Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
International Comparison and Consumer Survey Requirements in the Broadband Data Improvement Act	)	GN Docket No. 09-47
	)	
A National Broadband Plan for Our Future	)	GN Docket No. 09-51
	)	
Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act.	)	GN Docket No. 09-137

COMMENTS OF THE UTILITIES TELECOM COUNCIL – NBP PUBLIC NOTICE #6

Utilities Telecom Council
Brett Kilbourne, Acting General Counsel
Utilities Telecom Council
1901 Pennsylvania Avenue, NW
Fifth Floor
Washington, DC 20006
202-872-0030

October 23, 2009

TABLE OF CONTENTS

SUMMARY

The Commission should facilitate access to at least 30 MHz of dedicated spectrum by utilities and other critical infrastructure industries (CII) in order to support the development of smart grid and other next generation CII communications systems. Existing spectrum that is used by utilities and other CII below 1 GHz is all narrowband, and is subject to congestion and interference. Broadband is needed to support many smart grid applications, and broadband wireless will help to cost-effectively deploy reliable smart grid communications networks.

UTC urges the Commission to support utility and other CII access to the 1800-1830 MHz band, which is allocated for Federal government use in the United States, and which was recently reserved for utility purposes in Canada. Access to this spectrum in the U.S. would promote interoperability and equipment development. This band could be shared with Federal government operations for fixed and mobile applications.

UTC also supports utility and other CII access to the 700 MHz band, which could provide an additional source of broadband spectrum for fixed and mobile voice and data communications to support many smart grid applications. Access to the band would also promote interoperability between utilities and Public Safety.

UTC also urges the Commission to grant utilities and other CII access to the 14.0-14.5 GHz band on a secondary basis. This band could be shared with incumbent satellite operations to provide terrestrial point-to-point short range broadband communications for limited smart grid applications.

The Commission should consider the importance of utility communications, when determining whether the use of the spectrum is maximizing the public interest. Utilities are putting the spectrum to productive use, because their critical infrastructure communications systems ensure the safe, reliable and efficient delivery of essential services to the public at large. They also help to protect the safety of utility personnel at work in the field. As such, the economic and societal benefits of CII communications systems are substantial.

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
International Comparison and Consumer Survey Requirements in the Broadband Data Improvement Act	)	GN Docket No. 09-47
	)	
A National Broadband Plan for Our Future	)	GN Docket No. 09-51
	)	
Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act.	)	GN Docket No. 09-137

COMMENTS OF THE UTILITIES TELECOM COUNCIL – NBP PUBLIC NOTICE #6

The Utilities Telecom Council is pleased to provide the following comments in response to the Commission's *NBP Public Notice #6*, released September 23, 2009 in the above referenced proceedings.[1] UTC believes that it is important for the FCC to put broadband to work by allocating 30 MHz of spectrum to support smart grid and other next generation critical infrastructure communications systems, which will help promote energy independence and security, environmental quality, and economic recovery. Current spectrum allocations used by critical infrastructure industries (CII) are insufficient to meet functional requirements for smart grid applications. Utilities and

[1] *Comment Sought on Spectrum for Broadband*, NBP Public Notice #6, GN Docket Nos. 09-47, 09-51, 09-137, rel. Sept. 23, 2009 ("*NBP Public Notice #6*").

other CII will need spectrum for mobile and fixed wireless broadband. UTC urges the FCC to support access to dedicated spectrum for CII in the 1800-1830 MHz band. UTC also supports access to the 700 MHz D-Block spectrum, which could supplement – not substitute – for the 1800-1830 MHz band, particularly for mobile smart grid applications. The public interest would be served by providing dedicated access to spectrum for smart grid, because it would provide tangible benefits for the economy, the environment, and public safety that would far exceed the speculative value of the spectrum, if it was auctioned. In addition, Congress classified CII as providers of "public safety radio services" that are auction-exempt. Yet, the Commission has not fulfilled Congress's intent by providing any auction-exempt spectrum for CII; instead, it has been taking spectrum away ever since it got its auction authority in 1997. Now is the time to fulfill Congress's intent and provide CII with dedicated access to 30 MHz of spectrum that is exempt from auction in order to support smart grid and other next generation CII communications systems.

I. Background and Introduction

UTC is an international trade association for the telecommunications and information technology interests of electric, gas and water utilities and other critical infrastructure industries, including pipeline companies. Its members include investor-owned, municipal and cooperatively organized utilities. These utilities can range in size from large combination electric, gas and water utilities that serve millions of customers in a region to small distribution companies that serve a few thousand customers in isolated communities or rural areas. Although they differ in size and services, they all rely on communications to deliver essential services to the public at large safely and

effectively. These critical infrastructure communications systems are designed, built, operated and maintained at extremely high standards, which exceed those of commercial systems for reliability, survivability, availability and coverage. Utilities demand this functionality because -- as the Commission itself recognized -- "[a]ny failure in their ability to communicate by radio could have severe consequences on the public welfare."[2]

In its *NBP Public Notice #6*, the Commission inquires regarding the ability of existing spectrum to support next-generation build-outs, and it inquires regarding the specific bands that are best positioned for mobile and fixed broadband. It also inquires regarding the key issues for moving spectrum allocations towards their highest and best use in the public interest. Finally, it inquires regarding the ability of current spectrum allocations to support both fixed and mobile wireless backhaul.[3] UTC is pleased to provide its perspective on the need for spectrum to support smart grid and other next generation CII communications systems.

II. Ability of Current Spectrum to Support Next generation Build-outs

The Commission asked a variety of questions regarding the ability of current spectrum to support next-generation build-outs.[4] UTC has assessed existing spectrum allocations used by critical infrastructure industries, and it has estimated that CII will need at least 30 MHz of dedicated spectrum to support current and future smart grid requirements and other next generation CII communications systems.

---

[2] Replacement of Part 90 by Part 88 to Revise the Private Land Mobile Radio Services," PR Docket No. 92-235, *Second Report and Order,* 12 FCC Rcd. 14307,14329 (1997).

[3] *See generally NBP Public Notice #6.*

[4] *Id.*

A. Assessment of Current Spectrum Allocations

There are no broadband spectrum allocations available to CII below 1 GHz. Traditional CII communications below 1 GHz are primarily voice dispatch using narrow band channels of 25 kHz or less bandwidth. The bands available for licensed operations commonly used are: [5]

- VHF Low Band: 25 - 50 MHz is available for shared use with channel bandwidths of 20 kHz, typically.
- VHF High Band: 150 – 174 MHz is available for shared use with channel bandwidths of 20 kHz, until 2011 when channel bandwidths begin transition to 12.5 kHz under the FCC's narrow band mandate. There are a few channels available in this range for data communications, but these channels are often secondary to voice operation.
- UHF: 450-512 MHz is available for shared use with channel bandwidths of 20 kHz, until 2011 when channel bandwidths begin transition to 12.5 kHz under the FCC's narrow band mandate. There are a few channels available in this range for data communications, but these channels are often secondary to voice operation.
- 800 MHz: 854-861 MHz is available for exclusive access and is allocated for voice communications on a primary basis. Secondary data communications is permitted on the 25 kHz bandwidth channels and these channels can be aggregated if exclusive use is attained. The band is extremely congested and channels are generally not available for direct, site-based licensing in major markets. Portions of the band were licensed by auction and in rare instances; these allocations are available on secondary markets. Utility access to these channels has been restricted through the FCC rebanding process mandated to relieve interference into existing systems by commercial operations, primarily Sprint Nextel. Channels previously allocated to business radio services and available to utilities have been reallocated to public safety as Sprint Nextel vacates the frequencies. Existing utilities operating voice systems in this band have found their ability to expand operations restricted in this process.
- 900 MHz: 935-940 MHz is available for exclusive access and is allocated for voice communications on a primary basis. Secondary data communications is permitted on the 12.5 kHz bandwidth channels and these channels can be aggregated if exclusive use is attained. While not as congested as 800 MHz, channels are generally not available in major markets. Applications for new licenses in this band will not be accepted until the geographic region has

[5] Frequency ranges provided are descriptive in nature and not intended to be exact.

completed its 800 MHz rebanding, further restricting access to narrow band voice spectrum.

- Multiple Address System (MAS) 950-960 MHz is available for exclusive data communications between fixed points, generally with a central "master" station controlling communications. The band is heavily used by utilities for a variety of slow speed telemetry needs. Channels are generally congested in major markets. Bandwidths of 25 kHz and higher are available on a showing of need.
- 1.4 GHz: 1427-1432 MHz is shared with Wireless Medical Telemetry Services (WMTS) such that each service has 2.5 MHz of the total 5 MHz allocation. The band is reserved exclusive for data communications, with a maximum bandwidth of 50 kHz. Wider channels are available on a showing of need. This relatively new allocation is being used for supervisory control and data acquisition (SCADA) and wireless automated meter reading (AMR). While not considered broadband and insufficient for most smart grid applications, data rates of 19,200 bps or high are possible with currently available equipment.
- 3.65 GHz[6]: 3650 - 3700 MHz is the first true "broadband" allocation available to utilities. A 50 MHz non-exclusive license is issued and the licensee must register each fixed tower location. The amount of bandwidth, 25 or 50 MHz, available depends on the contention-based protocol used by the licensee. There are several areas of the country with grandfathered satellite systems that must be protected. This allocation is not exclusive to utility use and may also be used for wireless internet and commercial communications backhaul. Several utilities are considering this band as part of major automated metering infrastructure (AMI) roll out.
- 4.9 GHz: 4940 – 4990 MHz is one of the public safety broadband allocations. Unlike the 3.65 GHz band available to utilities, there are no exclusion zones and the band is available for public safety use nationwide. While the band is intended for use to support crisis incidents with broadband limited area communications, some vendors are marketing equipment in the band as a low cost alternative to license backhaul. Unlike the 700 MHz spectrum, where utilities are precluded from eligibility, 4.9 GHz may be considered available to utilities that qualify as government entities, i.e. municipal utilities. Allowing investor owned utilities and other critical infrastructure entities access to this band, when these agencies have been deemed "public safety" in other Commission and Congressional documents, would promote interoperability amongst all emergency responders, expand the market for equipment vendors and provide traditional "guns and hoses" public safety a partner to utilize the spectrum.
- Microwave: 6 GHz and higher is available for point to point microwave communications, with some point to multipoint operation allowed on higher frequencies. Utilities use the 6 GHz, 11 GHz and often the 18 GHz band for high capacity backhaul. UTC sees a trend in larger bandwidths being requested, often 30 MHz or more to support OC3 or higher data capacity. We also see some utilities using wireless backhaul as backup to existing fiber systems to meet stringent federal energy section guidelines on communications reliability.

[6] *See* Subpart Z of Part 90 of the FCC Rules, 47 C.F.R. § 90.1301 *et seq*.

Generally, there is a shortage of spectrum in these bands to meet existing needs of critical infrastructure industries. This shortage is due to the fact that CII must contend with a variety of other potentially incompatible radio users. There simply is not enough spectrum to go around. At one time, spectrum was set aside for CII in several discrete frequency pools, but the Commission consolidated those pools with others in an effort to promote spectrum efficiency. This created more competition for fewer frequencies, which resulted in congestion and interference to CII. Compounding this problem, the Commission reallocated several spectrum bands – including the upper and lower 2 GHz bands -- from private to commercial use. This forced CII to relocate from these bands to higher frequency bands that were subject to poorer propagation and more interference. While CII have resorted to using unlicensed bands and commercial services to meet some of their non-critical communications needs, the lack of licensed broadband spectrum has made it increasingly difficult for CII to carry out their operations safely and efficiently.

With the advent of smart grid, the lack of available spectrum has made a bad situation worse. Utilities will need broadband capacity to meet the functional requirements to support many smart grid applications. As noted at the outset, there is no broadband spectrum available in any of the existing spectrum bands that are used by CII below 1 GHz. This is particularly problematic because coverage is a major issue for CII as they look for communications solutions to support their smart grid roll-outs. Broadband spectrum above 1 GHz is in short supply as well -- particularly below 2 GHz -- which provides favorable propagation characteristics necessary to provide coverage at reduced infrastructure build-out costs. As such, CII find themselves in a spectrum

squeeze in which they need broadband spectrum for smart grid, while they struggle with interference and congestion in their existing narrowband spectrum bands.

B. Estimate of Current Spectrum Needs for Smart Grid Applications

It is difficult to predict the amount of spectrum that CII will need for smart grid and other next generation CII communications systems, because the concept of the "Smart Grid" differs from utility to utility depending on each utility's specific needs. Some will deploy AMI, while others will deploy a full range of smart grid applications, including distribution automation, substation monitoring and control, and demand response. Each of these applications will affect the amount of spectrum, and the criticality of the communications and their associated functional requirements may dictate certain bands of spectrum, whether licensed or unlicensed. Notwithstanding the variety of approaches that utilities will take to implement smart grid, broadband wireless will be a key element in the communications infrastructure that will support many, if not all kinds of different smart grid applications.

UTC has estimated that CII will need an additional 30 MHz of spectrum below 2 GHz to support smart grid and other next generation CII communications systems. This estimate has been developed through multiple studies, dating back to 1998. At that time, utilities estimated that 10 MHz of spectrum would meet their needs until 2010. Then in 2002, NTIA conducted a study of the spectrum needs of critical infrastructure.[7] The NTIA identified various spectrum bands recommended for use by the energy, water

[7] "Current and Future Spectrum Use by the Energy, Water and Railroad Industries," National Telecommunications and Information Administration. Jan. 2002 at http://www.ntia.doc.gov/osmhome/reports/sp0149/sp0149.pdf

and railroad industries,[8] but it could not validate specific requirements, or issues such as spectrum congestion and exclusivity which were reported on the record. However, NTIA suggested that some of these issues could be addressed by newly allocated spectrum bands, or advanced communications technology; and it "believed the significance of these industries and the urgency of these issues may have changed as a result of the September 11th events," such that "it is of the utmost importance that the Federal Communications Commission revisit these critical issues in order to accommodate the increasing role that these industries play in maintaining quality of life."[9]

This year, UTC updated its estimate to account for increased demands from smart grid. It leveraged the work of several utility members who developed a model for wireless smart grid communications. The model is based on predicted data requirements attributed to a group of applications associated with the smart grid. Data traffic was refined through probability analysis and mapped to a ubiquitous communications "cloud" provided by WiMAX, a wide area broadband communications protocol based upon IEEE 802.16. Preliminary WiMAX designs use a sectorized base station antenna system similar to those deployed by wireless carriers. In this case, six

[8] The *NTIA Report* indicated that the 220 MHz band, 450 MHz band, 800 MHz band, 900 MHz band, 1427–1432 MHz band and the 1–12 GHz band could be used by the Energy Industry. *NTIA Report*, Table 2, at xx. Moreover, the *NTIA Report* indicates that the 216–220 MHz band, 6 GHz band, 11 GHz band and 23 GHz band could be used by the water industry. *Id*. Finally, the *NTIA Report* indicated that the 700 MHz band and the 1.4 GHz band could be used by the railroad industry. *Id*.

[9] NTIA Critical Infrastructure Spectrum Use Study at xxi-xxii. *But see* "FCC Staff Report on NTIA's Study of Current and Future Spectrum Use by the Energy, Water and Railroad Industries," Federal Communications Commission, July 30, 2002 at http://www.ictregulationtoolkit.org/en/Publication.2763.html (declining to allocate any dedicated spectrum to address issues raised in the NTIA report).

antenna sectors per base station are assumed in the design, with each sector covering 60 degrees. The analysis revealed a requirement for 30 MHz of spectrum needed to support the electric Smart Grid infrastructure. The most intensive need for bandwidth resulted from the need to monitor all the assets of the Smart Grid in near real time, in order ensure the response time needed to shift electric delivery to meet varying demands. [10]

This estimate is confirmed by a recent survey that UTC conducted to respond to the Commission's Public Notice #2 regarding smart grid implementation plans. The survey respondents (which serve 24% of the total electric customers in the nation) reported that they lack two-way communications to 54% of their substations and that 72% of their intelligent grid devices and 94% of their customers will need upgraded communications to support smart grid functionality. Due in large part to the sheer number of smart grid devices and the frequency with which they will be sending and receiving data, next generation communications systems must be able to carry orders of magnitude more traffic than existing narrowband systems, estimated at speeds of up to 10 mbps and roundtrip latency of less than 30 milliseconds. While most of this capacity will be devoted to fixed data, an increasing amount of capacity must also support mobile broadband for next-generation data and voice to field crews. Finally, the system must support a network of networks to support different applications within different domains of the grid, thus entailing a hybrid approach composed of multiple technologies

[10] "The Utility Spectrum Crisis, A Critical Need to Enable Smart Grid," Utilities Telecom Council, January 2009 at 26 http://www.utc.org/fileshare/files/3/Public_Policy_Issues/Spectrum_Issues/finalspectrumcrisisreport0109.pdf. (describing the need for dedicated spectrum and the allocation of the 1800-1830 MHz band).

including point-to-point and point-to-multi-point microwave, as well as wireless mesh and Zigbee-based systems.[11]

UTC's estimate is consistent with those of individual utilities and energy industry organizations on the record in this proceeding.[12] American Electric Power testified at the FCC's broadband workshop on Smart Grid that "dedicated licensed spectrum is sorely needed by utilities" and that "AEP will need significant bandwidth in the areas that it serves and commercial broadband services will not always meet the requirements."[13] Centerpoint Energy similarly concluded that "the upgrades to CNP's grid to be implemented as part of its Smart Grid will require an estimated 2 Mbps communication network."[14] DTE Energy also estimated that "Bandwidths that allow for several Mbs are required for backhaul links, whereas bandwidths of 200 to 500 Kbps are required to support point to multi point communications out to pole mounted distribution devices."[15]

Other utilities commenting on the record requested dedicated spectrum for smart grid generally. Florida Power and Light urged the Commission to allocate dedicated spectrum for smart grid applications, including substation communications, SCADA and

[11] *See* Comments of the Utilities Telecom Council in GN Docket Nos. 09-47, 09-51 and 09-137, Attachment A (filed Oct. 2, 2009).

[12] *See e.g.* Comments of the American Petroleum Institute in GN Docket No. 09-51 (filed June 8, 2009); Comments of the American Public Power Association in GN Docket Nos. 09-51, 09-137 and 09-47 (filed Oct. 2, 2009) ; Comments of the Edison Electric Institute in GN Docket Nos. 09-51, 09-137 and 09-47 (filed Oct. 2, 2009); and Comments of the National Rural Electric Cooperative Association in GN Docket Nos. 09-51, 09-137 and 09-47 (filed Oct. 2, 2009).

[13] Presentation by Jason D. Griffith at the FCC's Broadband Workshop on Smart Grid, "AEP's Smart Grid Initiative" at slide 5, Aug. 25, 2009.

[14] Comments of Centerpoint Energy in GN Docket Nos. 09-51, 09-137, 09-47 at 7 (filed Oct. 2, 2009).

[15] Comments of DTE Energy in GN Docket Nos. 09-51, 09-137, 09-47 at 14 (filed Oct. 2, 2009).

communications with utility crews.[16] Southern Company also emphasized the need for spectrum to support next generation communications for field engineering by utility crews, as well as to support other smart grid applications.[17] Sempra Energy Utilities also stated that "smart grid deployments and operations would be simplified dramatically" if the Commission provided access to dedicated spectrum. It added that a WiMAX-based solution has the appropriate control and configuration mechanisms" to meet its traffic requirements, and that "a 5 MHz or 10 MHz spectrum block would allow energy utilities to utilize WiMAX profile-defined channel bandwidths and to take advantage of the availability of equipment being produced by a number of manufacturers."[18]

Additional spectrum is urgently needed. Utilities are currently planning to invest billions in smart grid and deploy millions of smart meters and intelligent grid devices. In addition, $4.5 billion has been appropriated for smart grid grants through the Department of Energy; and the first round of funds are scheduled to be awarded next month. Access to dedicated spectrum will help to reduce the cost of smart grid, while accelerating deployment and improving communications reliability and security. Moreover, now is the time for dedicated spectrum, during the initial stages of smart grid deployment while systems are still being designed. Finally, smart grid will provide a myriad of benefits to consumers, including time-of-use pricing, net metering and

[16] Comments of Florida Power & Light in GN Docket Nos 09-51, 09-137, 09-47 at 1-2 (filed Oct. 2, 2009).

[17] Comments of Southern Company Services, Inc. in GN Docket Nos. 09-51, 09-137, 09-47 at 15 (filed Oct. 2, 2009).

[18] Comments of Sempra Energy Utilities in GN Docket Nos. 09-51, 09-137 and 09-47 at 17 (filed Oct. 2, 2009).

improved outage restoration. As such, the Commission should act quickly to provide dedicated spectrum for smart grid and other next generation CII communications systems that will provide a myriad of public interest benefits.

C. Estimate of Future Spectrum Needs for Smart Grid Applications

Although it is difficult to predict the amount of spectrum that will be needed for smart grid, one thing is certain: it is only going to increase in the future. There are basically two reasons why spectrum use will increase: 1) the number of smart grid devices is likely to increase as more applications are discovered and as demand for energy increases and 2) the complexity of the networks is going to grow as systems are upgraded and more mobile applications are used.

The advent of plug-in electric vehicles and the implementation of renewable sources of energy onto the grid is going to add a whole new dimension to smart grid. As reported during the FCC's workshop on smart grid, each electric vehicle "when it's charging -- and they can take hours to charge --by itself can [use] a couple kilowatts,"[19] which is approximately as much electricity as each home will use in a day, on average. "So, a house with an electric vehicle can double its average demand while the car is attached."[20] Utilities will need to balance the additional load from electric vehicles, which will require two way broadband communications. Otherwise, the additional load from electric vehicles could threaten grid capacity and reliability.

Similarly, renewable sources of power, such as wind and solar, represent challenges for smart grid. By their nature, renewable sources of power are intermittent. As such, utilities need to be able to control the grid to balance this load, which can be

[19] Transcript at 42-43 at http://www.broadband.gov/docs/ws_15_grid.doc.

[20] *Id.*

unpredictable. Again, utilities will need two-way real-time communications to balance this load effectively. While renewable sources of electricity represent a small percentage of generation currently, that will likely increase, particularly as state and federal regulators require utilities to meet renewable portfolio standards. Moreover, distributed generation and net metering will mean that utilities will need to extend control across a wide area, not just to large wind or solar farms. Therefore, managing renewable generation is a real problem that will likely require broadband wireless communications to cost effectively control the load across the entire service territory on a real-time basis.

These are just some examples that barely scratch the surface of the extent to which future demands from smart grid are likely to increase the amount of spectrum that will be needed. Some have estimated that the network for smart grid could be "10-100 times bigger than the internet," considering that every home is connected to electricity and every device that can be plugged in (e.g. appliances) is a potential smart grid device.[21] While certain smart grid applications may not require high bandwidth or real-time communications, the aggregate data from all of these potential devices is enormous. In addition, the network will need to be able handle remote software upgrades, which can require significant bandwidth at a given time. These are just some of the larger issues for smart grid in the immediate future, but they strongly suggest that utilities will need more spectrum to meet these demands.

III. Spectrum for Mobile and Fixed Broadband

The Commission asks a similar set of questions regarding suitable spectrum for

[21] "Cisco Adding Brains to the Power System's Brawn" at http://newsroom.cisco.com/dlls/2009/ts_051809.html.

mobile and fixed wireless broadband. Specifically, it asks about the "current stock" of spectrum that is available; other spectrum allocations that could be repurposed for mobile or fixed wireless broadband; how additional spectrum would affect an operator's business case; and bands that are available in other countries that could be made available in the United States.[22] UTC believes that the bands that it has identified for smart grid and other next-generation CII networks are suitable for both mobile and fixed operations. Thus, the following section describes these bands for both mobile and fixed use, rather than breaking them out separately as either mobile or fixed.

A. 1800-1830 MHz Band

UTC has identified the 1800-1830 MHz band as suitable for smart grid and other next generation CII networks. In Canada, this band was recently reserved by Industry Canada for utility purposes, including smart grid. A harmonized allocation in the United States would promote interoperability between and among U.S. and Canadian utilities that are all interconnected on the North American electric grid. In the United States, this band is allocated for Federal government use. UTC believes that utilities could share this spectrum with Federal government users in the United States, because they would primarily use the bands for fixed point-to-point applications, which would be relatively easy to coordinate around Federal operations that appear to be limited to remote isolated areas of the country away from populated areas. Moreover, utilities are compatible with Federal government operations, because they both use communications for similar purposes and in similar ways.[23] Finally, if the band was

[22] *See NBP Public Notice #6.*

[23] For example, utilities require highly reliable communications networks that support critical infrastructure, which is similar to Federal uses that require highly reliable communications to

made available in the United States as well as Canada, it would provide a foundation for utilities to develop a common communications network for smart grid rather than using a mix of disparate systems using disparate bands, and it would enlarge the potential market for products and services, thereby attracting new entrants and investment.

Already, network and product development for this band is underway in Canada. Utilities are working with existing equipment manufacturers to design equipment to meet utility standards for throughput and latency. It is UTC's understanding that there is already equipment available that can meet utility standards, and that Canadian utilities have made a request for proposals for vendors to participate in a Smart Zone demonstration project, which is expected to begin in December. Based on the results of the demonstration project, the next phase includes a full scale build-out of a WiMAX-based network in 2010. A presentation is attached, which describes this project and related plans in further detail.[24] As such, equipment is already available on the market, and if the band is made available in the United States, it is likely that economies of scale will reduce the cost of equipment and new entrants will increase the availability of products and service throughout the North American market.

UTC anticipates that the 1800-1830 MHz band will be used primarily for fixed data applications, but that it could also be used for mobile voice and data. This will provide wide-area coverage and broadband throughput to cost-effectively support smart grid applications, such as distributed generation integration, outage restoration optimization, distribution automation, PHEV integration and usage, and asset security.

---

support Homeland Security.

[24] *See* Attachment A, Richard Bertolo, "Smart Meter/Smart Grid Update," June 3, 2009. Note that in addition to Hydro One, it is UTC's understanding that BC Hydro is conducting a similar project with another manufacturer of equipment to operate in the 1800-1830 MHz band.

The network would be based on WiMAX, which supports both fixed and mobile line-of-sight (LOS) and non-line-of-sight (NLOS) for wide area broadband communications. Thus, the network could be used for mobile as well as fixed operations, and as utilities implement mobile workforce plans more broadly throughout their service territories, it is likely that they would use this network to support mobile data applications, such as laptops in service vehicles in the field.

Currently, utilities have implemented broadband mobile data applications on a limited basis using commercial networks, because their existing private internal narrowband wireless communications networks only support up to 4800 bps per 6.25 kHz bandwidth, which is insufficient for uploading and downloading large files and streaming high quality video. Given the choice, utilities generally would prefer to use their private internal communications systems as an integrated platform for broadband and narrowband applications, using dynamic channel allocation and modulation schemes to ensure reliable communications – especially in emergency and disaster scenarios when commercial networks tend to be inoperable or unavailable. Access to the 1800-1830 MHz band would give utilities that choice.

B. 700 MHz Band

Utilities and other CII are also interested in the 700 MHz band in order to support smart grid and other next generation CII networks. Specifically, access to the 700 MHz D-Block would provide 10 MHz of spectrum that could be interoperable with public safety broadband systems in the lower half (763-768 MHz/793-798 MHz) of the 24 MHz of Public Safety 700 MHz spectrum. While the 10 MHz of spectrum in the 700 MHz D-Block would not support all of their communications needs, it does offer several advantages that could augment the 1800-1830 MHz band.

First, it would provide better coverage. While WiMAX designs tend to use a six mile range, by comparison, a base station in the 700 MHz D-Block could cover up to four times more area. Of course, throughput would be affected by range, but systems in the 700 MHz block have been designed to support speeds of 1.2 mbps downlink and 512 kbps uplink,[25] which would be sufficient to support many smart grid mobile broadband applications, as well as some of the fixed applications. As such, it would require less infrastructure to build-out a 700 MHz band network.

Second, there are manufacturers that are currently producing equipment on a commercial scale for the 700 MHz band. Some of these manufacturers are already providing equipment to the utility industry for radio systems in other bands. Presumably, these manufacturers would be able to meet utility design specifications in the 700 MHz band as well. Moreover, the cost and availability of equipment would likely be better in the 700 MHz band, due to the relative maturity and size of the market. This would help to speed the deployment of smart grid and other next-generation CII communications networks.

Third, the proximity to the 10 MHz of Public Safety broadband spectrum, as well as to the A/B/C blocks and the 800 MHz PLMR bands would promote interoperability between utilities and police, fire and rescue as "first responders." Utilities are often called to emergencies and need to coordinate with local authorities, for example to shut off power or gas in a burning building. Lack of interoperability between CII and Public Safety systems hampers those efforts. The proximity of the D-Block with the Public

[25] *See* Testimony for FCC En Banc Hearing by Stagg Newman, Principal Pisgah Comm Consulting, July 30, 2008 at 2 at http://www.fcc.gov/realaudio/presentations/2008/073008/newman.pdf.

Safety broadband spectrum could also promote partnerships between CII and Public Safety for shared systems, such as they have done in the PLMR bands.[26] That could provide synergies that could lower build-out costs and could potentially provide additional available capacity, particularly during emergencies when it is likely to be needed most.

Of course there are issues with the 700 MHz D-Block band. In addition to the limited amount of spectrum that is available, the D-Block is subject to auction to a commercial licensee, according to statute.[27] It is uncertain when or if the spectrum will be available, assuming it is auctioned. There are currently proposals under consideration that would give the D-Block to Public Safety to be combined with its 10 MHz into a 20 MHz block.[28] Assuming it is auctioned, utilities would need to at least have priority access to the band on the same terms as Public Safety; otherwise utilities could not rely on the spectrum for mission critical communications. These are just some of the uncertainties associated with the 700 MHz band, and CII need regulatory certainty before making any investments, particularly the kind of significant investments in smart grid that would typically need to be approved by state regulators.

---

[26] For examples of CII and Public Safety shared systems: S*ee e.g.* State of Ohio and Ohio Rural Electric Cooperatives, Inc., DA 09-423, *Order*, 24 FCC Rcd. 2289 (2009); *and see* State of Illinois, DA 08-124, *Order*, 24 FCC Rcd. 437 (2008); *and see* Douglas Electric Cooperative Request for Waiver of Section 90.179 of the Commission's Rules, DA 06-1996, *Order,* 21 FCC Rcd. 11298 (2006).

[27] *See* 47 U.S.C. §337(a)(2)(directing the Commission to allocate 36 megahertz of the spectrum between 746-806 MHz for commercial use to be assigned by competitive bidding.)

[28] Testimony of Brian Fontes to the House Energy and Commerce Subcommittee on Communications, Technology, and the Internet Hearing, "A National Interoperable Broadband Network for Public Safety: Recent Developments," 2009 WLNR 18940530, Sept. 24, 2009.

C. 14.0-14.5 GHz Band

Finally, UTC and Winchester Cator, LLC have filed a Petition with the Commission seeking secondary access to the 14.0-14.5 GHz band in order to support smart grid and other next generation CII networks.[29] UTC urges the Commission to grant expeditiously the Petition in order to allow fixed point-to-point and point-to-multipoint services (fixed and temporary fixed stations) on a secondary basis and to permit a single nationwide CII licensee to coordinate and manage all new fixed satellite services in the band. UTC has submitted studies showing that CII can share the spectrum with incumbent satellite earth stations without causing or receiving harmful interference. This would open up 500 MHz of spectrum that could be used for short-range broadband communications for smart grid and other next generation CII networks.

UTC looks forward to working with the Commission in promoting dedicated access for utilities and other CII to these and other bands. To be clear, utility and CII access to any spectrum should not be mandated by the Commission. Instead, the Commission should enable utilities and other CII to make technology choices that are appropriate under the circumstances. Currently, utilities and other CII are moving forward in deploying smart grid and other next generation CII communications networks. However, access to dedicated spectrum would give utilities and other CII technology options, which may be better than what they currently have. Finally, UTC emphasizes that utilities and other CII need access to *at least* 30 MHz of spectrum to meet their current and future needs, which are expected to grow as additional smart grid devices

[29] *Utilities Telecom Council and Winchester Cator, LLC, Petition for Rulemaking to Establish Rules Governing Critical Industry Fixed Service Operations in the 14.0-14.5 GHz Band*, RM-11429.

and applications are implemented and as the complexity of the network increases. This spectrum is *in addition to* – not a substitute for – existing spectrum that utilities and other CII use for land mobile and microwave communications.

IV. Public Interest Factors for Spectrum for Broadband

The Commission asks a variety of questions regarding the key issues in moving spectrum allocations toward their highest and best use in the public interest. Specifically, it asks how it should define and determine the value of different uses, as well as how it should define what it means to use the spectrum efficiently and productively; how it should decide whether to reallocate spectrum for broadband and how it should encourage licensees to use the spectrum in ways that maximize its public value.[30] The following section focuses on answering those questions.

In determining the value of different uses of the spectrum, the Commission should include qualitative as well as quantitative factors. Specifically, the Commission should consider the importance of the use of the spectrum, not just whether the spectrum is used efficiently. In that regard, CII use of the spectrum is highly important. It supports the safety, security and reliability of the nation's critical infrastructure and it enables a variety of overriding national policy objectives, including energy efficiency and environmental quality. The failure of a CII communications network can have catastrophic consequences; and utilities and other CII are increasingly dependent on these networks to manage their operations. As explained above, utilities and other CII cannot rely on commercial systems for mission critical communications; and they are subject to regional and national reliability and cyber security standards. As such,

[30] *NBP Public Notice #6*.

access to spectrum is critical for them to deliver their essential services to the public at large.

Clearly, utilities and other CII are using the spectrum efficiently and productively. Utilities and other CII have implemented trunking and other technologies that make efficient use of the spectrum that they have. But efficiency should not be the sole criteria; instead the Commission should also consider whether the spectrum is being used productively, as well. Utilities and other CII are making productive use of the spectrum, because everything depends on the essential services they provide. The Commission need only look to the aftermath of Hurricane Katrina to recognize that without power or water, everything stops. With the advent of smart grid and other next generation CII networks, spectrum is going to be even more important for enabling real-time pricing, renewable energy resources and PHEVs. As such, UTC submits that utilities and other CII are making productive and efficient use of the spectrum, because their wireless communications systems help to ensure reliability and security, while promoting energy efficiency and environmental quality.

Given the importance of CI, the FCC must not reallocate any spectrum bands that utilities and other CII currently use. As explained above, the Commission has already reallocated several spectrum bands used by CI, and this has forced them to relocate into other frequency bands at significant time and expense. Having already relocated once, they should not be forced to relocate again. It is not clear where else they would go, because there is little if any available spectrum. As such, the Commission should avoid the reallocation of spectrum that is used by CI.

Of course, spectrum is a limited resource and the public has a right to expect that

the Commission maximizes its value. That is why the Commission should be allocating dedicated spectrum for CI, *because* the public depends on the essential services that they provide. It is estimated that the economic impact from power outages alone is $80 billion annually.[31] That in itself should be enough to show the value of CII use of the spectrum, but in addition, CII systems protect the safety of personnel and the public, as well. These economic and societal benefits underline the value of CII use of the spectrum to the public. Yet, utilities and CII have no access to dedicated spectrum, which has led to congestion and interference to their communications networks. As such, the Commission should support utility access to suitable dedicated spectrum for smart grid and other next generation CII networks.

[31] *See* "Understanding the Cost of Power Interruptions to U.S. Electricity Consumers." Lawrence Berkeley National Laboratory, Sept. 2004 at http://www.oe.energy.gov/DocumentsandMedia/Understanding_Cost_of_Power_Interruptions.pdf

CONCLUSION

WHEREFORE, the premises considered, UTC respectfully requests that the Commission act as requested herein. Specifically, the Commission should support the allocation of at least 30 MHz of dedicated spectrum for critical infrastructure industries, which will advance the national policy interest in the promotion of smart grid, as well as the safety, reliability and security of the nation's critical infrastructure.

Respectfully submitted,

Utilities Telecom Council

_ss_____
Brett Kilbourne, Acting General Counsel
Utilities Telecom Council
1901 Pennsylvania Avenue, NW
Fifth Floor
Washington, DC 20006
202-872-0030

October 23, 2009