Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC

In the Matter of	)	
	)	
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. 14-126

COMMENTS OF THE FIBER TO THE HOME COUNCIL AMERICAS ON THE TENTH BROADBAND PROGRESS NOTICE OF INQUIRY

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I. INTRODUCTION AND SUMMARY

The Fiber to the Home Council Americas ("FTTH Council" or "Council")[1] hereby respectfully submits its comments to the Federal Communications Commission ("Commission") in response to the Tenth Broadband Progress Notice of Inquiry ("Tenth NOI").[2] In these

[1] The FTTH Council's mission is to accelerate deployment of all-fiber access networks by demonstrating how fiber-enabled applications and solutions create value for service providers and their customers, promote economic development, and enhance quality of life. The FTTH Council's members represent all areas of the broadband access industry, including telecommunications, computing, networking, system integration, engineering, and content-provider companies, as well as traditional service providers, utilities, and municipalities. As of today, the FTTH Council has more than 300 entities as members. A complete list of FTTH Council members can be found on the organization's website: http://www.ftthcouncil.org.

[2] *See In the Matter of 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. 14-126, Tenth Broadband Progress Notice of Inquiry, FCC 14-113 (rel. Aug. 5, 2014).

comments, the FTTH Council again responds to the Commission's inquiry: what is Advanced Telecommunications Capability?[3]

Since the Commission's last inquiry, the market for bandwidth-intensive services and applications has exploded, driven by video, cloud, and peer-to-peer applications and the proliferation of Internet-enabled devices within the household. This trend shows no sign of abating and in fact may accelerate. In response, service providers are racing to deploy networks – particularly all-fiber networks – with far greater broadband capabilities in communities across the country. These providers recognize that only fiber networks provide the performance and scalability necessary to meet consumer needs well into the future. Moreover, as the market for wireline broadband services continues its transition to all-fiber networks with unlimited bandwidth, the concept of "speed" as a benchmark is becoming an increasingly outdated proxy for advanced telecommunications capability. Therefore, the Council submits that the Commission cease using speed as a benchmark for advanced telecommunications capability and instead adopt the more relevant metric, one based on network infrastructure: are all-fiber networks being deployed to all Americans in a reasonable and timely fashion?[4]

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[3] *See* Tenth NOI, ¶ 5.

[4] The Council recognizes that DOCSIS technology enables high-speed broadband service; however, even cable operators understand that the physical transmission medium of coaxial cable will be replaced by fiber because of its superior performance and operational characteristics and are accelerating their deployment of all-fiber infrastructure. *See, e.g.*, Shalini Ramachandran, *Comcast Steps Up Its Game on Internet Speeds, Cable Operator Is Going All-Fiber for Some of Its Customers*, The Wall Street Journal (July 24, 2014), *available at* http://online.wsj.com/articles/comcast-steps-up-its-game-on-internet-speeds-1406238911 ("'We are excited for the possibility of providing Xfinity service, delivered via Fiber to the Home – right here in your community!' Comcast said in a letter. . . . A Comcast spokeswoman confirmed the company has begun laying fiber to homes in new residential areas adjacent to its existing cable systems.").

The Council's position that the Commission should adopt an infrastructure (fiber) based approach also stems from the concern that reliance on "speed" as a benchmark forces the Commission to constantly move the goalposts of its Section 706(b) analysis. This has resulted in an annual game of catch-up, with the Commission's standard rarely capturing market realities. An evolving speed benchmark also creates uncertainty: when should the Commission step in and exercise its Section 706 authority to remove barriers to deployment, and what network design and technology should providers that accept universal service funding deploy?

In sum, the Commission should base its Section 706 inquiry on whether all-fiber networks are being deployed to all Americans in a reasonable and timely fashion. Additionally, regardless of whether the Commission adopts the Council's proposed standard, it should take immediate steps to remove barriers to all-fiber infrastructure investment by ensuring reasonable, expeditious, and cost-based access to rights of way and poles, ducts, and conduits; supporting all-fiber network deployment through its Connect America Fund ("CAF") Phase II competitive bidding process and E-Rate modernization proceedings; and granting the pending municipal broadband petitions of the Electric Power Board of Chattanooga, Tennessee and the City of Wilson, North Carolina.

In addition, while the Council submits that the Commission should use all-fiber networks as the benchmark for its Section 706 inquiry, the Council recognizes that in remote areas, fiber deployment may not be economically feasible and other broadband infrastructure will be required. In a submission to the Commission during development of the National Broadband Plan, the Council explained that the inflexion point, where deployment costs accelerate dramatically, occurs in the "final" (most expensive) 10-20 percent of households. *See In the Matter of A National Broadband Plan for Our Future*, GN Docket No. 09-51, Notice of *Ex Parte* Presentation from Thomas J. Navin, Wiley Rein, on behalf of Corning, CSMG Adventis and the Fiber to the Home Council (Oct. 15, 2009).

II. WHAT IS ADVANCED TELECOMMUNICATIONS CAPABILITY?

In the Tenth NOI, the Commission again focuses on a number of characteristics of broadband capability to define "advanced telecommunications capability" for purposes of its Section 706 analysis.[5] The Commission's Section 706 analysis has relied on broadband speed as the most appropriate benchmark to determine whether "advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion," although it has sought comment on whether to expand its benchmark analysis to include broadband latency, usage, and other characteristics. The Tenth NOI continues this approach.[6] The Council suggests that it is time for the Commission's analysis to evolve to reflect the fact that in the broadband market access to all-fiber infrastructure is the relevant metric for consumers, edge providers, anchor institutions, and communities.

In this section, the Council first addresses the massive growth in video, cloud, and other services that are driving consumer demand for greater bandwidth and the deployment of all-fiber networks to meet that demand. Second, the Council reviews developments in the deployment of all-fiber networks throughout the country to meet the needs of consumers, edge providers, and their communities. Third, the Council submits that the Commission should move from using speed to define "advanced telecommunications capability," and instead set a standard based upon the proper network infrastructure, i.e. the deployment of all-fiber networks.

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[5] *See* Tenth NOI, ¶ 5.

[6] *See id.*, ¶¶ 25-30.

A. The Explosion in Video, Cloud, and Peer-to-Peer Services, Along with Multiple Device Usage, Continues to Drive Consumer Demand for Greater Bandwidth and the Deployment of All-Fiber Networks

In the Tenth NOI, the Commission seeks comment on which applications Americans are using most today and how they affect the need for broadband services at a particular speed.[7] In addition, the Commission asks how to assess common household broadband use, including multiple simultaneous uses of broadband and peak usage times.[8] As the Council stated in its response to the Commission's Ninth Broadband Inquiry, the applications that are driving consumer need for greater bandwidth include real-time video, cloud, and peer-to-peer services, and the use of multiple devices over a single connection.[9]

1. Real-Time Video

The principal driver of bandwidth demand continues to be video. Sandvine has found that "Real-Time Entertainment maintains its status as the dominant traffic category [in the United States] and likely the key driver of network growth."[10] According to the Cisco 2014 Zettabyte Report, global "IP video traffic will be 79 percent of all IP traffic (both business and consumer) by 2018, up from 66 percent in 2013."[11] IP video demand will come from a number of sources, including Internet video, IP video-on-demand services, file sharing, online gaming, and video-conferencing services.[12] Indeed, a study by Nielsen found that a majority of American

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7 *See id.*, ¶¶ 6.

8 *See id.*, ¶¶ 8-13.

9 *See* Comments of the Fiber-to-the-Home Council, GN Docket No. 12-228, at 8-12 (Sept. 20, 2012) ("FTTH Council Comments on Ninth NOI" or "Ninth NOI Comments").

10 *See* Sandvine Intelligent Broadband Networks, Global Internet Phenomena Report, at 5 (2014), *available at* https://www.sandvine.com/downloads/general/global-internet-phenomena/2014/1h-2014-global-internet-phenomena-report.pdf ("2014 Sandvine Report").

11 *See* Cisco, *The Zettabyte Era: Trends and Analysis*, at 2 (June 10, 2014), *available at* http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/VNI_Hyperconnectivity_WP.pdf ("Cisco 2014 Zettabyte Report").

12 *See id.* at 16.

households spend an average of 60 hours per week consuming video content, often across multiple devices.[13] Moreover, the proliferation of ultra-high-definition (4K) video will have a pronounced effect on traffic, since 4K video uses double the bandwidth of HD video and nine times the bandwidth of standard-definition video.[14] Further, manufacturers are already testing 8K video, which some estimate will require 350 Mbps downstream to stream a single video.[15]

The growth of two-way and multi-party video conferencing and video chat applications will also affect bandwidth demand, including upstream demand. Cisco has found that "PC-to-PC video calling is gaining momentum."[16] As real-time video communications become more commonplace, and the quality of the video streams improve, there will be a commensurate increase in bandwidth demand. Even today, the Commission's 4/1 Mbps standard could not accommodate multiple users within a household simultaneously video chatting on some platforms.[17]

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13 *See* Nielsen, *The Digital Consumer*, at 2 (Feb. 2014), *available at* http://www.nielsen.com/content/dam/corporate/us/en/reports-downloads/2014%20Reports/the-digital-consumer-report-feb-2014.pdf.

14 *See* Cisco 2014 Zettabyte Report at 7.

15 *See* Hunter Skipworth, *Forget 4K, it's an 8K TV you want*, Digital Spy (Jan. 11, 2014), *available at* http://www.digitalspy.com/tech/news/a543255/forget-4k-its-an-8k-tv-you-want.html; Trefor Davies, *Why We Will All Need 1Gbps FTTP – 20/20 Vision – Conversations with Nat Morris*, Trefor.net (Sept. 17, 2012), *available at* http://www.trefor.net/2012/09/17/why-we-are-all-going-to-need-1gbps-fttp-2020-vision-conversations-with-nat-morris/.

16 Cisco 2014 Zettabyte Report at 17.

17 *See* FTTH Council Europe, FTTH Business Guide, at 13 (Revision date Oct. 2, 2013), *available at* http://www.ftthcouncil.eu/documents/Publications/FTTH_Business_Guide_2013_V4.0.pdf ("FTTH Business Guide") (noting that Cisco HD videoconferencing requires a minimum of 3.5 Mbps symmetrical bandwidth, although 5 Mbps symmetrical bandwidth is recommended). Further, Google's cloud-based video chat tool, Hangouts, has a minimum upstream requirement of 1 Mbps. *See* Google, *Hangouts system requirements*, *available at* https://support.google.com/plus/answer/1216376?hl=en. Even under these circumstances, two individuals within a single household using a 4/1 Mbps connection could not simultaneously use the product to conduct separate video chats.

As a result, when the Commission asks which applications consumers are using most today, the answer remains video, including ultra-high-definition (4K) video (and soon 8K video) and multi-party video communications services. Therefore, the Council submits that the 4 Mbps/1 Mbps speed benchmark no longer allows consumers to "originate and receive" the broadband services identified in Section 706.

2. Multiple Devices

Another key driver of bandwidth consumption is the dramatic increase in the number of devices that consumers are connecting simultaneously to a single broadband connection. In 2012, Cisco found that 43 percent of U.S. homes have four or more online devices, up from 32 percent 18 months prior.[18] Today, the average U.S. household has seven Internet-connected devices, a number that rises each year.[19] Some have estimated that within the next three years there will be as many as 204 million TV-connected, Internet-enabled devices in American homes, including "video consoles, streaming media players, Blu-ray Disc players, and TVs."[20] As an increasing number of consumers rely on IP-based entertainment, households will require even more bandwidth to use these services. For example, Cisco has found that "video devices can have a multiplier effect on traffic," such that "[a]n Internet-enabled HD television that draws

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18 *See* Cisco, *Bandwidth Consumption and Broadband Reliability*, at 3 (July 2012), *available at* http://www.cisco.com/c/en/us/products/collateral/cloud-systems-management/prime-home/white_paper_c11-711195.pdf.

19 *See* Verizon, *Sharing Speed with Multiple Connected Devices*, at 1 (2014), *available at* http://www.verizon.com/cs/groups/public/documents/adacct/bandwith-and-multiple-device.pdf.

20 *See* NPD Group, *The Number of Connected TV Devices Will Be More than Double The Number of U.S. Internet Households by 2017* (July 21, 2014), *available at* https://www.npd.com/wps/portal/npd/us/news/press-releases/the-number-of-connected-tv-devices-will-be-more-than-double-the-number-of-us-internet-households-by-2017/.

50 minutes of content per day from the Internet would generate as much Internet traffic as an entire household today."[21]

Further, many consumers rely on multiple Internet-enabled devices at the same time, with 84 percent of smartphone and tablet owners stating that they use their mobile devices as second screens – often connected to a wireline network through Wi-Fi[22] – at the same time as they watch TV.[23] In addition, as the Internet of Things reaches an estimated 50 billion connected devices by 2020,[24] consumers will need even more bandwidth to satisfy always-on, Internet-enabled devices.[25] Based on these varied and simultaneous uses of different devices, it is clear that the current Section 706 broadband benchmark is insufficient to accommodate multi-device households.

3. Cloud and Distributed Services

A further source of the growth in bandwidth demand is the fact that consumers are using the cloud to store and share data, music, and video content and to access that data from multiple devices. In this way, rather than storing data locally, consumers are constantly sending and receiving data from the remote data centers of cloud-based services. Cisco estimates that data

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21 *See* Cisco 2014 Zettabyte Report at 7. To adequately account for these multi-device households, the Commission should assess common household bandwidth use with the presumption that each member of the household simultaneously is engaging in multiple bandwidth-intensive tasks.

22 *See* Tenth NOI, ¶ 11 n.25.

23 *See The Digital Consumer* at 14.

24 *See* Dave Evans, *The Internet of Things: How the Next Evolution of the Internet Is Changing Everything*, Cisco, 3 (Apr. 2011), *available at* http://www.cisco.com/web/about/ac79/docs/innov/IoT_IBSG_0411FINAL.pdf.

25 *See* Acquity Group, *The Internet of Things: The Future of Consumer Adoption*, 4 (2014), *available at* http://www.acquitygroup.com/docs/default-source/Whitepapers/acquitygroup-2014iotstudyfca32e3440236f7b9704ff000083d49c.pdf?sfvrsn=0 (finding that 69 percent of consumers plan to purchase an in-home Internet of Things devices within the next five years).

center-to-user traffic will reach 1.3 zettabytes by 2017.[26] As demand for and adoption of bandwidth-intensive cloud applications increases, sufficient download and upload speed will be "critical" to application performance.[27]

In addition to cloud-based services, consumers will continue to rely on distributed services, including peer-to-peer file sharing and newer distributed applications (such as those that rely on "blockchain" technologies), that can require significant symmetrical bandwidth. Cisco has noted that "[p]eer-to-peer (P2P), by definition, is highly symmetric traffic, with between 40 and 60 percent of P2P traffic consisting of upstream traffic."[28] One such service, BitTorrent, comprises nearly a quarter of peak period U.S. upstream traffic.[29] Consequently, as more consumers demand (and utilize) peer-to-peer services and applications, the demand for fast, symmetrical bandwidth will grow.

Taken together, video, cloud-based, and peer-to-peer applications, along with the proliferation of multiple devices and simultaneous uses, drive a growing need for greater bandwidth. As described in the next section, a number of providers are answering consumer demand and building future-proof networks in cities across the country. These networks will enable entirely new applications, services, and entire industries that will have an exponential effect on consumer demand for ultra-high-speed connectivity.

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26 *See* Cisco Global Cloud Index, at 2 (2013), *available at* http://www.cisco.com/c/en/us/solutions/collateral/service-provider/global-cloud-index-gci/Cloud_Index_QA.pdf; Cisco Global Cloud Index: Forecast and Methodology, 2012-2017 (2013), *available at* http://www.cisco.com/c/en/us/solutions/collateral/service-provider/global-cloud-index-gci/Cloud_Index_White_Paper.pdf.

27 *See id.* at 3.

28 Cisco 2014 Zettabyte Report at 16 n.1.

29 *See* 2014 Sandvine Report at 6.

B. The Market for Broadband Services Is Rapidly Transitioning Toward All-fiber, Last-mile Connectivity

As the Commission recognized in the Tenth NOI, since its last broadband inquiry, "there have been numerous noteworthy developments in the broadband market and the Commission has continued to take significant steps to accelerate the deployment of modern communications networks."[30] Perhaps the most important of these developments is the proliferation of all-fiber networks throughout the country.

In its comments on the Commission's Ninth Broadband NOI, the Council described a number of developments in the deployment of all-fiber networks, including the Google Fiber project in Kansas City, the Gig.U initiative for connecting university communities, and a number of programs – including the US Ignite and "Gig Tank" programs – to develop fiber-ready applications and services.[31] In the two short years since the Ninth Broadband NOI, the market for all-fiber services has expanded significantly. Today, there are around 22.7 million homes that are actively marketed with all-fiber services, and 55 total gigabit networks.[32] Google Fiber has now deployed all-fiber networks to customers in Kansas City (Missouri and Kansas) and Provo, Utah, and it has announced plans to deploy an all-fiber network in Austin, Texas.[33] In addition, Google announced that it is exploring fiber projects in 34 new cities, including Atlanta, Charlotte, Nashville, Phoenix, Portland, Salt Lake City, San Antonio, and San Jose.[34] Similarly, AT&T has announced plans to explore all-fiber networks in up to 100 cities, including 21 major

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30 *See* Tenth NOI, ¶ 2.

31 *See* FTTH Council Comments on Ninth NOI at 5-8.

32 *See* "FTTH Progress and Impact, Understanding the FTTH landscape to enable better business decisions," presentation by Michael Render at the FTTH 2014 Conference & Expo, at 16-17 (June 23, 2014), *available at* www.ftthcouncil.org ("2014 Render Presentation").

33 *See* Google Fiber, *All Current Cities*, *available at* https://fiber.google.com/cities/ (last visited July 29, 2014).

34 *See* Google Fiber, *The future of Fiber*, *available at* https://fiber.google.com/newcities/ (last visited July 29, 2014).

metropolitan areas.[35] CenturyLink, for its part, recently announced that 1 Gbps connectivity is available to residential and business customers in 16 cities.[36] In addition, Cox Communications plans to roll-out "market-wide deployment of gigabit speeds by the end of 2016," beginning with networks in Phoenix, Las Vegas, and Omaha.[37] Regional providers also are jumping on the all-fiber bandwagon: Cincinnati Bell, Bright House Networks, and GCI Communications have all-fiber network deployment plans in Cincinnati, Tampa, and Anchorage, respectively.[38] And these network deployments are in addition to the more than one hundred municipalities and electric cooperatives that have stepped up to meet community needs with all-fiber deployments.[39]

These network deployments herald a major transformation of the U.S. market for advanced telecommunications capability. For example, a number of U.S. cities will soon benefit from all-fiber competition, with two or more providers offering all-fiber networks to residents

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35 *See* AT&T Newsroom, *AT&T Eyes 100 Cities and Municipalities for its Ultra-Fast Fiber Networks* (Apr. 21, 2014), *available at* http://about.att.com/story/att_eyes_100_u_s_cities_and_municipalities_for_its_ultra_fast_fiber_network.html.

36 *See* CenturyLink News, *CenturyLink expands its gigabit service to 16 cities, delivering broadband speeds up to 1 gigabit per second* (Aug. 5, 2014), *available at* https://www.centurylink.com/fiber/news/centurylink-expands-gigabit-service-to-sixteen-cities.html.

37 *See* Press Release, *Cox Communications Kicks Off Plan to Offer Residential Gigabit Speeds: Phoenix, Las Vegas, Omaha chosen as first markets* (May 22, 2014), *available at* http://cox.mediaroom.com/index.php?item=753.

38 Mike Robuck, *Cincinnati Bell to join Gigabit club*, CED Magazine (Aug. 19, 2014), *available at* http://www.cedmagazine.com/news/2014/08/cincinnati-bell-to-join-gigabit-club; Chloe Albanesius, *Bright House Bringing Gigabit Internet to Homes in Tampa*, PCMag (Mar. 13, 2014) *available at* http://www.pcmag.com/article2/0,2817,2454920,00.asp; Press Release, *Gigabit Broadband Coming to Alaska In Anchorage by 2015* (Dec. 19, 2013), *available at* http://www.gci.com/news-release/gigabit-broadband-ak-in-anchorage-2015.

39 For a list of municipal and electric cooperative all-fiber deployments, *see* http://www.bbpmag.com/search.php?s0=1&cols=-co-st-an-se-ty-mu-su-pa&st=&ve=&gr=&te=&se=&ty=-mun-ppr-ele&qco=&qme=&qan=&qus=0&qmu=&qsu=&qpa=&qin=0.

and/or businesses.[40] Furthermore, as the Commission continues to play an important role in encouraging robust, scalable network deployment through its Rural Broadband Experiments and the CAF Phase II competitive bidding process, it only will hasten the transition to an all-fiber broadband ecosystem.[41]

The deployment of all-fiber networks in communities throughout the country evidences a growing recognition that robust, scalable connectivity is a critical driver of economic development and social interaction. The deployment of all-fiber networks in cities throughout the country will catalyze a "big bang" of creative energy to develop new applications and content, as bandwidth is removed as a constraint on innovation, which will in turn propel consumer demand for all-fiber networks that can handle these new applications. As explained in the following section, to reflect the rapidly evolving broadband market, it is time for the Commission to abandon its long-outdated reliance on speed for its Section 706 analysis and instead set a standard based on the deployment of all-fiber networks.

C. The Commission Should Abandon Its Speed Benchmark and Instead Focus on the Deployment of Fiber

In the *Sixth Broadband Deployment Report*, the Commission noted that it wished to have a "relatively static point at which to gauge the progress and growth in the advanced services market" to avoid constantly altering the definition of advanced services in its annual Section

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40 *See* Masha Zager, *Large Companies Plan Gigabit Rollouts*, Broadband Communities Magazine (July 2014), *available at* http://www.bbpmag.com/Features/0714feature-GigabitRollouts.php ("Gigabit Rollouts Article"); *see also* Gig.U, *From Gigabit Testbeds to the "Game of Gigs": The Third Annual Report of Gig.U*, at 19 (Aug. 2014), *available at* http://www.gig-u.org/cms/assets/uploads/2012/12/81714-Gig.U-Final-Report-Draft-1.pdf (depicting gigabit efforts and competition between and among large providers and independent projects).

41 *See In the Matter of Connect America Fund, et al.*, WC Docket No. 10-90 *et al.*, Report and Order and Further Notice of Proposed Rulemaking, FCC 14-98, ¶ 5 (rel. July 14, 2014) ("Rural Broadband Experiments Order"). Of the 1,000 expressions of interest that the Commission received in response to its announcement of the Rural Broadband Experiments, nearly 60 percent proposed to offer all-fiber networks in price-cap areas.

706(b) inquiries.[42] Yet, in seeking to rely upon a speed benchmark in a dynamic and evolving market, the Commission has given itself no other choice but to constantly redefine what "advanced telecommunications capability" means. Moreover, to the extent the Commission has refrained from updating its speed benchmark, its choice has resulted in a benchmark that is increasingly out of touch with the market for advanced services.

As explained above, in the Tenth NOI, the Commission again asks whether and to what extent it should use broadband speed as a benchmark in its Section 706(b) inquiry. Specifically, the Commission asks "whether a download speed of 10 Mbps" – or some higher speed – "would adequately reflect Congress's goal of evaluating *advanced* telecommunications capability," and whether the benchmark should be set based on a projection of anticipated future demand.[43] With respect to upload speed, the Commission asks whether 1 Mbps is sufficient to meet the requirements of Section 706, particularly when, as described above, many consumers use "symmetrical services, such as two-way video calling; the uploading of media to social networks; and cloud storage."[44]

Since the Commission's *Sixth Broadband Deployment Report*, the Council has consistently argued for an increase in the broadband speed benchmark to reflect then-current market realities.[45] However, given that speeds are increasing substantially and will continue to

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42 *See 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 et al.*, GN Docket No. 09-137 *et al.*, Sixth Broadband Deployment Report, 25 FCC Rcd 9556, 9565, ¶ 13 (rel. July 20, 2010) ("Sixth Broadband Deployment Report") (internal quotations and citations omitted).

43 *See* Tenth NOI, ¶ 15 (emphasis in original).

44 *See id.*, ¶¶ 16-17.

45 In its *2010 Sixth Broadband Deployment Report*, the Commission took the "overdue step" of establishing a benchmark of 4 Mbps/1 Mbps for advanced telecommunications service. *See* Sixth Broadband Deployment Report, 25 FCC Rcd at 9558, ¶ 4. The

increase in response to demands from consumers and edge providers, the time has come for the Commission to abandon its speed benchmark and instead focus on the deployment of robust, scalable network infrastructure (fiber) when defining "advanced telecommunications capability." The Commission's speed benchmark has consistently fallen below market realities. For example, the Tenth NOI suggests raising the downstream speed threshold to 10 Mbps. And yet, the latest Measuring Broadband America report concluded that the average subscribed speed tier is now 21.2 Mbps – or over five times the current speed benchmark and over double the proposed benchmark.[46] Moreover, average speeds are increasing by 36% each year.[47] If those rates continue, we should expect to see nearly 100 Mbps average downstream speeds within 5 years and well over 450 Mbps average downstream speeds within 10 years. Further, as more consumers have access to all-fiber networks, these averages are likely to grow exponentially. Indeed, as explained above in Section II.B, broadband providers are now racing to deploy

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following year, in response to the Commission's *2010 Seventh Broadband Deployment NOI*, the Council supported the then-current 4 Mbps/1 Mbps benchmark, but recognized – as the Commission did – that the benchmark would only be relevant for a limited time. *See* Comments of the Fiber-to-the-Home Council, GN Docket No. 10-159 (filed Sept. 7, 2010). Indeed, by the next year, the Council noted that the speed benchmark was "already . . . outdated." *See* Comments of the Fiber-to-the-Home Council, GN Docket No. 11-121, at 2 (filed Sept. 6, 2011). In response to the Commission's *2012 Ninth Broadband Deployment NOI*, the Council argued that "[a]verage broadband speeds . . . greatly surpassed the existing broadband benchmark of 4 Mbps/1Mbps," and therefore proposed a new benchmark of 20 Mbps/4 Mbps. FTTH Council Comments on Ninth NOI at 12. Nevertheless, the Commission has maintained its benchmark at 4 Mbps/1 Mbps since the *2010 Sixth Broadband Deployment Report*.

46 *See* FCC Office of Engineering and Technology and Consumer and Governmental Affairs Bureau, *2014 Measuring Broadband America, Fixed Broadband Report: A Report on Consumer Fixed Broadband Performance in the U.S.*, at 13 (June 2014), *available at* http://data.fcc.gov/download/measuring-broadband-america/2014/2014-Fixed-Measuring-Broadband-America-Report.pdf ("2014 Measuring Broadband America Report").

47 *See id*.

affordable all-fiber networks throughout the country.[48] Accordingly, rather than rely on a once-per-decade recalibration of a speed threshold that becomes obsolete almost immediately after it is announced,[49] the Commission should measure broadband deployment based on the most relevant and more static and measurable standard: the deployment of all-fiber networks. Setting a standard based on the deployment of all-fiber networks provides a number advantages over the current speed benchmark.

First, all-fiber infrastructure is widely recognized as providing far superior performance to other network technologies when compared on the basis of the Commission's proposed broadband metrics – i.e., speed, latency, and usage. All-fiber networks have virtually unlimited bandwidth that can accommodate even the most bandwidth-hungry households. All-fiber networks today are providing the highest tested median download speed when compared to cable, fiber-to-the-node, DSL, and wireless networks.[50] Indeed, researchers are already testing fiber networks capable of delivering multiple *terabits* per second – over one million times faster than the Commission's current broadband benchmark.[51] In addition, the latest Measuring Broadband America Report found that fiber-to-the-home services had the lowest latency of all broadband technologies tested.[52] Moreover, all-fiber networks can readily deliver symmetrical bandwidth, which will be vital to meet growing consumer demand for upstream capacity.[53] All-

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48 *See* Gigabit Rollouts Article.

49 *See Sixth Broadband Deployment Report*, 25 FCC Rcd at 9558, ¶ 4.

50 *See* 2014 Render Presentation at 38.

51 *See* Kate Knibbs, *The World's Fastest Network Lets You Download a Movie in .2 Milliseconds*, Gizmodo (July 31, 2014), *available at* http://gizmodo.com/the-worlds-fastest-network-lets-you-download-a-movie-in-1614039292 (discussing a recent successful test of a 43 Tbps fiber network).

52 *See 2014 Measuring Broadband America Report* at 13.

53 *See* FTTH Business Guide at 12 (finding that "upstream bandwidth will become increasingly important as applications requiring two-way video sharing become more commonplace, and cloud-based services . . . proliferate.").

fiber networks also are readily scalable to faster speeds simply by upgrading modulating electronics. As a result, all-fiber networks can keep up with consumer demand for new applications and services well into the future.

In addition, the value of all-fiber networks extends well beyond the speed and performance that a consumer gets for a given price. The fact is that the virtually unlimited bandwidth of all-fiber networks enables activities that simply are not possible with other network technologies. For example, broadband provided over all-fiber networks bring education, health care, and other social goods into the home through immersive, innovative applications and services. It is for this reason that prominent industry analyst Larry Downes has stated that cities with all-fiber, last-mile networks are a "remarkable example of big bang disruption," and that the more such cities there are, "the more big bang disruptions we're going to see."[54] In essence, all-fiber networks drive the ultimate virtuous cycle, one in which bandwidth is no longer a constraint on innovation and the possibilities for application developers are only bounded by their creativity. Further, because the networks have symmetrical bandwidth, they turn consumers into producers. A recent consumer survey found that 13 percent of FTTH users have a home-based business, bringing in an estimated $10,000 in incremental income from their network.[55] Additionally, all-fiber networks appear to increase the value of single-family and multi-dwelling-unit properties.[56]

Because of these vastly superior performance capabilities, all-fiber networks are what consumers and edge providers – and their communities – want. Consumers, who are connecting

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54 *See* Emi Kolawole, *Tsunamis, big bangs and gigabit city disruption*, The Washington Post (Apr. 18, 2013), *available at* http://www.washingtonpost.com/blogs/innovations/post/tsunamis-big-bangs-and-gigabit-city-disruption/2013/04/18/75c78646-a77e-11e2-8302-3c7e0ea97057_blog.html.

55 *See* 2014 Render Presentation at 51.

56 *See id.* at 53.

more devices to the Internet and using more bandwidth-intensive applications than ever, recognize the value of all-fiber networks. Similarly, local leaders know that all-fiber networks can bring their communities economic growth, social interaction, and public benefit. Moreover, edge providers understand that to provide next-generation services, they and their customers must have access to next-generation (i.e., all-fiber) connectivity. And while all-fiber networks respond to an existing consumer demand, they will become even more necessary for consumers to participate in the digital economy. As a result, the Commission should adopt a standard that addresses these demands and sets the foundation for all-fiber deployment to all Americans.

The Commission also should adopt infrastructure (fiber) metric as the appropriate benchmark for its Section 706 inquiry because it provides a measurable and "relatively static point" that the Commission can use as a baseline for its analyses for years to come. Additionally, by using this standard, the Commission can remove significant and unnecessary complexity from its current Section 706(b) inquiry – and add certainty – while avoiding the need to constantly recalibrate its standard based on a rapidly evolving market.[57]

For these reasons, the Commission should take seriously its desire to "start anew"[58] and set a benchmark for its Section 706(b) analysis that discards its outdated reliance on speed and instead focuses on a forward-looking and static benchmark: the extent to which all-fiber access

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[57] The Tenth NOI asks whether the speed benchmark should be based on one or more of the following criteria: average household broadband use, multiple simultaneous uses, peak usage time, future use, and even suggests splitting the speed benchmark in two to accommodate for the Commission's long-term goals. *See* Tenth NOI, ¶¶ 8-13. Similarly, the Commission asks whether it should incorporate still more criteria into its analysis, including broadband latency, data usage allowances, and "technical and/or economic characteristics of a broadband service," including jitter or service reliability. *See id.*, ¶ 30. These criteria, while certainly important, only serve to make the Commission's analysis needlessly complex and invite further opportunities to move the goalposts rather than rely upon a static standard.

[58] *See* Tenth NOI, ¶ 3.

networks are being deployed in a reasonable and timely fashion to all Americans. When judged against this standard, it is clear that all-fiber networks are not being deployed in a reasonable and timely fashion to all Americans. Therefore, as explained in the next section, the Commission should take immediate steps to remove barriers to the deployment of all-fiber networks.

III. THE COMMISSION SHOULD CONTINUE ITS FOCUS ON ADDRESSING AND REMOVING IMPEDIMENTS TO BROADBAND DEPLOYMENT

In the Tenth NOI, the Commission asks what immediate actions it could take to accelerate deployment of advanced telecommunications capability by utilizing "price cap regulation, regulatory forbearance, measures that promote competition in the local telecommunications market, or other regulating methods that remove barriers to infrastructure investment."[59] In this section, the Council suggests four concrete steps that the Commission could take to remove barriers to all-fiber infrastructure investment.

First, the Commission must focus on ensuring reasonable, expeditious, and cost-based access to rights of way and poles, ducts, and conduits so that broadband providers have a workable business case to expand broadband coverage and upgrade current infrastructure. As the Council argued in its comments on the Ninth NOI, despite positive steps that the Commission has taken, there is much more to be done.[60] Moreover, the Commission should continue to consider methods for improving access to non-federal rights of way through changes to state and local laws and regulations, as well as access to private rights of way, including, for example, railroad track crossings. Additionally, the Commission should remain vigilant against other local barriers to deployment that may hinder private providers from deploying all-fiber networks to all Americans in a reasonable and timely fashion.

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59 *See id.*, ¶ 49 (internal citations omitted).

60 *See* FTTH Council Comments on Ninth NOI at 15.

Second, the Commission should provide proper incentives to rural telecommunications and broadband providers to deploy all-fiber networks that are (or soon will be) available to Americans in urban and suburban areas. The FTTH Council commends the Commission for adopting its Rural Broadband Experiments program, which will provide $100 million total funding to winning applicants who propose to deploy robust, scalable broadband in rural areas.[61] The Commission should continue the momentum that the Rural Broadband Experiments have built by ensuring that the CAF Phase II competitive bidding process is designed to incent the deployment of all-fiber networks. More specifically, as the Council argued in its recent comments on the CAF Phase II competitive bidding process, the Commission should require recipients of CAF Phase II funding through competitive bidding (at least in the first phase of bidding) to deploy all-fiber networks.[62]

Third, the Commission can accelerate the deployment of all-fiber networks through its E-Rate modernization proceeding. The White House has set a goal of connecting students with speeds of "no less than 100 Mbps and a target speed of 1 Gpbs" within five years.[63] In order to reach this goal, schools and libraries must have access to fiber. However, many schools and libraries recognize that cost stands as a barrier to deployment of all-fiber infrastructure. As a result, the Commission recently issued a Public Notice seeking focused comments on ways to

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61 *See generally* Rural Broadband Experiments Order.

62 *See In the Matter of Connect America Fund*, WC Docket No. 10-90, Comments of the Fiber to the Home Council Americas on the Further Notice of Proposed Rulemaking on Connect America Fund Public Interest Obligations and the Phase II Competitive Bidding Process, at 5 (Aug. 8, 2014).

63 *See In the Matter of Modernizing the E-rate Program for Schools and Libraries*, WC Docket No. 13-184, Notice of Proposed Rulemaking, 28 FCC Rcd. 11304, 11307-08, ¶ 7 (rel. July 23, 2013).

use E-rate funds to deploy ultra-high-speed networks to schools and libraries.[64] The Commission should use the opportunity presented in the E-Rate Modernization proceeding to further promote the deployment of all-fiber networks to our nation's schools and libraries, which would in turn meet the Commission's goal of ensuring the deployment of advanced telecommunications capability to, "in particular, elementary and secondary schools and classrooms."[65]

Fourth, the Commission could accelerate the deployment of all-fiber networks, on a limited scale, by granting the petitions of the Electric Power Board of Chattanooga, Tennessee and the City of Wilson, North Carolina, and leveraging its Section 706(b) authority to preempt the Tennessee and North Carolina laws and rules that serve as a *de jure* or *de facto* prohibitions against municipal utility broadband.[66] As the Council argued in its comments in support of the petitions, these sorts of prohibitions are repugnant to the goals of Section 706, and the Commission has legal authority to preempt them in order to ensure the timely and reasonable deployment of advanced telecommunications capability where a private provider is unwilling to

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64 *See Wireline Competition Bureau Seeks Focused Comment on E-Rate Modernization*, WC Docket No. 13-184, Public Notice, DA 14-308, ¶ 26 ("In light of the record demonstrating that the costs of one-time construction projects, even though already supported by the E-rate program, can be cost-prohibitive, we seek comment on whether the Commission should undertake a limited initiative, within the existing priority one system, to incent the deployment of high-capacity broadband connections to schools and libraries.").

65 *See* 47 U.S.C. § 1302(a).

66 *See generally*, *In the Matter of City of Wilson, North Carolina, Petition for Preemption of North Carolina General Statutes § 160A-340 et seq.; The Electric Power Board of Chattanooga, Tennessee, Petition for Preemption of a Portion of Section 7-52-601 of the Tennessee Code, Annotated*, WC Docket Nos. 14-115, 14-116, Comments of the Fiber to the Home Council Americas in Support of Electric Power Board and City of Wilson Petitions, Pursuant to Section 706 of the Telecommunications Act of 1996, Seeking Preemption of State Laws Restricting the Deployment of Certain Broadband Networks (Aug. 29, 2014).

deploy advanced telecommunications capability and a municipal utility stands ready to meet consumer and community needs.[67]

IV. CONCLUSION

In conclusion, the Commission should in conducting its Section 706 inquiry discard its speed benchmark in favor of a forward-looking standard that recognizes America's need to advance toward an all-fiber broadband ecosystem. The Council believes the new benchmark should be based on the existence of all-fiber networks and whether they are being deployed to all Americans in a reasonable and timely fashion.

Respectfully Submitted,

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[67] *See id.*