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

In the Matter of	)	
	)	
Inquiry Concerning Deployment of Advanced	)	GN Docket No. 17-199
Telecommunications Capability to All Americans	)	
in a Reasonable and Timely Fashion	)	

THIRTEENTH SECTION 706 REPORT NOTICE OF INQUIRY

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Comment Date: September 7, 2017
Reply Comment Date: September 22, 2017

By the Commission: Commissioner Clyburn concurring and issuing a statement.

TABLE OF CONTENTS

I. INTRODUCTION

1. Section 706 of the Telecommunications Act of 1996, as amended (1996 Act), requires the Commission to determine and report annually on "whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion."[1] With this Notice of Inquiry

[1] 47 U.S.C. § 1302(b). For simplicity in past inquiries, the Commission has sometimes used the term "broadband" to refer to "advanced telecommunications capability." However, "advanced telecommunications capability" is a statutory term with a definition that is more narrow than the term "broadband." *See* 47 U.S.C. § 1302(d)(1) ("The term 'advanced telecommunications capability' is defined, without regard to any transmission media or technology, as high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology."). As this definition makes clear, (continued . . .)

(*Inquiry*), we initiate the next annual assessment of the "availability of advanced telecommunications capability to all Americans in a reasonable and timely fashion," and solicit comment and information to help guide our analysis.[2]

2. The Commission released the *2016 Notice of Inquiry* on August 4, 2016, asking a number of questions about broadband deployment, but did not issue a subsequent report.[3] In light of the changes in the industry and our recent actions to encourage broadband deployment,[4] we propose to start this *Inquiry* afresh, with updated data and questions focused on the current progress of deployment of advanced telecommunications capability.

3. In response to this *Inquiry*, we seek objective data and other evidence reflecting the state of broadband deployment and availability. We encourage individual consumers, providers of broadband services, consumer advocates, analysts, companies, policy institutes, governmental entities, and all other interested parties to help us determine the most effective ways to complete this statutorily mandated task. We also encourage commenters to bring to our attention new issues concerning the deployment and availability of advanced telecommunications capability and recommend new ways to measure and evaluate deployment and availability. The information we gather in this proceeding will help ensure that our broadband policies are well-informed and backed by sound data analysis as we strive to encourage the deployment of broadband to all Americans in a reasonable and timely fashion.

II. STATUTORY FRAMEWORK FOR SECTION 706 INQUIRY

4. Section 706 requires us to evaluate annually "whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion."[5] Accordingly, we look to the language of the statute to guide our evaluation of the state of deployment of "advanced telecommunications capability" in the United States today. We intend to conduct this *Inquiry* by orienting it toward evaluating whether the progress being made in the deployment of advanced telecommunications capability is occurring in a reasonable and timely fashion. We believe this is the most faithful approach to fulfilling this requirement in the statute. We seek comment in this Notice of Inquiry on the appropriate metrics and benchmarks by which to measure the deployment of both fixed and mobile services in order to evaluate the extent to which American consumers have access to advanced telecommunications capability.

A. Advanced Telecommunications Capability

1. Evaluating Fixed and Mobile Services

5. Americans today regularly use both fixed and mobile advanced telecommunications capability to originate and receive high-quality voice, data, graphics, and video telecommunications. We propose to incorporate both fixed and mobile advanced telecommunications services into our Section 706 inquiry. This proposal is consistent with the statutory language in Section 706, which defines "advanced telecommunications capability . . . without regard to any transmission media or technology, as high-speed, switched, broadband telecommunications capability that enables users to originate and receive

(Continued from previous page)
while all services providing advanced telecommunications capability are "broadband," not all broadband services provide advanced telecommunications capability.

[2] 47 U.S.C. § 1302(b).

[3] *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. 16-245, Twelfth Broadband Progress Notice of Inquiry, 31 FCC Rcd 9140 (2016) (*2016 Notice of Inquiry*).

[4] *See infra* Part IV.

[5] 47 U.S.C. § 1302(b).

high-quality voice, data, graphics, and video telecommunications using any technology."[6] Given the salient differences in fixed and mobile advanced telecommunications capability, as well as the data available for this *Inquiry*, we believe recognizing a distinction between these two technologies used to provide advanced telecommunications capability is appropriate. If we were to only include one of these technologies in our *Inquiry* we would effectively be excluding a large portion of the technologies used "to originate and receive high-quality voice, data, graphics, and video telecommunications." We seek comment on this proposal.

6. Many Americans use mobile broadband to enjoy advanced telecommunications capability. As of the beginning of 2016, approximately 80 percent of American mobile subscribers used smartphones, up from approximately 50 percent in 2012.[7] As of the first quarter of 2016, about 90 percent of new mobile phones sold were smartphones, as compared to approximately 67 percent in 2012.[8] The *Nineteenth Mobile Competition Report* found that most of the U.S. population resides in an area with LTE coverage from at least one service provider and that median download speeds during the second half of 2015 ranged from approximately 8 megabits per second (Mbps) to 15 Mbps.[9] And in recent months, the four nationwide mobile broadband providers have announced or expanded their "unlimited" data offerings.[10]

7. The increase in mobile edge content demonstrates how Americans are increasingly using mobile broadband to achieve advanced telecommunications capability. Mobile applications and websites provide "high-quality voice, data, graphics, and video telecommunications," including text messaging, e-mail, social networking, and video recording and viewing to those with a robust enough broadband connection.[11] Mobile devices are used more often to share photographs and videos online,[12] and have also enabled video calling applications.[13] Productivity applications once confined to personal computers are now commonly available on mobile devices, including the Microsoft Office Suite, Intuit QuickBooks,

[6] 47 U.S.C. § 1302(d)(1).

[7] *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services*, WT Docket No. 16-137, Nineteenth Report, 31 FCC Rcd 10534, 10618, para. 121 (WTB 2016) (*Nineteenth Mobile Competition Report*).

[8] *Nineteenth Mobile Competition Report*, 31 FCC Rcd at 10618, para. 121.

[9] *Id.* at 10561, para. 36 & at 10656, Table VI.B.i.

[10] While these plans allow unlimited data usage without overage charges, they each have a "soft cap" that, when reached, can cause data to be deprioritized during times of congestion. Video resolution may also be lowered by default under the plans. Verizon Unlimited, https://www.verizonwireless.com/plans/verizon-plan/ (providing unlimited plans with 22 GB a month soft cap; speeds are reduced to 3G after 10 GB is reached when tethering; video plays at full HD by default); AT&T Unlimited Data Plans, https://www.att.com/plans/unlimited-data-plans.html (22 GB a month soft cap; video plays at 480p by default); Sprint Unlimited Data Plans, https://www.sprint.com/landings/unlimited-cell-phone-plans/ (23 GB of data with soft cap; video plays at 1080p by default); T-Mobile One Unlimited Data Plans, https://www.t-mobile.com/cell-phone-plans (On all T-Mobile plans, if congested, top 3% of data users (>32 GB/month) may notice reduced speeds due to prioritization. Video typically streams at DVD quality (480p)).

[11] *Nineteenth Mobile Competition Report*, 31 FCC Rcd at 10620, para. 124 & Chart VII.A.3.

[12] *See* Mary Meeker, Internet Trends 2016, pp. 78, 90 (June 1, 2016), http://www.kpcb.com/InternetTrends.

[13] *See, e.g.*, Google Play Store, Google Duo, https://play.google.com/store/apps/details?id=com.google.android.apps.tachyon; Google Play Store, Skype, https://play.google.com/store/apps/details?id=com.skype.raider; Apple, Use FaceTime with your iPhone, iPad, or iPod Touch, https://support.apple.com/en-us/HT204380.

Google Drive, and Adobe Acrobat.[14] In line with the increase in mobile edge content, average data use has increased from less than 1 GB per month in 2012 to approximately 4 GB per month in 2016.[15] We seek comment on the increasing popularity of mobile content, and how that should affect our evaluation of advanced telecommunications capability. Are there other trends regarding mobile broadband that should be analyzed in this year's Report?

8. Meanwhile, the fixed broadband industry continues to evolve. Certain providers, offering different technologies, have recently begun or announced the deployment of fixed gigabit (1,000 Mbps) connections in particular communities, including Altice,[16] Cincinnati Bell,[17] Verizon,[18] Hawaiian Telcom,[19] AT&T,[20] Google Fiber,[21] Comcast,[22] and CenturyLink.[23] Certain satellite and fixed wireless providers also appear to be increasing their offerings of high-speed services, particularly focusing on previously underserved rural and exurban areas.[24] For example, ViaSat recently launched ViaSat-2, which is expected to double its available bandwidth, with more than 300 gigabits per second (Gbps) of total network capacity, as well as seven times the broadband coverage.[25]

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[14] Microsoft Office Apps, https://products.office.com/en-us/mobile/office; Intuit QuickBooks for mobile, https://quickbooks.intuit.com/mobile/; Google Mobile: Get more done, on-the-go, https://www.google.com/mobile/drive/; Acrobat Reader mobile app FAQ, https://helpx.adobe.com/acrobat/mobile-app-faq.html.

[15] *Nineteenth Mobile Competition Report*, 31 FCC Rcd at 10622, para. 127.

[16] Iain Morris, Altice Plans FTTH for Entire US Footprint, LightReading (Nov. 30, 2016), http://www.lightreading.com/gigabit/fttx/altice-plans-ftth-for-entire-us-footprint/d/d-id/728657; Altice, ALTICE USA UNVEILS "GENERATION GIGASPEED" A FULL-SCALE FIBER-TO-THE-HOME NETWORK INVESTMENT PLAN TO ENABLE 10 GIGABIT BROADBAND SPEEDS, http://altice.net/wp-content/uploads/2016/11/Altice-pr-altice-USA-Unveils-Generation-Gigaspeed.pdf.

[17] Sean Buckley, Cincinnati Bell plans to pass 35K additional addresses with Fioptics in 2017, Fierce Telecom (Feb. 15, 2017), http://www.fiercetelecom.com/telecom/cincinnati-bell-plans-to-pass-35k-additional-addresses-fioptics-2017.

[18] Edward C. Baig, Verizon launches near-gigabit speed Fios, rivaling Google Fiber, USA Today (Apr. 24, 2017), https://www.usatoday.com/story/tech/columnist/baig/2017/04/24/verizon-pushing-fios-speeds-near-gigabit/100843224/.

[19] Sean Buckley, Hawaiian Telcom top-tier internet subscribers grew 86 percent in first quarter, Fierce Telecom (May 11, 2017), http://www.fiercetelecom.com/telecom/hawaiian-telcom-says-100-1-gbps-internet-subs-grew-86-q1-2017.

[20] Ian Sherr, AT&T Fiber adds eight more metro areas, CNET (Apr. 20, 2017), https://www.cnet.com/news/att-fiber-adds-eight-more-metro-areas/.

[21] Carolyn Tribbe Greer, It's official: Google Fiber is coming to Louisville, Louisville Business First (Apr. 26, 2017), http://www.bizjournals.com/louisville/news/2017/04/26/its-official-google-fiber-is-coming-to-louisville.html.

[22] Dave Flessner, Comcast adds more Gig service in 'Gig City,' Chattanooga Times Free Press (Feb. 20, 2017), http://www.timesfreepress.com/news/breakingnews/story/2017/feb/20/comcast-adds-more-gig-service-gig-city/413790/.

[23] Sean Buckley, CenturyLink gets aggressive with FTTH, but cable retains upper hand in sub-10 Mbps markets, Fierce Telecom (Jan. 14, 2016), http://www.fiercetelecom.com/telecom/centurylink-gets-aggressive-ftth-but-cable-retains-upper-hand-sub-10-mbps-markets.

[24] *See* Samantha Masunaga, Satellite constellations could be poised to challenge the broadband industry, Los Angeles Times (Dec. 30, 2016), http://www.latimes.com/business/la-fi-satellite-constellation-broadband-20161230-story.html; Joan Engebretson, Exec: AT&T Fixed Wireless Planned for CAF-Funded Rural Areas, TeleCompetitor (Aug. 10, 2016), http://www.telecompetitor.com/exec-att-fixed-wireless-planned-for-caf-funded-rural-areas/.

[25] *See* ViaSat, ViaSat-2 Scheduled for Launch Tonight, June 1 at 4:45 PM PDT, Live Stream of the Launch Will Be Available on the ViaSat Website (June 1, 2016), http://investors.viasat.com/releaseDetail.cfm?ReleaseID=1028604.

9. According to the Pew Research Center, the percentage of Americans subscribing to fixed broadband has reached an all-time high of approximately 73 percent.[26] At the same time, 13 percent of Americans across all demographic groups are relying solely on smartphones for home internet access.[27] Given that Americans use both fixed and mobile broadband technologies, we seek comment on whether we should evaluate the deployment of fixed and mobile broadband as separate and distinct ways to achieve advanced telecommunications capability. Taking into account the differences between the various services and the geographic, economic, and population diversity of our nation, we seek comment on focusing this Section 706 *Inquiry* on whether *some form* of advanced telecommunications capability, be it fixed *or* mobile, is being deployed to all Americans in a reasonable and timely fashion. Would such an inquiry best follow the statutory instruction to evaluate the deployment of advanced telecommunications capability "without regard to any transmission media or technology"?[28]

10. Alternatively, we seek comment on whether we should evaluate the deployment based on the presence of both fixed *and* mobile services. As noted elsewhere in this *Inquiry*, mobile and fixed broadband have different technical characteristics and limitations, and broadband providers choose to market their fixed and mobile products in different ways.[29] This is consistent with the approach that the Commission has generally taken in the universal service context, by adopting programs to subsidize fixed and mobile broadband independent of one another.[30] We seek comment on this approach.

11. In fulfilling our statutory obligation to report on demographic information for unserved areas,[31] we propose to report demographic information for areas with neither fixed nor mobile advanced telecommunications capability; with fixed but not mobile advanced telecommunications capability; and with mobile but not fixed advanced telecommunications capability. We believe this approach will provide useful information in our report while also recognizing that advanced telecommunications capability is provided in different circumstances using fixed or mobile service as discussed above.

2. Benchmarks and Metrics

12. In this section, we seek comment on the benchmarks we use to define "advanced telecommunications capability." First, we propose to maintain the current speed benchmark of 25 Mbps download and 3 Mbps upload (25 Mbps/3 Mbps) for fixed broadband, and we also seek comment about other potential benchmarks. Next, we seek comment on potential benchmarks and metrics for mobile broadband. Finally, we seek comment on creating a predictable, objective framework we can use going forward to update the benchmarks for evaluating Americans' access to advanced telecommunications capability in a reasonable and timely fashion.

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[26] *See* Aaron Smith, Record shares of Americans now own smartphones, have home broadband, Pew Research Center for Internet and Technology (Jan. 12, 2017), http://www.pewresearch.org/fact-tank/2017/01/12/evolution-of-technology/; *see also* Pew Research Center for Internet and Technology, Internet/Broadband Fact Sheet (Jan. 12, 2017), http://www.pewinternet.org/fact-sheet/internet-broadband/.

[27] *See* Pew Research Center for Internet and Technology, Internet/Broadband Fact Sheet (Jan. 12, 2017), http://www.pewinternet.org/fact-sheet/internet-broadband; Will Rinehart, Four Things We Know About Fixed And Mobile Broadband Competition, American Action Forum (May 17, 2016), https://www.americanactionforum.org/insight/four-things-know-fixed-mobile-broadband-competition/.

[28] *See* 47 U.S.C. § 1302(d)(1).

[29] *See supra*, para. 5.

[30] *See Connect America Fund, et al.*, Report and Order and Further Notice of Proposed Rulemaking, 26 FCC Rcd 17663, 17681-82, paras. 51-54 (2011).

[31] 47 U.S.C. § 1302(c).

a. Fixed Service Benchmarks

13. Section 706 defines advanced telecommunications capability as "*high-speed*, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications."[32] We propose to continue use of a specific speed benchmark to evaluate advanced telecommunications capability.[33] We seek comment on this proposal. Do we need to maintain a specific speed benchmark to adequately conduct this *Inquiry*, or are there other methods that we can use? Commenters favoring elimination of the speed benchmark should propose specific methodologies for alternative ways of measuring advanced telecommunications capability.

14. We seek comment on the appropriate benchmark for fixed advanced telecommunications capability. Should we maintain the 25 Mbps download, 3 Mbps upload (25 Mbps/3 Mbps) speed benchmark, and to apply it to all forms of fixed broadband? For example, the most recent Internet Access Services Report finds that 59 percent of residential fixed connections equal or exceed such speed.[34] Should we consider modifying the 25 Mbps/3 Mbps benchmark? Those proposing different speed benchmarks should specify and provide justifications for their proposed alternatives. We also seek comment on whether there are other sources or data points we should consider.

15. Recognizing there may be other characteristics of service in addition to speed relevant for evaluating deployment, we also seek comment on whether we should incorporate into our benchmarks any measures of latency or consistency of service.[35] If we were to do so, do reliable and comprehensive data exist that could be applied in a meaningful way year after year for annual inquiries?

16. We also seek comment on whether we should establish other benchmarks for evaluating advanced telecommunications capability. For example, should we consider data allowances and other limitations on service in evaluating advanced telecommunications capability? Commenters supporting adoption of additional benchmarks should provide a justification for why examination of the proposed benchmark is necessary to evaluate the deployment of advanced telecommunications capability and should propose a specific methodology for applying any such proposed benchmark.

b. Mobile Service Metrics and Benchmarks

17. We seek comment on how the Commission should evaluate advanced telecommunications capability in the mobile context.[36] What benchmarks and metrics, if any, should the Commission use in that evaluation? More specifically, we seek comment on how the Commission might establish a speed benchmark for mobile broadband services. We also seek comment on whether to take into account consistency/reliability of service and latency in the mobile broadband environment, and their interaction with speed. In addition, we seek comment on the data sources that should guide the Commission's analysis of these metrics and potential benchmarks.

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[32] 47 U.S.C. § 1302(d)(1) (emphasis added).

[33] The 25 Mbps/3 Mbps speed benchmark was established in the *2015 Report* and maintained in the *2016 Report*. *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, 2015 Broadband Progress Report and Notice of Inquiry on Immediate Action to Accelerate Deployment, 30 FCC Rcd 1375, 1403-08, paras. 45-55 (2015) (*2015 Report*); *2016 Report*, 31 FCC Rcd at 722, paras. 51-52.

[34] *See* Wireline Competition Bureau, FCC, Internet Access Services: Status as of June 30, 2016, at Fig. 10 (WCB 2017).

[35] We invite parties who submitted comments in response to the *2016 Notice of Inquiry* to submit new comments detailing what, if anything, has changed regarding latency, consistency of service, and other potential benchmarks since the Commission's previous *Inquiry*.

[36] As above, we invite parties who submitted comments in response to the *2016 Notice of Inquiry* to note any changes since their previous comments with regard to mobile benchmarks.

18. The Commission has not previously set a mobile speed benchmark.[37] Our consideration of whether and how to set a speed benchmark will be informed by assessing the mobile broadband services and speeds that are available to consumers today, as well as evidence regarding what services consumers are choosing today, and what might be available in the near future. We ask commenters to address these factors in their comments. Should the Commission set a mobile speed benchmark, and if so, what it should be? We anticipate that any speed benchmark we set would be lower than the 25 Mbps/3 Mbps benchmark adopted for fixed broadband services, given differing capabilities of mobile broadband. We ask commenters to discuss this choice.[38] We seek comment on how use cases, engineering studies, and any other relevant empirical data should inform a mobile speed benchmark in terms of both the downlink and the uplink speed.

19. We seek comment on whether a mobile speed benchmark of 10 Mbps/1 Mbps is appropriate for mobile broadband services. Would a download speed benchmark higher or lower than 10 Mbps be appropriate for the purpose of assessing American consumers' access to advanced telecommunications capability? How should we appropriately consider edge speed in setting a mobile speed benchmark? As discussed below, in setting any mobile speed benchmark, how should we take into account the important issues of reliability/consistency of service and latency in the mobile broadband environment? Would it be more practical to use deployment of various air interface technologies (e.g., LTE) as a proxy for speed benchmarks? In this case, could we maintain a technology-neutral evaluation but rely on deployment of technologies we understand to typically be used to provide mobile advanced telecommunications capability?

20. We note that in the Commission's discussion of performance metrics for supported areas in the Mobility Fund II proceeding, the Commission stated that the median data speed of the network for the supported area must be 10 Mbps/1 Mbps, with at least 90 percent of the required download speed measurements not less than a certain threshold speed.[39] Further, the Commission decided to use a speed benchmark of at least 5 Mbps downlink for determining areas eligible for Mobility Fund II support.[40] Should the decisions made in Mobility Fund II inform any benchmark set for this proceeding? Would an uplink speed benchmark of 1 Mbps be appropriate for the purpose of assessing American consumers' access to advanced telecommunications capability or should the uplink speed be higher or lower than 1 Mbps, and if so, why?

21. We also ask commenters to address methodological issues related to the Commission's evaluation of a mobile broadband speed benchmark. What effects might testing methods, failed speed tests, and other characteristics of a particular speed test have on the appropriateness of a certain speed benchmark? At what geographic level should we be examining speed to satisfy our statutory obligation under Section 706(c), and why? Further, we seek comment on the appropriate methodology to use for setting a speed benchmark for mobile broadband.

22. Finally, we also seek comment on whether to incorporate additional characteristics of mobile broadband, including consistency/reliability of service, latency, or data allowances into our evaluation. For such characteristics, do reliable and comprehensive data exist that could be applied in a meaningful way year after year for annual inquiries? Commenters supporting inclusion of such

[37] *2016 Report*, 31 FCC Rcd at 724, para. 58.

[38] The *2016 Report* noted that mobile transmissions are subject to environmental factors that fixed line transmissions do not encounter and, thus, cannot achieve the same kinds of consistent speeds at the current level of technology. *2016 Report*, 31 FCC Rcd at 712, para. 29. In addition, mobile broadband networks lack the capacity or consistency of service to support most bandwidth intensive uses, such as full-screen HD video streaming, online gaming, and video conferencing applications. *Id.* at 717-18, para. 41.

[39] *Connect America Fund; Universal Service Reform – Mobility Fund*, Report and Order and Further Notice of Proposed Rulemaking, 32 FCC Rcd 2152, 2189-90, para. 87. (*MF-II R&O and FNPRM*).

[40] *MF-II R&O and FNPRM*, 32 FCC Rcd at 2173, 2236-37, 2238, paras. 51, 232, 243.

characteristics should explain their reasoning, and also discuss how such characteristics could be practically included into the *Inquiry*.

c. Framework for Updating Benchmarks

23. We next seek comment on whether and how we can establish a framework for conducting the annual Section 706 inquiry. We believe our annual inquiry would be aided by establishing a consistent, objective framework using predictable, reliable, and regularly-released public data from sources on which we can rely to evaluate our benchmarks.[41] We seek comment on this view and on the proper framework and data sources to employ. Would pre-committing to using the same inputs and methods year-after-year increase the value and rigor of our analysis? Alternatively, would it unduly constrain the analysis? If we use the same consistent inputs year-after-year, how would we introduce new data sources that may be relevant in the future? What are the benefits and drawbacks of adopting a specific framework for evaluating benchmarks as opposed to maintaining a more flexible standard of what constitutes advanced telecommunications capability?

24. For the fixed broadband speed benchmark in particular, we seek comment on whether there should be a relationship between the benchmark and what some fraction of subscribers are actually purchasing. Would a reasonable speed benchmark for fixed broadband be based on the mean or median speed purchased by consumers? Or, would it be more consistent with the idea of "advanced" telecommunications capability to select a benchmark which fewer consumers purchase? One of the statutory factors we consider in determining whether a particular service should be eligible for universal service support mechanisms is whether it has "been subscribed to by a substantial majority of residential customers."[42] Should we consider setting the fixed speed benchmark at the level that a substantial majority of residential customers subscribe to? Alternatively, is selecting a benchmark based on what consumers subscribe to the wrong metric? The most recent Internet Access Services Report finds that 59 percent of residential fixed connections have speeds greater than or equal to 25 Mbps/3 Mbps.[43] Could this be a reasonable basis for establishing a benchmark that can be easily and consistently updated over time? If so, we seek comment on how we could implement such a standard. How, if at all, should we consider the interplay between deployment of higher-speed services and customer uptake rates? Should the Commission account for consumer perceptions? If such perceptions were included in our economic analysis, what methodology should be used? What data could the Commission rely upon? Or, for example if consumers who have the choice of service offering speeds of 15 or 25 Mbps largely choose 15 Mbps service, should that influence our determination of what constitutes advanced telecommunications capability?[44] We also seek comment on other methods of selecting a benchmark independent of consumer purchasing trends or perceptions. Would it be more consistent with the statute to identify advanced telecommunications capability independent of consumer demand? How would we reasonably and consistently set such a benchmark? We seek comment on alternative methods of selecting a benchmark and how those methods are consistent with the statute.

25. Section 706 specifies that advanced telecommunications capability requires access to voice, data, graphics, and video telecommunications.[45] How should we interpret this statutory instruction when seeking to update the fixed speed benchmark? And what are the implications, if any, for a mobile speed benchmark? For example, we could set the benchmark at a speed that would allow Americans to

[41] *See* Free State Foundation Reply Comments, GN Docket No. 16-245, at 6-7 (Sept. 19, 2016).

[42] *See* 47 U.S.C. § 254(c)(1)(b).

[43] *See* Wireline Competition Bureau, FCC, Internet Access Services: Status as of June 30, 2016 at Fig. 10 (WCB 2017).

[44] *See* Will Rinehart, American Action Forum, Comments, GN Docket No. 16-245 at 5 (Sept. 21, 2016) (arguing data shows that 15 Mbps is the most common fixed connection used by consumers).

[45] 47 U.S.C. § 1302(d)(1).

use, with full functionality, the leading voice, data, graphics, and video telecommunications services. If we took such an approach, are there objective, regularly-updated data we could use to guide our analysis and determine which services to include in the evaluation? Are there other approaches we could take that incorporate the ability to use voice, data, graphics, and video telecommunications services into our benchmarks?

26. We note that some parties have criticized the Commission's recent Section 706 reports as lacking sufficient "clarity" and "economic rigor."[46] With respect to the clarity of the recent reports, we seek comment on specific steps we could take to make our analysis clearer and more predictable to industry, consumers, and other interested parties. For example, would having clear criteria using specific data sources prompt an adjustment in the benchmark help on this count? Or, for fixed broadband services, we could commit to maintaining the same speed benchmark until there is evidence that most Americans with access to speeds higher than the benchmark choose to purchase such speeds.[47] Would such an approach lead to more useful and predictable Section 706 reports? If we were to set a mobile speed benchmark, should there be any differences in how we update the mobile speed benchmark as opposed to how we update the fixed speed benchmark? What approaches might we take in the mobile context?

27. Similarly, we seek comment on measures we could take to increase the rigor of our approach. Are there particular parts of previous reports that lacked sufficient rigor? Are there specific analyses that we should conduct? To make our analysis more rigorous, should we continue our benchmark-based approach to evaluating the deployment of advanced telecommunications capability or should we consider other potential approaches, and why or why not?

28. Additionally, we seek comment on ways to incorporate the impact of industrial and technological change into our analysis. When we adopt a specific benchmark, should we also look at other speeds as well to gain a more fulsome view of the state of advanced telecommunications capability? For example, should the fact that several broadband providers have announced gigabit deployments in certain communities affect our speed benchmark?[48] Is it more consistent with the statutory definition of "advanced" telecommunications capability to adopt a benchmark based on the vanguard of services being deployed? How should emerging uses such as the Internet of things (IoT) factor in to selection of a benchmark?[49] How, if at all, should these or other industry developments affect the speed benchmark? Are there any other factors that we should consider?

29. Finally, we seek comment on whether we should use a more flexible approach without a specified framework for analyzing benchmarks. Is an ad hoc approach better suited to defining advanced telecommunications capability, particularly as technology continues to evolve? What are the benefits and drawbacks of maintaining a more flexible standard of what constitutes advanced telecommunications capability? How can we practically implement such an approach?

B. Deployment of Advanced Telecommunications Capability to All Americans

30. The next prong of the Section 706 inquiry "is whether advanced telecommunications capability *is being deployed to all Americans* in a reasonable and timely fashion."[50] We propose to

[46] Letter from Matthew A. Brill, Counsel to NCTA, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 16-245, at 1 (filed March 2, 2017).

[47] *See* NCTA Comments, GN Docket No. 16-245, at 4-5 (Sept. 6, 2016).

[48] *See supra* notes 16-25.

[49] Colin Neagle, CES 2016: Why the IoT needs fiber-optic broadband to succeed, NetworkWorld (Jan. 5, 2016) http://www.networkworld.com/article/3019428/internet-of-things/ces-2016-internet-of-things-iot-smart-home-fiber.html.

[50] 47 U.S.C. § 1302(b) (emphasis added).

measure whether advanced telecommunications capability is being deployed by evaluating progress—specifically, comparing deployment to census blocks in the present year to deployment to census blocks in previous years.[51] In conducting this analysis, we propose to analyze fixed and mobile broadband separately and then consider the totality of the evidence in our ultimate determination of whether advanced telecommunications capability is being deployed in a reasonable and timely manner. We seek comment on these proposals.

31. We propose to measure whether advanced telecommunications capability is being deployed to all Americans, i.e., in all areas of the country, by examining *all* areas in the country, and comparing deployment across areas. We accordingly seek comment on how the Commission should treat the disparity between the availability of advanced telecommunications capability in urban areas (including disparities within urban areas), and the availability of such services in rural areas and on Tribal lands.[52] We also seek comment on whether we should evaluate the deployment of advanced telecommunications capability based on certain demographic criteria. For example, should we evaluate whether broadband is being reasonably and timely deployed to low-income Americans? What factors should we evaluate and how should we do so? How can we most accurately capture and reflect the statutory intent behind this portion of our inquiry? What factors and data should we consider when making this determination?

32. Are there are other ways to analyze how advanced telecommunications capability is being deployed? Rather than measuring broadband deployment based on census blocks, should we consider another geographic metric, such as states, road miles,[53] croplands,[54] counties, other categories, or simply the entire landmass of the United States? If we were to use a different geographic metric, would our current Form 477 data collection be sufficient to conduct such an examination? If not, are there alternative data sources available that would be sufficient?

33. Finally, are there qualitative factors we should consider analyzing whether broadband is being deployed? For example, we could focus on the emergence of satellite and fixed wireless providers as fixed broadband providers in rural areas. We welcome suggestions of additional factors that we might consider.

C. Deployment in a Reasonable and Timely Fashion

34. We also seek comment on specific methods to assess whether deployment of advanced telecommunications capability meets Section 706's requirement that the deployment of advanced telecommunications capability to all Americans is being carried out "in a reasonable and timely fashion."[55] Prior inquiries have examined various aspects of the deployment of and market for advanced services, such as: high-speed service availability and subscription; investment in the infrastructure to support advanced services; the number of providers offering service through a particular technology; and the different technological options that consumers have for obtaining advanced services.[56] Are some or

[51] In comments in response to the *2016 Notice of Inquiry*, USTelecom proposed that we focus on the progress of actual deployment from year-to-year rather than what percentage of the population has access to broadband meeting a particular speed benchmark. USTelecom Comments, GN Docket No. 16-245, at 2-3 (Sept. 7, 2016).

[52] *See infra* Part III.

[53] *See* Competitive Carriers Association Comments, GN Docket No. 16-245, at 6 (Sept. 6, 2016).

[54] *See* Deere & Company Comments, GN Docket No. 16-245, at 5-6 (Sept. 6, 2016); Letter from Senator Roger Wicker, *et al.* to Tom Wheeler, Chairman, FCC (July 11, 2016).

[55] 47 U.S.C. § 1302(b).

[56] *See*, *e.g.*, *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,* CC Docket No. 98-146, Third Notice of Inquiry, 16 FCC Rcd 15515, 15522-24,
(continued . . .)

all of these criteria still useful for our analysis today? If not, what alternative criteria should we use when analyzing whether advanced telecommunications capability is being deployed in a "reasonable and timely" manner under Section 706(b)? How does our intent to evaluate progress affect how we should judge what is reasonable and timely?

35. What quantitative measures should we use for this portion of the *Inquiry*? How can we generate the most accurate information available on the reasonableness and timeliness of deployment, both overall (i.e., nationwide) as well as in specific geographic environments (i.e., rural versus urban areas)? Are there qualitative measures we should consider, such as examining whether broadband providers are deploying systems within expected timeframes? Should our approach differ in periods when major technological upgrades are being deployed in broadband networks, such as from 3G to 4G LTE in the mobile context? Given the way technological advancements often disseminate, with the rate of change differing considerably depending on where in a cycle dissemination is, how should this affect our assessment of what is reasonable and timely?[57]

36. In comments in response to the *2016 Notice of Inquiry*, USTelecom proposed that we focus on the progress of actual deployment from year-to-year rather than what percentage of the population has access to broadband meeting a particular speed benchmark.[58] How would such an inquiry proceed? Could we combine a benchmark-based approach with other tools to measure broadband deployment?

37. In addition, we seek comment on the interpretation of the terms "reasonable" and "timely" in the Section 706 evaluation. Insofar as they are separately-identified terms, should they be given independent meaning, and if so, what should be the scope of each concept? Alternatively, are the concepts of "reasonable and timely" deployment so interrelated that it makes most sense to evaluate them on a consolidated basis, rather than independently? We seek comment on these conceptual approaches and any alternatives.

38. *International Comparisons.* We also seek comment on the role of international comparisons in our analysis.[59] How should the Commission consider international comparisons as part of its determination as to whether advanced telecommunications capability is being deployed in a reasonable and timely fashion in the United States? The Commission has previously found that the available

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paras. 19-24 (2001) (*2001 Notice*); *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,* GN Docket No. 07-45, Fifth Notice of Inquiry, 22 FCC Rcd 7816, 7820-23, paras. 13-21 (2007) (*2007 Notice*); *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. 11-121, Eighth Broadband Progress Notice of Inquiry, 26 FCC Rcd 11800, 1180-11, paras. 20-21 (2011) (*2011 Notice*); *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, 29 FCC Rcd 9747, 9765-66, 9767-70, paras. 38, 43-48 (2014) (*2014 Notice*).

[57] *See generally* D. Sudharshan, Ben Shaw-Ching Liu and Brian T. Ratchford, *Optimal Response to a Next Generation New Product Introduction: To Imitate or to Leapfrog?*, Managerial and Decision Economics, Vol. 27, No. 1, at 41-62 (2006); H. Peyton Young, *Innovation Diffusion in Heterogeneous Populations: Contagion, Social Influence, and Social Learning*, The American Economic Review, Vol. 99, No. 5, at 1899-1924 (2009).

[58] USTelecom Comments, GN Docket No. 16-245, at 2-3 (Sept. 7, 2016).

[59] 47 U.S.C. § 1303(b).

international broadband data is not perfectly comparable to U.S. data.[60] Is this still accurate? If so, how should we account for such differences to improve our international comparisons?

D. Schools and Classrooms

39. Section 706 also requires that the Commission's inquiry concerning the availability of advanced telecommunications capability to all Americans include an evaluation of the availability of advanced telecommunications capability specifically in "elementary and secondary schools and classrooms."[61] We seek comment on the current state of deployment of advanced telecommunications capability to schools and classrooms. We also seek comment on what level of broadband capacity schools need from their networks to effectively meet their educational needs. Has the demand for this capacity changed in recent years? If so, when and how?

40. We seek comment on the proper methodology for determining the availability of advanced telecommunications capability in schools and classrooms. Previous Section 706 reports have relied on a short-term and long-term goal for broadband deployment to schools of 100 Mbps per 1,000 students and staff and 1 Gbps per 1,000 students and staff, respectively.[62] For purposes of the Section 706 analysis, should we continue to rely on the existing goals for schools from the Universal Service context or should we rely on higher or lower targets? Or, should we consider departing from such goals for schools entirely, perhaps in favor of some other measure? If so, what other criteria could we use to assess whether deployment of advanced telecommunications capability to schools and classrooms meets the statutory requirement?

III. DATA SOURCES AND ANALYSIS

41. *Deployment Data for Fixed Services*. We seek comment on the Commission's current procedure in the Section 706 inquiry to calculate the percentage of Americans with access to fixed advanced telecommunications capability and any possible modifications that would help us to more accurately arrive at this figure. In the *2016 Report*, the Commission determined the deployment of fixed advanced telecommunications capability by analyzing FCC Form 477 deployment data, including both terrestrial and satellite services.[63] Staff calculated the number of Americans (and households) with access to fixed advanced telecommunications capability by adding the population (and households) in the census blocks with at least one provider of residential services at speeds of at least 25 Mbps/3 Mbps.[64] Based upon June 2016 FCC Form 477 data, fixed broadband with speeds of at least 25 Mbps/3 Mbps has been deployed to approximately 93 percent of all Americans, including approximately 98 percent of Americans in urban areas and 72 percent of Americans in rural areas.[65] We seek comment on whether the

[60] *See*, *e.g.*, *2011 Notice*, 26 FCC Rcd at 11813, para. 27; *2014 Notice*, 29 FCC Rcd at 9771, para. 51.

[61] 47 U.S.C. § 1302(b).

[62] *2016 Report*, 31 FCC Rcd at 741, paras. 92-94; *2015 Report*, 30 FCC Rcd at 1410, para. 62. The Commission adopted a short term Internet access goal of at least 100 Mbps per 1,000 students and staff (users) and a long term Internet access goal of at least 1 Gbps per 1,000 users. *See Modernizing the E-Rate Program for Schools and Libraries,* Report and Order and Further Notice of Proposed Rulemaking, 28 FCC Rcd 8870, 8885, para. 34 (2014) (*2014 E-Rate Order*).

[63] *See 2016 Report*, 31 FCC Rcd at 729, para. 72. The Commission's prior reports relied upon the deployment data collected through the State Broadband Initiative deployment. These reports excluded satellite services because of concerns about the quality and reliability of that data. *See, e.g.*, *2015 Report,* 30 FCC Rcd at 1379, para. 9.

[64] *2016 Report*, 30 FCC Rcd at 730, 736, paras. 75 and 86.

[65] Staff analysis of FCC Form 477 Data, as of June 30, 2016, and FCC population estimates, as of June 30, 2015. Measured in households, the respective figures are 112 million, 95 million, and 17 million. These estimates may overstate or understate the estimate of Americans with access to fixed advanced telecommunications services because the estimates are based upon June 2016 Form 477 deployment data and our 2015 estimates of population

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Commission should continue to use this Form 477 deployment data census block approach to calculate deployment of fixed advanced telecommunications capability. We propose then using the change in this data across time as part of our *Inquiry*. Commenters arguing for an alternative approach should provide specific proposals and data sources.

42. We also seek comment on how we can most appropriately estimate the deployment of satellite services in our analysis. Satellite beam coverage is inherently flexible and capable of being deployed quickly based on demand. Overall beam capacity, however, is necessarily limited by the number and capacity of the current satellites in operation. We seek comment on how, if at all, we should account for this satellite capacity flexibility in our analysis. When a satellite provider reports on FCC Form 477 that it serves a particular census block or state, that satellite provider may have beams that can reach subscribers in that area, but capacity limitations will necessarily limit the number of subscribers in the area where the provider can actually provision service.[66] Do other fixed services have similar constraints, and if so, how can we improve our deployment assessment in the next report? The Commission's analysis in previous Section 706 reports has indicated that identifying areas served by fixed broadband providers based upon the FCC Form 477 deployment data may overstate the deployment of services throughout an area.[67] Does our proposal to evaluate progress rather than levels help to mitigate this issue? Should we instead consider qualitatively the pace of satellite deployment based on sources other than Form 477 data? We seek comment on this assessment and these questions.

43. *Deployment Data for Mobile Services*. In the *2016 Report*, the Commission estimated mobile broadband deployment by applying the centroid methodology to mobile LTE shapefiles.[68] Based on a concern that this method could overstate and understate coverage depending on whether the covered portion of the census block included the centroid, the Commission recently started using the actual area methodology for analysis of mobile coverage for purposes of Mobility Fund analysis. Rather than consider a census block to be either fully covered or not covered based on coverage of the centroid, the actual area methodology calculates the percentage of the census block that is covered at a sub-block level.[69] For purposes of this Report, we propose to continue to rely on Form 477 data for information on service provider coverage but seek comment about the methodologies used to depict deployment. Are there advantages to one approach over the other for purposes of assessing Americans' access to mobile advanced telecommunications capability, and how do the identified advantages depend on the geographic level being analyzed? For the purposes of this Report, is there a meaningful difference between the

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and household count data. *See* Federal Communications Commission, Staff Block Estimates, https://www.fcc.gov/reports-research/data/staff-block-estimates (last visited August 7, 2017).

[66] *See* FCC, 2016 Measuring Broadband America Fixed Broadband Report at 9, 16 and 31 (2016 Measuring Broadband America Report); Mike Freeman, *ViaSat: Betting Big on Satellite Broadband with Upcoming Launch*, San Diego Union Tribune, Feb. 5, 2017, http://www.sandiegouniontribune.com/business/technology/sd-fi-viasat-launch-20170202-story.html.

[67] *See*, *e.g.*, *Modernizing the FCC Form 477 Data Program,* WC Docket No. 11-10, Report and Order, 28 FCC Rcd 9887, 9904, para. 35 (*Modernizing FCC Form 477 Data*) (reporting fixed broadband deployment by census block appropriately balances the burdens of reporting this information to the Commission with the level of granularity required to carry out our statutory duties); *2016 Report*, 31 FCC Rcd at 730, para. 75, n234.

[68] *See 2016 Report,* 31 FCC Rcd 730, para. 75, n.234 (explaining that the Commission evaluated the ability of mobile wireless providers to provide services throughout a census block by evaluating whether the provider's shapefile overlaps the centroid of the census block). *Id.* at 730, para. 82, Tbls. 4-5 (reporting proportion of population with access to LTE technology). *See also Nineteenth Mobile Competition Report*, 31 FCC Rcd 10534, 10560, para. 34 (calculating the percentage of each census block covered by each technology). At the aggregate national level, the results were similar whether the centroid methodology or the actual area coverage methodology is utilized. *Id.* at 10561, para. 35.

[69] *FCC Releases Data on Mobile Broadband Deployment as of December 31, 2015*, Public Notice, 31 FCC Rcd 10886 (2016), Attach. at 10890-91, paras. 12-15.

centroid methodology and the actual area methodology in terms of assessing those areas where Americans do not have access to mobile advanced telecommunications capability? For instance, in terms of assessing unserved areas, would it be reasonable for the Commission to conclude that 65 percent of the population of a census block is served if 65 percent of the geography of the census block is covered by mobile advanced telecommunications capability when unlivable areas (e.g., lakes) are removed?[70] Are there alternative approaches that would be better for these purposes? Does our proposal to focus on change rather than levels mitigate the impact of these decisions as it relates to our ability to make a determination in our *Inquiry*? Should we distinguish between rural and non-rural areas in our analysis, and if so, why? Is any one approach more practical from an implementation standpoint, and how should we take that into consideration for purposes of this Report?

44. In analyzing mobile speeds, the Commission's Form 477 data provides information on the minimum advertised or expected speed of mobile services. In other contexts, the Commission has also reported alternative data sources for the speed of services that provide various estimates of the user's actual experience.[71] Should we supplement our Form 477 coverage data with speed performance data? Commenters supporting this view should provide specific information about how speed performance data could be used.

45. *Deployment Data for Schools*. To evaluate developments in the deployment of advanced telecommunications capability to America's elementary and secondary public schools, the Commission has relied upon FCC Form 471 data for E-Rate funding, EducationSuperHighway's report, and the CoSN Annual E-Rate and Infrastructure Survey.[72] In 2016, the Commission, working with the Universal Service Administrative Company (USAC), began to collect more specific information from E-Rate applicants about their Internet access bandwidths and connection types.[73] We seek comment on using our FCC Form 471 data for E-rate funding to calculate deployment data for schools. Should the Commission continue to also rely on third-party data sources in addition to, or instead of, our FCC Form 471 data? Are there other data sources we should consider?

IV. ACTIONS TO ACCELERATE ADVANCED TELECOMMUNICATIONS DEPLOYMENT

46. Section 706 directs the Commission to use "price cap regulation, regulatory forbearance, measures that promote competition in the local telecommunications market, or other regulating methods that remove barriers to infrastructure investment" to encourage deployment of advanced telecommunications capability on a reasonable and timely basis.[74] To that end, we have initiated a number of proceedings and taken other actions in recent months that we anticipate should assist in meeting our obligations under the statute. For example, in February 2017, we adopted orders in the Connect America Fund (CAF) docket establishing rules for a competitive "reverse auction" that will provide nearly $2 billion for rural deployment over the next decade[75] and allocating up to $4.53 billion

[70] 47 U.S.C. § 1302(c) ("As part of the inquiry required by subsection (b), the Commission shall compile a list of geographical areas that are not served by any provider of advanced telecommunications capability . . . and to the extent that data from the Census Bureau is available, determine, for each such unserved area—(1) the population; (2) the population density; and (3) the average per capita income.").

[71] *Nineteenth Mobile Competition Report*, 31 FCC Rcd, 10610-14, paras. 107-110 (and associated charts).

[72] *2015 Report*, 31 FCC Rcd at 730, para. 76. The Commission adopted a short term Internet access goal of at least 100 Mbps per 1,000 students and staff (users) and a long term Internet access goal of at least 1 Gbps per 1,000 users. *See 2014 E-Rate Order*, 28 FCC Rcd at 8885, para. 34.

[73] *See* FCC Form 471.

[74] 47 U.S.C. § 1302(a).

[75] *Connect America Fund*, *ETC Annual Reports and Certifications*, WC Docket Nos. 10-90, 14-58, Report and Order and Order on Reconsideration, 32 FCC Rcd 1624 (2017).

over the next decade to advance 4G LTE deployment to areas that are so costly that the private sector has not yet deployed there.[76]

47. This spring, we also adopted two Notices of Proposed Rulemaking examining what can be done to remove regulatory barriers to wireline and wireless network infrastructure investment and deployment.[77] We amended our rules to help bring high-speed Internet to locations that are very costly to serve, allowing carriers greater flexibility in planning deployment projects that are funded by the high-cost universal service support program.[78] In addition, the newly-established Broadband Deployment Advisory Committee (BDAC) will be developing model codes to encourage deployment and competitive entry, and will make recommendations on how to promote competitive access to broadband infrastructure and speed broadband deployment on federal lands.[79] Moreover, the Commission continues work on several proceedings to make additional spectrum available for flexible use wireless broadband, paving the way for widespread deployment of next-generation 5G networks and technologies.[80] And the recently-initiated *Restoring Internet Freedom* rulemaking proposes to encourage broadband investment by restoring a light-touch regulatory framework for the Internet by classifying broadband Internet access service as an information service.[81]

48. We seek comment on whether other actions, in addition to those already under way, might encourage more expansive and rapid deployment of networks that provide advanced telecommunications capability. What additional efforts should we undertake? What market or regulatory obstacles stand in the way of investment, innovation, and entrepreneurship, and how can we eliminate them? Are there additional barriers to infrastructure investment and deployment that can be eliminated? Are there considerations that the Commission should bear in mind in identifying and making available new spectrum for wireless broadband that would advance the goals of Section 706? What else can we do to eliminate other regulatory barriers to infrastructure investment so that companies can deploy, for example, the small cells, the towers, the fiber, and the new services that consumers demand? What can or should be done to further enable the deployment of wireless infrastructure on federal lands and to ensure that companies that obtain spectrum licenses meet their buildout obligations to ensure timely deployment of new and expanded wireless services? Are there barriers to deploying fixed wireless networks, especially in rural areas? If so, how can the Commission eliminate them? What more can we do to ease burdens that impede or otherwise slow the rate of deployment in rural areas? For example, what additional efforts should we undertake to revise our policies and regulations so that rural residents have the same broadband choices typically found in cities? Is there more that we can do to facilitate carriers'

[76] *Connect America Fund*, *Universal Service Reform – Mobility Fund*, WC Docket 10-90, WT Docket No. 10-208, Report and Order and Further Notice of Proposed Rulemaking, 32 FCC Rcd 2152 (2017).

[77] *See Accelerating Wireline Broadband Deployment by Removing Barriers to Infrastructure Investment*, WC Docket No. 17-84, Notice of Proposed Rulemaking, FCC 17-37 (rel. Apr. 21, 2017); *Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment*, *et al*., WT Docket No. 17-79, et al., Notice of Proposed Rulemaking, FCC 17-38 (rel. Apr. 21, 2017).

[78] *Connect America Fund*, *ETC Annual Reports and Certifications, Developing a Unified Intercarrier Compensation Regime*, WC Docket Nos. 10-90, 14-58, CC Docket No. 01-92, Order on Reconsideration, FCC 17-36 (rel. Apr. 21, 2017).

[79] *See FCC Announces the Membership and First Meeting of the Broadband Deployment Advisory Committee*, GN Docket No. 17-83, Public Notice, DA 17-328 (Apr. 6, 2017); *see also* https://www.fcc.gov/broadband-deployment-advisory-committee.

[80] *See Wireless Telecommunications Bureau and Office of Engineering and Technology Establish "Second Wave" Deadline for Proposals from Prospective Spectrum Access System (SAS) Administrator(s) and Environmental Sensing Capability (ESC) Operator(s)*, GN Docket No. 15-319, Public Notice, DA 17-339 (Apr. 7, 2017).

[81] *See Restoring Internet Freedom,* WC Docket No. 17-108, Notice of Proposed Rulemaking, FCC 17-60 (rel. May 23, 2017).

efforts to transition to next-generation technologies like fiber, particularly in rural areas? In identifying and making available new spectrum bands for wireless broadband services, are there opportunities to minimize burdens and to promote competition and encourage deployment? How can the Commission balance its desire to maximize flexibility while providing sufficient certainty to drive investment and innovation?

49. We also seek comment on whether federal, Tribal, state and local efforts to increase broadband deployment can be better coordinated. For example, are there restrictions on the use of funds that discourage deployment in particular areas or environments? Should we consider finding ways to facilitate coordinating federal support with other funding opportunities that, collectively, could increase the availability of advanced telecommunications services? Are there ways in which governmental efforts to promote broadband can more effectively complement and boost private actions? What other steps could the Commission, working on its own or in coordination with other federal, Tribal, state, local or private entities, take to reduce the disparity in broadband availability between urban and rural areas and Tribal lands?

50. We seek comment on these ideas, and on any other efforts that would expand broadband availability and increase the rate at which it is being deployed. To the extent commenters advocate that we undertake additional actions to encourage the deployment of advanced telecommunications capability, they should set forth those proposals with specificity.

V. SIXTH INTERNATIONAL BROADBAND DATA REPORT

51. The Commission is required to include in its annual Section 706 report "information comparing the extent of broadband service capability (including data transmission speeds and price for broadband service capability) in a total of 75 communities in at least 25 countries abroad for each of the data rate benchmarks for broadband service utilized by the Commission to reflect different speed tiers."[82] The Commission must assess broadband capability in international communities comparable to the communities in the United States with respect to "population size, population density, topography, and demographic profile."[83] The Commission is also directed to include "a geographically diverse selection of countries" and "communities including the capital cities of such countries."[84] The Commission must "identify relevant similarities and differences in each community, including their market structures, the number of competitors, the number of facilities-based providers, the types of technologies deployed by such providers, the applications and services those technologies enable, the regulatory model under which broadband service capability is provided, the types of applications and services used, business and residential use of such services, and other media available to consumers."[85] For purposes of the *Sixth International Broadband Data Report*, we seek comment on how to best interpret the statutory obligations. We also solicit comment generally on ways to improve our next international assessment.

52. Prior International Broadband Data Reports selected countries to capture as full an international profile as possible while also focusing on countries with more developed broadband markets.[86] Selection of countries and communities has also been affected by data availability as

[82] 47 U.S.C. § 1303(b)(1). In prior reports, the Commission has incorporated by reference the International Broadband Data Report to fulfill the obligation imposed by Section 103(b) of the BDIA. *See*, *e.g.*, *2016 Report*, 31 FCC Rcd at 748-50, paras. 114-18.

[83] 47 U.S.C. § 1303(b)(2).

[84] *Id.*

[85] *Id.* § 1303(b)(3).

[86] *See*, *e.g.*, *International Comparison Requirements Pursuant to the Broadband Data Improvement Act: International Broadband Data Report*, GN Docket No. 15-191, Fifth Report, 31 FCC Rcd 2667, 2668-69, paras. 3-4 (2016) (*Fifth International Broadband Data Report*), https://www.fcc.gov/reports-research/reports/international-broadband-data-reports/international-broadband-data-report-3.

communities can be compared only when a substantial set of relevant information is available. To comply with the statutory obligations, we have included international comparisons of actual broadband download speeds, prices for fixed and mobile broadband service plans, and broadband deployment (including deployment in rural and non-rural areas of the United States and Europe).[87] The International Broadband Data Reports have also included demographic data (population, income, education) and a summary of market and regulatory aspects of the countries included for comparison.[88] The *2016 Report* incorporated by reference the International Bureau's *Fifth International Broadband Data Report*,[89] which noted that "[t]he available international broadband data, though not fully comparable to data on the United States, continue to suggest that although the United States may be among the leaders for developed countries with regard to some broadband metrics, it lags in some other metrics."[90] We seek comment on whether the Commission should continue this same overall approach for our international assessment in the next report. We ask commenters to provide any recommendations on how to improve our analysis and to provide any relevant qualitative and quantitative data or suggest data sources.

53. *Selection of Countries*. We seek comment on how to improve the selection of the countries and communities for comparison with the United States. We propose to choose 75 communities in at least 25 countries that have developed broadband markets, which have readily available data. How should the Commission select the communities and countries that are most similar to the United States? For instance, should we select countries and/or communities in terms of population, density, income, and/or land area given we have readily available data for these variables?[91] We seek comment on whether this would improve the international comparison.

54. *Speeds*. We seek comment on how we can best compare, in the next International Broadband Data Report, fixed and mobile broadband speeds in the United States with those of other developed nations. In the *Fifth International Broadband Data Report*, the International Bureau presented data on both advertised and actual broadband speeds in different countries, by using the publicly available raw speed test data (for fixed broadband in 2014) provided by Ookla, proprietor of speedtest.net, on their Net Index site.[92] Should the Commission continue to rely on Ookla speed data?[93] What other broadband speed data are available that compares U.S. broadband speeds with speeds of other countries? We seek comment on whether, for example, we should rely on speed data from other sources, such as Akamai, which provide public data on average connection speed as well as breakdowns of different broadband speeds and geographic levels.[94]

55. *Fixed and Mobile Prices*. The statute directs the Commission to also report as part of its international comparisons on the prices for broadband service capability.[95] We therefore seek input on how best to compare fixed and mobile broadband pricing in the United States with the selected countries. In the *Fifth International Broadband Data Report*, we relied on Google's broadband price data (for fixed

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[87] *See*, *e.g.*, *International Comparison Requirements Pursuant to the Broadband Data Improvement Act: International Broadband Data Report*, GN Docket No. 14-126, Fourth Report, 30 FCC Rcd 14994 (2015); *Fifth International Broadband Data Report*, 31 FCC Rcd 2667.

[88] *Id*.

[89] *2016 Report*, 31 FCC Rcd at 748, para. 114.

[90] *Fifth International Broadband Data Report*, 31 FCC Rcd at 2667, para. 1.

[91] 47 U.S.C. § 1303(b)(2).

[92] *Fifth International Broadband Data Report*, 31 FCC Rcd at 2670, para. 8.

[93] *Id.* at 2675, para. 27 n.56 (noting that "Ookla has discontinued its Net Index").

[94] Akamai, Connectivity Visualizations, https://www.akamai.com/us/en/about/our-thinking/state-of-the-internet-report/state-of-the-internet-connectivity-visualization.jsp (last visited August 7, 2017).

[95] 47 U.S.C. § 1303(b)(1).

and mobile service offerings) and data gathered through Commission staff research (namely for smartphone broadband plans), which may not be available to the public for purposes of the next international assessment.[96] As we have noted in the past, it is difficult to compare empirically various broadband pricing data across countries.[97] We seek comment on how to best compare fixed and mobile prices in the United States with the selected countries and communities. How can our comparison of fixed and mobile prices in the previous reports be improved? Does the methodology used in the *Fifth International Broadband Data Report* for mobile broadband service offerings produce accurate results? What alternative methodologies should we consider? Should the Commission, for example, use a hedonic approach, which would calculate the price of broadband services based on the characteristics related to broadband services? Should we account for differences in mobile and fixed service pricing between the United States and foreign countries for the next report, and if so how? We seek comment on whether the variables we previously collected are adequate for applying a hedonic model or if we should collect any additional data.[98] Are there other sources of international broadband pricing data that could better improve the quality and usefulness of the pricing comparisons?

VI. PROCEDURAL MATTERS

A. *Ex Parte* Rules

56. This proceeding shall be treated as a "permit-but-disclose" proceeding in accordance with the Commission's *ex parte* rules.[99] Persons making *ex parte* presentations must file a copy of any written presentation or a memorandum summarizing any oral presentation within two business days after the presentation (unless a different deadline applicable to the Sunshine period applies). Persons making oral *ex parte* presentations are reminded that memoranda summarizing the presentation must (1) list all persons attending or otherwise participating in the meeting at which the *ex parte* presentation was made, and (2) summarize all data presented and arguments made during the presentation. If the presentation consisted in whole or in part of the presentation of data or arguments already reflected in the presenter's written comments, memoranda or other filings in the proceeding, the presenter may provide citations to such data or arguments in his or her prior comments, memoranda, or other filings (specifying the relevant page and/or paragraph numbers where such data or arguments can be found) in lieu of summarizing them in the memorandum. Documents shown or given to Commission staff during *ex parte* meetings are deemed to be written *ex parte* presentations and must be filed consistent with Rule 1.1206(b). In proceedings governed by Rule 1.49(f) or for which the Commission has made available a method of electronic filing, written *ex parte* presentations and memoranda summarizing oral *ex parte* presentations, and all attachments thereto, must be filed through the electronic comment filing system available for that proceeding, and must be filed in their native format (e.g., .doc, .xml, .ppt, searchable .pdf). Participants in this proceeding should familiarize themselves with the Commission's *ex parte* rules.

B. Comment Filing Procedures

57. Pursuant to Sections 1.415 and 1.419 of the Commission's rules, 47 CFR §§ 1.415, 1.419, interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. Comments may be filed using the Commission's Electronic Comment Filing System (ECFS). *See Electronic Filing of Documents in Rulemaking Proceedings*, 63 FR 24121 (1998).

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[96] *Fifth International Broadband Data Report*, 31 FCC Rcd at 2670, 2676-77, paras. 10, 33. As of June 19, 2017, Google had not posted broadband price data for 2016. *See* Vincent Chiu, Policy by the Numbers (Dec. 15, 2015), https://policybythenumbers.googleblog.com/2015/12/global-broadband-pricing-study-updated.html.

[97] *Id.* at 2676, para. 32.

[98] *Id*. at 2686, Appx. B.

[99] 47 CFR. §§ 1.1200 *et seq.*

- Electronic Filers: Comments may be filed electronically using the Internet by accessing the ECFS: http://apps.fcc.gov/ecfs/.
- Paper Filers: Parties who choose to file by paper must file an original and one copy of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding, filers must submit two additional copies for each additional docket or rulemaking number.

  Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail. All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission.

  - All hand-delivered or messenger-delivered paper filings for the Commission's Secretary must be delivered to FCC Headquarters at 445 12th St., SW, Room TW-A325, Washington, DC 20554. The filing hours are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes and boxes must be disposed of before entering the building.
  - Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743.
  - U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington DC 20554.

58. *Availability of Documents*. Comments, reply comments, and *ex parte* submissions will be publicly available online via ECFS.[100] These documents will also be available for public inspection during regular business hours in the FCC Reference Information Center, which is located in Room CY-A257 at FCC Headquarters, 445 12th Street, SW, Washington, DC 20554. The Reference Information Center is open to the public Monday through Thursday from 8:00 a.m. to 4:30 p.m. and Friday from 8:00 a.m. to 11:30 a.m.

59. *People with Disabilities*. To request materials in accessible formats for people with disabilities (braille, large print, electronic files, audio format), send an e-mail to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

C. Contact Person

60. For further information about this proceeding, please contact Ramesh Nagarajan, FCC Wireline Competition Bureau, Competition Policy Division, Room 5-C212, 445 12th Street, S.W., Washington, D.C. 20554, (202) 418-2582, Ramesh.Nagarajan@fcc.gov.

VII. ORDERING CLAUSE

61. Accordingly, IT IS ORDERED, that pursuant to Section 706 of the Telecommunications Act of 1996, as amended, 47 U.S.C. § 1302, and section 103(b) of the Broadband Data Improvement Act, 47 U.S.C. § 1303(b), this Notice of Inquiry IS ADOPTED.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

[100] Documents will generally be available electronically in ASCII, Microsoft Word, and/or Adobe Acrobat.

CONCURRING STATEMENT OF
COMMISSIONER MIGNON L. CLYBURN

Re: *Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*, GN Docket No. 17-199

The time for our annual inquiry into broadband availability has come once again. Today, the Commission asks whether advanced telecommunications capability has been reasonably and timely deployed, and seeks comment on how to measure and report on it. While the structure of this item may look similar to past years, and I appreciate the Chairman accepting edits that I proposed, for several reasons I must respectfully concur.

The whole point of this inquiry is to figure out whether consumers across America are getting good broadband. From my conversations around the country, including those I had in Marietta, Ohio last month, too many of our neighbors yearn for affordable, reliable fixed and mobile broadband connections and it is my fear that we continue to short-change consumers in several aspects of this proceeding.

We sell consumers short by proposing a speed benchmark that is way too low. The statute defines advanced telecommunications capability as broadband that is capable of "originat[ing] and receiv[ing] high-quality voice, data, graphics, and video telecommunications." High-definition video conferencing is squarely within the rubric of "originating and receiving high-quality . . . video telecommunications," yet the 25/3 Mbps standard we propose would not even allow for a single stream of 1080p video conferencing, much less 4K video conferencing.[101] This does not even consider that multiple devices are likely utilizing a single fixed connection, or the multiple uses of a mobile device.

Second, we seek comment on whether to deem an area as "served" if mobile *or* fixed service is available. I am extremely skeptical of this line of inquiry. Consumers who are mobile only often find themselves in such a position, not by choice but because they cannot afford a fixed connection. Today, mobile and fixed broadband are complements, not substitutes. They are very different in terms of both the nuts and bolts of how the networks operate, and how they are marketed to customers, including both from the perspective of speed and data usage. I have heard from too many consumers who can only afford a mobile connection, and even then they have to drop service in the middle of the month because they cannot afford to pay for more data.

Third, this Notice of Inquiry (NOI) falls into a precarious chicken-and-egg dilemma by seeking comment on whether the Commission should establish a speed benchmark based on the speed tier consumers are subscribing to. This presupposes that consumers are getting the services they want at the prices they want, and are not constrained by network limitations and terms of service. I heard from a provider just last month that priced its 1Gbps service at around $80 per month and achieved an over 30% take rate, even though it had other lower speed services at lower prices. Taking this approach could also send us on a race to the bottom. If only 25/3 Mbps service and nothing more was offered, and that was all consumers could subscribe to, we could select that as a benchmark and declare advanced telecommunications capability to be reasonably and timely deployed. This also seems contrary to the language of the statute. We are supposed to consider what is "advanced" in the context of what the service can do, not what consumers are buying. If, for example, 70% of Americans are buying broadband that does not allow people to use "high-quality voice, data, graphics, and video telecommunications" does that mean that this level of broadband is advanced telecommunications capability? Consumer purchasing

[101] Six Mbps is a common requirement for 30 fps 1080p raw video stream, and this does not account for packet header overhead. Irwin Lazar, How to calculate video conferencing bandwidth requirements, TechTarget Search Unified Communications (Nov. 2016), http://searchunifiedcommunications.techtarget.com/tip/Business-video-conferencing-setup-Calculating-bandwidth-requirements.

patterns may be a convenient shorthand, but I believe such an approach would be problematic.

Finally, this NOI seeks to measure deployment in terms of year-over-year progress rather than whether the service is actually meeting the needs of consumers. This seems both practically difficult and contrary to the statute. First, the Commission's interpretation of what is "advanced telecommunications capability" will and should change over time. Less than a decade ago, we said 200 kbps service was advanced. When the standard changes, the year-over-year value of measuring deployment will be greatly diminished. Second, the item defines advanced telecommunications capability in terms of what the broadband service can deliver, not whether facilities are present. I am fearful that we are starting down a path to look only at percentage coverage, and not at whether service is truly affordable and accessible for all Americans.

Nonetheless, I thank the Wireline Competition Bureau for their work on this proceeding as we all strive to ensure that broadband is being reasonably and timely deployed to all Americans.