grid."[29] While Advance Metering Infrastructure ("AMI") and smart meters are important Smart Grid technologies, there is much more to the "Smart Grid."[30] In fact, the early benefits that will come from the deployment and implementation of Smart Grid technologies will primarily be derived from strengthening and improving transmission and distribution systems[31]—benefits which, unfortunately, are often harder for consumers and regulators to discern, but are ultimately very important in delivering benefits to consumers. Further, many of the communications needs related to strengthening and improving transmission and distribution systems will be "mission critical."

In general, the initial comments support EEI's position that because there can never be a "one-size-fits-all" communications solution, this nation's electric utilities simply are not, and

[27] Department of Energy, *What the Smart Grid Means to You and the People You Serve,* 4 (Litos Strategic Communication 2009) ("Litos Report").
[28] Comments of Alcatel-Lucent at 2 ("ALU Comments").
[29] *See, e.g., Litos Report* at 4 ("A smarter grid refers to the current state of transformation, one in which technologies are being deployed today or in the near future.").
[30] In fact as pointed out by the National Cable & Telecommunications Association AMI meters are just one type of gateway that can be used to support energy management, distributed generation, demand response and smart appliances. Comments of the National Cable & Telecommunications Association at 4 ("NCTA Comments").
[31] *Id.* at 5- 6.(these benefits include optimizing asset utilization and efficient operation, enhancing reliability, improving power quality, reducing widespread outages, and reducing vulnerability to man-made and natural disasters).

cannot, rely on any one provider, network, technology or application to meet all of their assorted communications needs. As previously noted, electric utilities vary greatly in structure, geography, population/demographics, state/local regulations, and economics—as well as in investment strategies.[32] These utilities rely on a varying combination of private and commercial communications networks, including licensed wireless radio, licensed wireless microwave, unlicensed wireless, fiber, other private network, commercial wireless (licensed), commercial wireless (unlicensed) and commercial wireline. They must have the flexibility to plan on how to meet their communications system requirements as they consider a broad array of variables such as reliability and cyber security standards, functional and performance requirements, network ownership and technology options, and network management approaches.[33]

As Southern Company Services, Inc. ("Southern Company") noted, Smart Grid applications and services are evolving, the architecture and needs of each electric utility's grid are unique, and deployments will vary among utilities.[34] Similarly, the Florida Power & Light Company ("FPL") indicated that, historically it and other utilities have relied on a blended solution of utility and commercial wired and wireless networks, which have been deployed based on factors such as coverage, capabilities and cost.[35] The coming of the Smart Grid has not changed this calculation, because no single communications technology or carrier can reliably and cost effectively satisfy all Smart Grid related communications needs.

[32] Comments of the Edison Electric Institute at 3 ("EEI Comments"); *see also Litos Report* at 20 ("No two electricity service providers are alike. Nor are their business plans or investment strategies.").
[33] EEI Comments at 3.
[34] Response of Southern Company Services, Inc. at 2 ("Southern Company Response").
[35] Comments of Florida Power & Light Company ("FPL") at 3 ("FPL Comments").

This point was confirmed by vendors such as ALU and Motorola, Inc. ("Motorola").[36] Based on its experience, ALU commented that most electric utilities (especially those which operate transmission and distribution systems) prefer to exclusively own "mission critical networks" because of their need to meet stringent safety and grid control requirements in a fashion similar to public safety networks. On the other hand, due to factors such as cost, availability of network assets, including spectrum, and the need to deploy applications in an expedient manner, utilities will use commercial networks for some Smart Grid applications, particularly the least critical functions.[37]

Similarly, Motorola, Inc. ("Motorola") stated that while some elements of utilities' communications requirements are compatible with commercial networks, there were many elements (that were more mission critical) that were not. It further correctly noted that utilities and public safety have more in common in their critical communications requirements than do utilities and commercial wireless operators.[38]

These comments reflect the reality of what is beginning to happen throughout the country. The energy future has arrived for electric utilities such as San Diego Gas & Electric Company ("SDG&E") and its customers, not only in terms of the deployment of Smart Grid technologies,[39] but also in terms of the adoption of technology such as distributed photovoltaic systems and the deployment of residential and public-charging infrastructure for electric

[36] *See also*, Silver Spring Networks Comments at 1 ("Utilities' current communications needs are diverse, with considerable variation from utility to utility.") ("Silver Spring Networks Comments").
[37] ALU Comments at 2-3.
[38] Comments of Motorola, Inc. at 4. ("Motorola Comments")
[39] As DOE is aware, the California Public Utilities Commission has been very active with regard to promoting deployment of Smart Grid technologies. See *Rulemaking to Consider Smart Grid Technologies Pursuant to Federal Legislation and on the Commission's Own Motion to Actively Guide Policy in California's Development of a Smart Grid System*, Docket R.08-12-009, http://docs.cpuc.ca.gov/published/proceedings/R0812009.htm. DOE should proceed cautiously in developing its recommendations, so as not to impinge upon questions which are jurisdictionally subject to state and not federal authority. Such a cautious approach is also appropriate with regard to Smart Grid data access and privacy issues.

vehicles.[40] SDG&E is an example of an electric utility which serves a broad territory with highly varied topography and population density. Based on its experience so far, it has found that no single communications technology, solution or provider has emerged which can meet the communications requirements of the broad range of smart grid components and applications it is deploying.[41] Instead, it urges that the optimal way to meets the communications needs of electric utilities is through a hybrid approach, based on the utility's specific requirements, which incorporates wired and wireless solutions implemented through both commercial and private networks.[42]

Oncor Electric Delivery Company LLC ("Oncor") is also currently installing an Advanced Metering System. It too has an extensive territory, but its service area differs in geography, but not necessarily density, from that of SDG&E. It currently uses a mix of both private and public communications networks, as appropriate, to ensure optimal Smart Grid communications.[43]

Likewise, DTE Energy Company ("DTE") is implementing Smart Grid technology at all levels of its electrical and gas distribution systems as part of its SmartCurrents program. Its service territory also differs in geography from that of SDG&E and Oncor. Although at present DTE is communicating with electric and gas smart meters and field devices using a 60%/40% mix of public and private networks, it is building its own private communications system out of the concern that public networks are unsuitable due to the potential for compromising the safety and security of its customers and employees. Like other electric utilities, it has found that no one

[40] Comments of San Diego Gas & Electric Company at 4-6 ("SDG&E Comments").
[41] *Id.* at 4.
[42] *Id.* At 21-22.
[43] Comments of Oncor Electric Delivery Company LLC at 2-5 ("Oncor Comments").

communications solution is completely applicable system-wide.[44] Electric utilities must maintain the flexibility to deploy private networks and utilize commercial networks as their communications need require.

III. Electric Utilities Must Take Into Account Various Communications Requirements and Other Considerations in Determining How to Meet Their Needs

In Questions 2 and 3 of the RFI, the Department inquired as to the basic requirements for Smart Grid communications and electric utility communications systems. as well as other considerations. In answer, EEI indicated that in deciding how to best address specific communications needs, electric utilities must take into account a number of different requirements and other considerations. All of the requirements and considerations outlined by the Department—security, bandwidth, reliability, coverage, latency and back-up—and many more, are important. The significance given to each varies from company to company based on its circumstances. However, all companies were uniform in stating their need for reliable networks, bandwidth and full coverage for all of their service territories.

For example, Southern Company commented that each of the requirements outlined by the Department was important.[45] It confirmed the importance of firewalls, encryption and strong authentication for security purposes.[46] Southern Company noted that since it, like other utilities, operates in areas where hurricanes, tornados, and thunder storms are prevalent and frequently disrupt commercial power systems and communications systems, reliability is essential.[47] The

[44] Comments of DTE Energy Company at 1-3 ("DTE Comments").
[45] Southern Company Response at 5-12.
[46] *Id.* at 5-6.
[47] *Id.* at 7.

extreme variations in topography and climate in its operating territory also means that range and coverage are critical considerations.[48]

Exelon Corporation ("Exelon") also described how the significance of various requirements changed based on the application. For example, the security and reliability requirements for Power System Protection are high, and coverage must be company-wide, including all substations. However, the security requirements for AMI are medium because high security is embedded in the native protocol, the reliability requirement is low, and the coverage still must be company-wide including all customers.[49]

For Northeast Utilities System ("NU") latency and bandwidth are important requirements. The terrain in its New England service territory is mountainous and forested in areas, making broad coverage difficult and expensive.[50] These facts, along with weather events and peak site use times, have caused latency to be a problem for its Distribution Supervisory Control and Data Acquisition ("DSCADA"). Similarly, topographical problems have complicated its use of, and heightened its need for, bandwidth.[51]

For its part, FPL indicated that communications must be: two-way, pervasive, cost effective, scalable, near-real time, resilient, hardened, flexible and standards-based. Moreover, utilities must weave cyber security into the infrastructure.[52]

[48] *Id.* at 12-13.
[49] Comments of Exelon Corporation at 5 ("Exelon Comments").
[50] Comments of Northeast Utility System at 6 ("NU Comments").
[51] *Id. See also,* ALU Comments at 4 ("the bandwidth requirements of a smart grid control network will increase dramatically—much as the Internet has done.").
[52] FPL Comments at 13.

Once again, utilities have varying communications needs because different utilities face different situations, have different requirements and must take into account considerations not applicable to other utilities. Flexibility is required.

IV. Electric Utilities Will Use A Number Of Different Technologies to Deploy and Implement Communications Networks and Applications

In answer to RFI Questions 3 and 4, EEI indicated that there are a number of use cases for Smart Grid and other utility applications, and that utilities must be able to employ a full range of technology options, because many companies have different deployment and implementation plans and/or face different circumstances. EEI used four charts (Charts A-D) to demonstrate the variety of communications services and applications utilized by electric utilities. Further, it was pointed out that that the actual configuration of networks and the utilization of applications differs from company to company.[53]

These variances were confirmed in a number of comments. For example, SDG&E identified eight use cases: advanced metering infrastructure ("AMI"), home area network ("HAN"), demand response, distributed generation, Plug-In-Hybrid Electric Vehicles ("PEVs"), operations, microgrids, and renewable energy.[54] Southern Company identified eleven use cases (distribution automation, transmission automation, two-way communications, AMI, field force automation, video surveillance, predictive analytics, customer facing applications, power generation and Southern Power applications, back office applications, and other general business use applications, and eight technology options (multiple address system radio, spread spectrum radio, WiMAX, 3G cellular, 4G Cellular, SouthernLINC, 2G Cellular (TDMA), and satellite).[55]

[53] EEI Comments at 9-14
[54] SDG&E Comments at 17-19.
[55] Southern Company Response at 13-19.

Exelon identified eighteen wireline, wireless, satellite and other technology options. Exelon also pointed out that that it believed that the most critical application to utilities was System (relay) Protection or Tele-protection to ensure that fault conditions do not impact transformers and otherwise protect those assets from harm.[56] Other utilities offered a similar assortment of varied use cases and technological options.[57]

Non-utilities also recognized that different technologies and applications would be employed to address different use cases. For its part, Verizon identified seven use cases (AMI, demand response, grid optimization, wide area situational awareness, field service communications, secure data centers and additional future needs.)[58] Silver Spring Networks also identified a number of wired, wireless and networking technology options.[59] As the foregoing discussion illustrates, clearly "the devil is in the details" with regard to which companies will use what technologies to address which use cases.

V. Electric Utilities Must Continue to Be Able to Use Both Private and Commercial Networks

There was some disagreement among the commenting parties as to whether electric utilities should continue to be able to utilize a combination of public and private networks to meet their Smart Grid and other communications needs as they see fit based on their analysis of their needs, or whether they should rely entirely on commercial communications networks. The weight of the comments went in favor of permitting electric utilities to continue to have the flexibility of using the best-suited network, whether private or public.

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[56] Comments of Exelon Corporation at 4-7 ("Exelon Comments").
[57] *See, e.g.,* FPL Comments at 4-13, 16-17 (nine use cases including nuclear siren notification system and nine technologies).; NU Comments at 6-7 (three use cases and six technologies); Comments of Southern California Edison at 3-4 (ten use cases and assorted technology options for high-speed backbone, inter-utility area network tele-protection, substation LAN, field area network, and premise area network).
[58] Comments of Verizon and Verizon Wireless at 5-6 ("Verizon Comments).
[59] Silver Spring Comments at 6-7.

Clearly telecommunications carriers have valuable expertise and competence, and have invested considerable sums in their networks. Electric utilities do make extensive use of their commercial networks. At the same time, electric utilities have built, managed and operated private communications systems for many years. In fact, many electric utilities provide backbone fiber to telecommunications companies and have their own telecommunications affiliates. Therefore, contrary to the assertions of the National Cable & Telecommunications Association ("NCTA"),[60] electric utilities do have the expertise to deploy manage and operate advanced communications networks and they have been doing so longer than the cable industry has been in existence. The fact that telecommunications carriers have expertise in serving the communications needs of government agencies and other sophisticated customers,[61] does not mean that electric utilities are inadequate to the task, or that reliance by electric utilities on commercial networks is always more cost-effective or otherwise appropriate, especially for mission-critical functions. In fact, the actual experience to date with the operation and deployment of utility communications networks contradicts the assertions by telecommunications carriers that commercial communications carriers are uniquely suited to support the current and future needs of the Smart Grid,[62] and that existing commercial broadband networks would best facilitate the implementation of the Smart Grid.[63]

Instead, the weight of the comments demonstrates that electric utilities must retain the flexibility to deploy and use private networks especially for more critical functions. The suitability of private or commercial networks will vary by application and by company. While utilities typically use commercial services for their secondary communications needs, these

[60] *See* Comments of the National Cable & Telecommunications Association at 6 ("NCTA Comments").
[61] *See, e.g.* Verizon Comments at 2-4.
[62] Comments of AT&T at 2 ("AT&T Comments").
[63] *See* Verizon Comments at 1.

commercial networks are not designed to provide the levels of reliability, survivability and coverage necessary to meet all utility communications needs, particularly in times of emergency.[64]

As previously noted, often commercial carriers cannot restore their own networks until after power is restored. This is precisely the problem which has caused both electric utilities and vendors to stress the importance of maintaining blended private/public networks. According to Motorola, "existing commercial networks may be used to satisfy some of the less critical communications requirements, including AMI. However, critical safety and control functions must have extremely high levels of guaranteed reliability, very low latency and specialized coverage that commercial networks do not provide."[65]

Verizon's suggestion notwithstanding, Wireless Priority Service ("WPS") is not necessarily a good solution.[66] According to Motorola, even priority access would be no guarantee that communications over a commercial network would be available in times of emergency: "public safety users with priority access cannot obtain service, so it is likely utilities would have a similar experience."[67] Additionally, WPS is only as effective as is the serving carrier. If the carrier's network is down, neither WPS nor GETS will be of benefit to the utility. On the other hand, Telecommunications Service Priority ("TSP") has proven to be of some benefit to SouthernLINC Wireless. The company has made use of TSP on a regular basis to encourage Local Exchange Carriers to repair its circuits in a timely manner. Finally, the use of a Virtual Private Network ("VPN"), not owned and operated, or at least managed by the utility

[64] EEI Comments at 28-29.
[65] Motorola Comments at 13.
[66] *See* Verizon comments at 12 ("Wireless Priority Service could be extended to cover critical-infrastructure Smart Grid communications…").
[67] *Id*. at 3.

provider would likely not be of much use. Setting aside the obvious issues related to privacy, the location of access points is critical, due to the fact that generating plants and key substations tend to be remote and often not within access to a public network. Even wired systems are often inadequate due to facility shortages in the remote areas where these plants and substations operate. Also, the last mile repair of these remote wired networks is often slow due to the fact that circuits closer to the Central Office facilities must be repaired first. Speed of repair also varies by company.

Electric utilities have uniformly supported these observations in their comments. Southern Company currently uses a variety of solutions including public carrier solutions (for needs that do not have stringent reliability and availability requirements) and its own wireless network through SouthernLINC (for needs with more stringent reliability and availability requirements). To address its Supervisory Control and Data Acquisition (SCADA) and Automated Metering Infrastructure (AMI) needs today, Southern Company has deployed narrow band communications infrastructures which include: Multiple Address Systems (MAS), Utilinet radios and PCS, all in the 900 MHz band.[68]

Both FPL[69] and Oncor[70] also use a mix or blend of private and public networks. For example, FPL uses a blended network (a utility radio network with commercial backhaul) for radio dispatch of crews for initial hurricane restoration. At the same time, with regard to routine meter reading, FPL found that no commercial vendor could deliver an end-to end solution that

[68] Southern Company Response at 3.
[69] FPL Comments at 3.
[70] Oncor Comments at 1.

met the price point required by its business. As a result FPL is implementing a 900 MHz mesh network to support smart metering.[71]

The potential problems which have caused electric utilities to determine that they cannot rely solely on commercial networks are real. In 2008, due to inadequate back-up power, a Detroit area cellular switching office was taken offline for twelve hours during a power outage caused by a winter storm and during this time DTE lost connectivity to several thousand smart meters, computerized dispatching for field crews and general mobile communications.[72]

Northeast Utilities has found that private services were down three times fewer hours than leased services were down over the past year.[73] Also, it has been experiencing more and more problems with its leased telephone lines which use copper facilities because the incumbent local exchange companies have not maintained the copper plant.[74]

SDG&E has found that existing carrier-operated networks cannot adequately serve the full range of Smart Grid communications needs because of five fundamental problems. First, the coverage area of commercial networks does not cover 100 percent of SDG&E's territory. Second, commercial networks face reliability issues, especially during critical events such as natural disasters. Third, commercial carriers cannot, and will not, provide guarantees that access to services can be assigned priorities depending on the use or users during periods of system oversubscription, congestion or stress. Fourth, commercial systems are not sufficiently secure from disruption as well as unauthorized accessing of and/or modifications to information as it

[71] FPL Comments at 18-19.
[72] DTE Comments at 9.
[73] NU Comments at 3.
[74] *Id. See also,* Recommendation 4.9 of the National Broadband Plan: The FCC should ensure appropriate balance in its copper retirement policies, NBP at 48.

traverses the network. Fifth, commercial networks do not provide the configurable quality-of-service guarantees required for operating critical components of the electric grid.[75]

In its comments, NCTA raises the old shibboleth that rate-of-return regulation somehow incents electric utilities to favor the deployment of private networks.[76] As EEI indicated in its initial comments, this argument reflects a fundamental misunderstanding of the capital demands facing electric utilities and how deployment decisions are made.[77] Moreover, it ignores the fact that electric utilities already make extensive use of commercial networks where and when it makes sense.,.

As Southern Company stated:

> This simplistic argument overlooks two very critical points. First, and foremost, the selection of any communications system or service necessary to support utility operations is primarily based on the utility's operational needs and requirements. As with anything, total cost of ownership is a factor in the decision, but Southern Company does not base its communications purchasing decisions on whether the cost can be included in the company's rate base. Second, capital expenditures are subject to review by the state public utilities commissions, and are subject to denial in the event the regulators believe the investment was not a prudent use of ratepayers' money.
>
> …It is naive at best, or misleading at worst, for commercial carriers to suggest that a utility would have an incentive to take on the additional responsibility of installing and operating a private communications system just so the utility can include these costs in an already strained and heavily-scrutinized capital budget".[78]

CTIA makes a similarly false argument, and then compounds its error by attempting to base the argument on an EEI Article which does not stand for its proposition.[79] In its comments,

[75] SDG&E Comments at 21-22.
[76] NCTA Comments at 6, *see also*, Grid Net, Inc. Comments at 15 ("regulated rate of return is a powerful incentive [for electric utilities] to build their own.").
[77] EEI Comments at 14.
[78] Southern Company Response at 24-25.
[79] CTIA Comments at 12..

CTIA purports to estimate based on an EEI Article,[80] that building and managing a dedicated wireless Smart Grid communications network could cost a utility more than $110 million over 10 years, versus $54 million for relying on a commercial network over a similar period of time.[81] However the underlying report, entitled *Transmission Projects: At A Glance,* simply "showcases representative transmission projects that EEI member companies have planned for the next ten years and captures the efforts of EEI members' increased focus on transmission. This report is not a comprehensive compilation of all projects that are being undertaken by EEI members…"[82] Nowhere in this report is there any discussion of the cost of "building and managing" a Smart Grid communications network, much less a comparison of the cost of deploying and managing a private versus a commercial network.

CTIA's comments are also undercut by Silver Spring which commented that "private, purpose-built RF mesh neighborhood area networks can cost nearly 100x less than the OpEx of existing commercial networks, while providing superior coverage and reliability, as well as arguably more robust security."[83] Similarly, as previously noted, FPL is implementing a 900 MHz mesh network to support smart metering, because it could not find a commercial vendor that could meet the required price point.[84]

Finally, many of these "private versus commercial networks" arguments ignore or do not understand that the communications element is only a small part of the overall cost of

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[80] James D. Fama, *Experts Say Public Wireless Networks are Appropriate for Smart Grid Applications*, ELECTRIC LIGHT AND POWER, *available at:* http://www.elp.com/index/display/article-display/0414592383/articles/utility-automation-engineering-td/volume-15/Issue_6/departments/notes/New_EEI_Report_Shows_US_Transmission_Investment_Large_Growing.htm l (last visited July 29, 2010).

[81] CTIA Comments at 12.

[82] *Transmission Projects: At A Glance* at iii (Prepared by Edison Electric Institute with assistance from Navigant consulting, Inc. February 2010), *available at* *http://eei.org/OURISSUES/ELECTRICITYTRANSMISSION/Pages/TransmissionProjectsAt.aspx* (last visited July 29, 2010).

[83] Silver Spring Comments at 5.

[84] *See infra* at18.

deployment. For instance, even with regard to AMI, according to an EPRI AMI white paper only nine percent of the total costs of an AMI deployment are for the communications network. The remaining ninety-one percent of the costs are for the End Point Hardware (Meter Data Management System and the Data Collection Device), Network Hardware (Advanced Metering Infrastructure Hosts, Installation, Project Management and IT.[85] The "nine percent tail" is not going to waive the "ninety-one percent dog."

CONCLUSION

EEI respectfully requests that the Department consider these comments and ensure that any DOE recommendations regarding the communications requirements of electric utilities are consistent with them. If the Department has any questions about these comments, please contact Greg Obenchain, Manager of Distribution Operations and Standards, at gobenchain@edu.org or 202-508-5138.

Respectfully submitted,

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[85] Advanced Metering Infrastructure (AMI), Electric Power Research Institute (2007).