Before the
United States Department of Commerce
National Telecommunications and Information Administration
Washington, DC

Infrastructure Investment and Jobs Act	)	Docket No. NTIA-2021-0002
Implementation	)	RIN 0660-ZA33

COMMENTS OF THE FIBER BROADBAND ASSOCIATION

Gary Bolton
President and CEO
Fiber Broadband Association
3050 K Street NW
Washington, DC 20037
(202) 524-9550

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The Fiber Broadband Association ("FBA")[1] submits these comments in response to the Notice and Request for Comments ("Notice")[2] issued by the National Telecommunications and Information Administration ("NTIA") related to the grant programs for which the NTIA is responsible under the Infrastructure Investment and Jobs Act (the "Bipartisan Infrastructure Law" ("BIL")).[3] FBA's comments are focused on questions set forth in the Notice and related issues on the Broadband Equity, Access, and Deployment ("BEAD") Program, whereby the NTIA will provide grants to States, Territories, the District of Columbia, and Puerto Rico (collectively "States and Territories") to close the digital divides.[4]

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1 FBA is a not for profit trade association with more than 250 members, including telecommunications, computing, networking, system integration, engineering, construction, and content-provider companies, as well as traditional service providers, utilities, and municipalities. Its 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. A complete list of FBA members can be found on the organization's website: https://www.fiberbroadband.org/.

2 Department of Commerce, National Telecommunications and Information Administration, Docket No. 220105-0002, RIN 0660-ZA33, Infrastructure and Jobs Act Implementation, Notice, Request for Comment, *Fed. Reg*. Vol. 87 No. 6, at 1122-1126.

3 Infrastructure Investment and Jobs Act, Pub. L. No. 117-58 (2021), available at: https://www.govinfo.gov/content/pkg/BILLS-117hr3684enr/pdf/BILLS-117hr3684enr.pdf.

4 BIL, Division F—Broadband, Title I—Broadband Grants for States, District of Columbia, Puerto Rico, and Territories, Sec. 60102 Grants for Broadband Deployment.

I. INTRODUCTION/SUMMARY

The BEAD Program presents a once-in-a-generation opportunity to give residents, businesses, and anchor institutions at unserved and underserved locations the benefits of the same high-performance, future-proof, reliable broadband service over all-fiber networks, which in a mere two decades has burgeoned, now passing more than 50 million locations and growing by 11% in 2021 and accelerating. All-fiber networks not only support gigabit-plus, low latency direct connections to locations, but they provide the critical infrastructure for multiple use cases such as 5G, smart grid, and sensing technology networks. In effect, the market has confirmed that all-fiber is the fundamental networking technology of the 21st Century.

All-fiber networks also can be readily upgraded to accommodate future needs. A single fiber has more than 50,000 Gbps of capacity. Even today, all-fiber networks are rapidly evolving from 2.5G GPON to 10/10 XGS-PON and 25/50G GPON is now being installed. For instance, AT&T, on January 24, 2022, announced it was bringing 5 Gbps symmetrical service to large parts of its service territories.[5] Another broadband provider also announced it was "offering ultra-high-speed 5-gig and 2-gig residential fiber internet service to nearly 170,000 residential customer addresses in 60 cities and towns."[6]

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5 *See* "AT&T Becomes Fastest Major Internet Provider, Delivering Fiber, with up to 5-gigs of Speed," (Jan. 24, 2022) available at: https://about.att.com/aboutus/pressrelease/2022/fastest-major-internet-provider.html.

6 *See* "Ziply™ Fiber launches fastest home internet in the Northwest; enables 5-gig and 2-gig service to nearly 170,000 addresses in 60 cities and towns in WA, OR and ID," (January 20, 2022) available at https://www.globenewswire.com/news-release/2022/01/20/2369835/0/en/Ziply-Fiber-launches-fastest-home-internet-in-the-Northwest-enables-5-gig-and-2-gig-service-to-nearly-170-000-addresses-in-60-cities-and-towns-in-WA-OR-and-ID.html.

Further, all–fiber networks can be deployed cost effectively (based on lifetime costs) in virtually all areas of the country, including in less dense areas, because of the higher take rate.[7] Thus, the NTIA has an enormous opportunity to "do right" by those consumers, businesses, and institutions that have so far been left on the wrong side of the digital divide and give them access to connectivity that will provide them with the same opportunities so many now have.

Moreover, the BIL and the BEAD Program statute (the "Statute") give NTIA direction and the tools to ensure all-fiber networks are deployed to the maximum extent. First, Congress finds at the outset of the BIL that all households, businesses, and institutions should have access to affordable, reliable, high-speed broadband service if they are to participate fully in modern life and that the "persistent 'digital divide'" – whereby those on the wrong side do not have access to broadband service most Americans now receive – is a barrier to competitiveness and "equitable distribution of essential public services."[8] Second, the Statute directs NTIA to determine what is a "priority broadband project" based on network performance criteria and requires that such projects have the ability to scale speeds over time to meet future household and business needs and to "support the deployment of 5G, successor wireless technologies, and other advanced

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7 *See* "Broadband/Internet Availability Service Report," NTCA—The Rural Broadband Association (Dec. 2021), available at: https://www.ntca.org/sites/default/files/documents/2021-12/2021-broadband-survey-report-final-12-15-21.pdf ("[M]embers report an average of 72% of customers in their areas subscribe to a broadband service of some speed …On average, three-quarters (75.0%) of serviceable locations are served by fiber to the home (FTTH) in 2021; this is an increase of 5.1 percentage points from the prior year's survey…With respect to downstream service availability, on average, respondents reported that the following percentages of their customer base can receive maximum speeds of: Greater than/equal to 1 Gig: 55.4%; Greater than/equal to 100 Mbps but less than 1 Gig: 20.2%; Greater than/equal to 25 Mbps but less than 100 Mbps: 10.6%; Greater than/equal to 10 Mbps but less than 25 Mbps: 10.1%; Less than 10 Mbps: 3.7%.").

8 Sec. 60101. Findings.

services."[9] Third, the Statute also requires States and Territories, when making awards, to give priority to networks that offer greater speeds.[10]

In these comments, we begin by discussing the rationale for directing States and Territories to favor the deployment of all-fiber networks when making deployment awards. We then discuss the critical elements upon which NTIA should base the BEAD Program – transparency, objectivity, accountability – to ensure its success and provide processes and requirements for States and Territories to follow in awarding deployment grants. Perhaps the most important element for maximizing use of BEAD Program funding is for the States and Territories to adhere to a transparent, objective, and merit-based (i.e., quantitative) competitive bidding process where experience, sound finances, and network performance, as well as cost-effective bids, are preferred. While reverse auctions have proven value, FBA believes it is more practical for States and Territories, which have no experience using the FCC's reverse auction mechanism, to use a single round "sealed" bid process where bids are evaluated on a point system that furthers the objectives of the Program and the statutory requirements. Such a process also will give NTIA the ability to audit the results to ensure compliance with the Statute. However, FBA recognizes that other processes also may be reasonable – so long as they implement the mandates of the BEAD Program and are transparent, objective, and accountable.

In addition to addressing deployment aspects of the BEAD Program, FBA believes that NTIA should require – or at least encourage – States and Territories to spend a certain percentage of the grants received on adoption, cybersecurity protections, and workforce development.

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9 Sec. 60102(a)(I).

10 Sec. 60102(h)(A)(iv)(II).

II. RATIONALE FOR PRIORITIZING ALL-FIBER PROJECTS

[The information in this section responds to Notice Questions 13-15, "Ensuring Publicly Funded Broadband Networks That Sustain and Scale"][11]

A. ALL-FIBER PROJECTS WILL ENSURE CONSUMERS RECEIVE THE BROADBAND PERFORMANCE THEY NEED TO PARTICIPATE IN OUR INFORMATION SOCIETY AND ECONOMY

The typical American household needs broadband connections with performance that will allow them to participate in our education system, be a part of the workforce, access healthcare, and otherwise engage in today's economy and society. Only with robust, reliable broadband can children engage in remote learning through virtual classrooms and online tutorials, access resources to complete homework assignments, apply for colleges and internships, and participate in a range of other activities that are critical to their success.[12] Robust connections also support the livelihoods of adults by helping them access specialized training and professional development, allowing them to find and apply for jobs, and facilitating remote work.[13] High-performance broadband enables access to telehealth and telemedicine so people can engage in online consultations, connect with specialists, participate in remote monitoring of chronic

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11 Notice, at 1124-1125.

12 *See* Hampton, K., Fernandez, L., Robertson, C. T., Bauer, J. M., *Broadband and Student Performance Gaps*, Quello Center, at 24 (2020), https://quello.msu.edu/wp-content/uploads/2020/03/Broadband_Gap_Quello_Report_MSU.pdf; "e-Connectivity @ USDA: Broadband Resources for Rural America," USDA Rural Development Innovation Center, at 5 (Dec. 2018), https://www.rd.usda.gov/files/508_RDeConnectivityToolkit121918.pdf ("USDA Report").

13 *See id*.

medical conditions, and access other medical services.[14] Such connections also allow Americans to shop and sell their products and services, stay connected to family and friends across the country and around the world, and access news, entertainment, and social media to build cultural connections and contribute to political discourse.

BEAD Program funds should support public investments in broadband infrastructure that will provide unserved or underserved populations with broadband service that will enable them to engage in these activities. Today, most households need reliable, low latency broadband connections with upload and download speeds of at least 100 Mbps to support simultaneous engagement in these activities by multiple users in a household. The average household has 2.62 people[15] and 25 connected devices[16] that are accessing multiple bandwidth-hungry applications at the same time. The Federal Communication Commission's ("FCC's") Broadband Speed Guide shows that each additional user, device, or high-bandwidth application accessing a single

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14 *See id.*; "Report to the President of the United States from the Task Force on Agriculture and Rural Prosperity," Interagency Task Force on Agriculture and Rural Prosperity, at 19 (Oct. 2017), https://www.usda.gov/sites/default/files/documents/rural-prosperity-report.pdf ("Task Force Report") ("Remote healthcare . . . also reduces the cost of care, improves patient outcomes, and reduces the burden on patients.").

15 *See QuickFacts: Families and Living Arrangements*, U.S. Census Bureau, https://www.census.gov/quickfacts/fact/table/US/HCN010212 (last visited July 7, 2021).

16 *How the pandemic has stress-tested the crowded digital home*, Deloitte, 3 (June 2021), https://www2.deloitte.com/content/dam/insights/articles/6978_TMT-Connectivity-and-mobiletrends/DI_TMT-Connectivity-and-mobile-trends.pdf.

broadband connection simultaneously increases the broadband performance that is needed.[17] It is no surprise, then, that as of June 2021, Ookla Speedtest data showed average fixed broadband download speeds of over 195 Mbps and upload speeds of nearly 69 Mbps.[18]

The pandemic may have accelerated residential adoption of faster upload and download speeds and increased data usage, but these performance demands predated the pandemic's onset. According to Ookla Speedtest data, presented in a recent FBA whitepaper, over the past five years, U.S. fixed broadband download and upload speeds have been increasing at a compound annual growth rate of 27% and 28% respectively.[19] This tracks with earlier FCC data showing that at the end of 2018—over two and a half years ago—more than 85% of Americans had access to broadband delivering 250/50 Mbps[20] and that median speeds for all fixed connections had reached 100/10 Mbps.[21] And, by the second quarter of 2020, nearly 5% of subscribers

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17 *See Household Broadband Guide*, FCC, https://www.fcc.gov/consumers/guides/household-broadband-guide (last visited Dec. 17, 2020). A 2020 report by Common Sense Media assessing remote learning needs during the pandemic found that homes with multiple students need download speeds of 200 Mbps to "ensure a robust and uninterrupted learning experience and allow for more synchronous distance learning programming." *See* Chandra, S., Fazlullah, A., Hill, H., Lynch, J., McBride, L., Weiss, D., and Wu, M., *Connect all students: How states and school districts can close the digital divide*, Common Sense Media, at 21. (2020), https://d2e111jq13me73.cloudfront.net/sites/default/files/uploads/common_sense_media_partner_report_final.pdf ("Common Sense Report").

18 *See United States's Mobile and Fixed Broadband Internet Speeds*, Ookla Speedtest, https://www.speedtest.net/global-index/united-states (last visited July 16, 2021).

19 *Eliminate the Digital Divide in Rural North America with Fiber*, Fiber Broadband Association (June 2021); *see also* "The Rural Digital Divide Fiber Broadband Can Eliminate: The North American Rural Digital Divide," Fiber Broadband Association (June 2021) ("FBA Digital Divide White Paper").

20 *Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*, GN Docket No. 19-285, 2020 Broadband Deployment Report, FCC 2-50, ¶ 2 (rel. Apr. 24, 2020).

21 *Internet Access Services: Status as of December 31, 2018*, Office of Economics and Analytics, FCC, at 8 (Sept. 17, 2020).

accessed connections of 1 gigabit or faster (up 133% year-over-year) and about 61% had obtained connections of 100 Mbps or faster (a one-year increase of 27%).[22] Subscribers also significantly increased the amount of data they were consuming.

B. ALL-FIBER NETWORKS ARE THE ONLY TECHNOLOGY THAT CAN DELIVER THE SECURE, RELIABLE, AND FUTURE-PROOF CONNECTIONS CONSUMERS WILL NEED FOR DECADES TO COME

All-fiber technology alone supports the deployment of future-proof networks that will keep pace with consumer demand for high-performance broadband, which is expected to continue its rapid upward trajectory.[23] Last year, AT&T Communications LLC CEO Jeffery Scott McElfresh noted that "demand for broadband is strong and growing," and he identified two trends:

> The first trend, demand for uplink capacity is growing at a faster pace than downlink. . . . User-generated content is on a faster growth pace from applications such as video conferencing. The second trend, while both mobile and fixed broadband usage is growing, we're actually seeing an increased dependence on the fixed network as it provides the performance and capacity customer applications require. And while this trend has been

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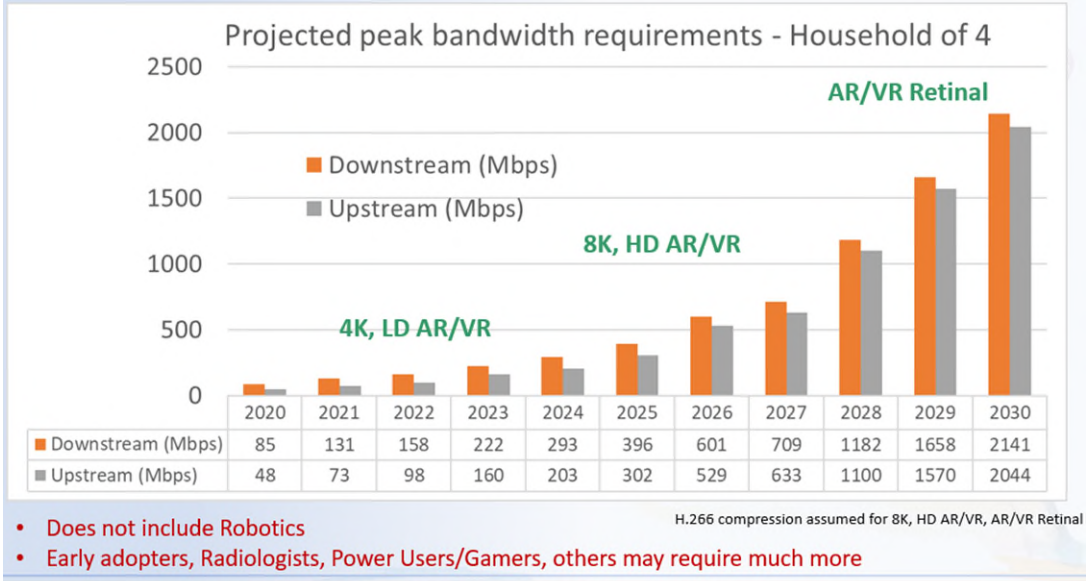
22 *OVBI: Upstream Broadband Usage, Faster Speeds Spike Higher in Q2 2020*, Open Vault (Aug. 11, 2020), https://openvault.com/ovbi-upstream-broadband-usage-faster-speeds-spike-higher-in-q2-2020/; *see also See also* NTCA Broadband/Internet Availability Survey Report, NTCA (Dec. 2020), https://www.ntca.org/sites/default/files/documents/2020-12/2020%20Broadband%20Survey%20Report.pdf ("NTCA Broadband Survey") (showing that NTCA members reported that the percentage of their rural customers subscribing to services with 100 Mbps download or greater increased from 18% to more than 28% in one year).

23 While the discussion in these comments focuses on the reasons the NTIA should require States to prioritize last-mile all-fiber projects, the same rationale holds for middle-mile fiber deployments. As such, in implementing the Middle Mile Broadband Infrastructure Program, the NTIA should prioritize fiber projects.

> recently influenced by COVID-19, as employees work from home and students learn from home, it's a trend that we expect will continue.[24]

Along with McElfresh's emphasis on upstream demand, he noted that the delta with downstream demand is expected to be cut in half.[25] He added that AT&T expects demand for broadband to increase more than five times in the next five years, with a majority of customers expected to consume up to 4.6 terabytes of data monthly.[26]

A study conducted for FBA showed that growth in demand is expected to continue such that peak demand for a family of four should exceed 2000 Mbps symmetric by 2030:



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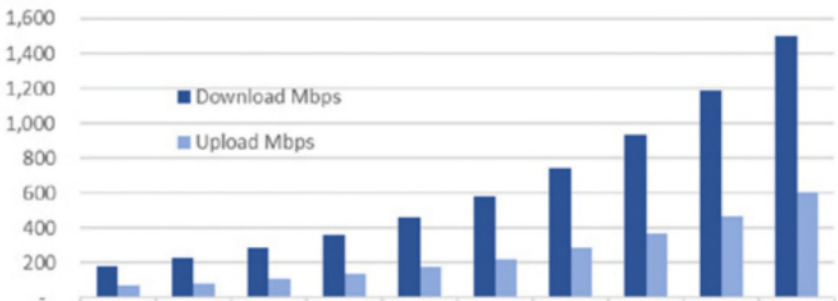
24 Edited Transcript: AT&T Inc. Analyst & Investor Day at 4 (Mar. 12, 2021), https://investors.att.com/~/media/Files/A/ATT-IR/financial-reports/quarterly-earnings/2020/q4-2020/final-at-and-t-investor-and-analyst-day-3-12-21.pdf ("AT&T Investor Day Transcript").

25 *Id.*

26 *Id.*

The previously-mentioned Ookla Speedtest data provides more modest, but still substantial growth projections, with download speeds that could reach 1,500 Mbps and upload speeds at nearly 600 Mbps by 2030:[27]

Year	Download (Mbps)	Upload (Mbps)
2016	54.97	18.88
2021	179.06	64.89
CAGR	27%	28%



	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Download Mbps	179	227	287	364	461	583	739	935	1,185	1,500
Upload Mbps	65	83	106	136	174	223	285	365	468	599

These ongoing increases in demand are anticipated due to increased reliance on applications that require greater upstream and downstream bandwidth brought on by the pandemic, ongoing growth in the number of connected devices in homes, and an array of high-bandwidth technologies, including 4K streaming, augmented reality ("AR"), and virtual reality ("VR").[28] AR and VR, in particular, hold the potential to facilitate greatly improved virtual education, telemedicine, remote work, and entertainment. But these applications require much higher symmetric bandwidths than available to most Americans today—up to 5000 Mbps to deliver a realistic experience to end users, due to the cloud-based processing that enables cost-

27 FBA Digital Divide White Paper, at 5.

28 *See* AT&T Investor Day Transcript, at 5.

effective consumer equipment.[29] For AR in particular, upstream bandwidth needs can match or even exceed downstream requirements.[30]

All-fiber networks deliver superior performance, widely offering 1 GB and 10 GB symmetrical data transmissions today, with 25 GB and even 50 GB speeds already coming to market.[31] Fiber is also readily scalable to provide higher performance to meet increasing consumer demands over the next several decades simply by upgrading electronics.[32]

Fiber also offers better security, reliability, and durability compared to other network technologies. Fiber technology offers greater network security because it is less vulnerable to cable tapping and hacking,[33] and new innovations are making it even more impenetrable.[34] Fiber reliability exceeds that of other network infrastructure because it is less susceptible than cable,

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29 "VR and AR Pushing Connectivity Limits," Qualcomm Technologies, Inc. (Oct. 2018), https://www.qualcomm.com/media/documents/files/vr-and-ar-pushing-connectivity-limits.pdf.

30 "Cloud AR/VR Whitepaper," GSMA Future Networks (Oct. 26, 2019), https://www.gsma.com/futurenetworks/wiki/cloud-ar-vr-whitepaper/.

31 *See e.g.*, *10 Gig Internet*, Cedar Falls Utilities, https://www.cfu.net/tv-internet/internet-service-info/10-gig-internet ("We know customer demand for bandwidth and connection speed will continue to grow. . . . We view it as our job to offer a world-class communications network and get out of the way to see what our customers can do with no limitations. Most importantly, the business-ready infrastructure helps local companies succeed and positions Cedar Falls to compete nationally for new jobs and economic growth. The 10 Gig network is a platform built for innovation.") (last visited July 7, 2021).

32 A recent study showed that by combining different existing amplifier technologies into a hybrid system, engineers in the UK and Japan were able to achieve 178 terabits per second (Tb/s) through existing fiber infrastructure—fast enough to download the entire Netflix library in under a second. Irving, Michael, *Internet speed record shattered at 178 terabits per second*, New Atlas, (Aug. 20, 2020), https://newatlas.com/telecommunications/internet-speed-record178-terabits-per-second/.

33 *The Benefits of Fiber*, USTelecom (June 2, 2017), https://www.ustelecom.org/the-benefits-of-fiber/.

34 As the foundational transmission medium, optical fiber and cable are essential to supply chain security and consequently must rely on trusted suppliers to minimize vulnerability.

DSL, fixed wireless, and satellite to inclement weather, electromagnetic interference, and other issues that degrade or destabilize service.[35] In particular, buried fiber networks have proven to be the most robust transmission media, especially in areas prone to natural disasters, because fiber cables and associated materials are specifically designed to withstand water penetration and corrosion and because active electronics in fiber networks tend to be housed in well-constructed buildings and not in outdoor cabinets in the field or as radios attached to infrastructure. Thus, fiber allows data to flow over great distances without degrading so consumers can enjoy steady and stable internet connections.

A fiber-first approach also will ensure today's unserved and underserved communities do not fall further behind. If BEAD Program funds are used to support suboptimal deployments that are below or barely meet consumers' performance needs today, there is a risk these communities will be stranded on the wrong side of the digital divide with broadband deployments that will be obsolete as soon as they are connected.[36] While a scalability requirement might help mitigate

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35 *The Benefits of Fiber*, *supra* n.32; *see also* "Operational Expenses for All-Fiber Networks Are Far Lower Than for Other Access Networks," Fiber Broadband Association, at 7 (June 2020) ("FBA OpEx Study").

36 *See 5 Steps to get the internet to all Americans*, Tom Wheeler (May 27, 2020), https://www.brookings.edu/research/5-steps-to-get-the-internet-to-all-americans/

("The policy issue, therefore, becomes whether federal dollars should pay for a basic level of service, or strive for the kind of service enjoyed by the vast majority of other Americans? The answer is both, but the principal effort should first be for the high-speed, low-latency, future-proofed capabilities of fiber-optic cable."

"Under current FCC funding rules, the federal support goes to the company that builds connections at the lowest price. While there have been some recent adjustments, the program pits high-performance, but also high-cost, fiber against the lower-cost, but lower-capability, alternatives. Such a "worse where there's none" philosophy is understandable, and its goals laudable. But if we are going to spend federal dollars, we should first see if it is possible to build a service similar to what 90% of Americans enjoy. To do otherwise will only set us up for another digital divide down the road."

"There may, indeed, be areas where it is simply impossible to provide a fiber connection. After all, there are still some remote spots not reached by the telephone network. When it

this risk, a better approach is to maximize the use of BEAD Program funds for projects that deploy all-fiber technology.

C. ALL-FIBER NETWORK DEPLOYMENTS ARE ECONOMICALLY FEASIBLE IN VIRTUALLY ALL AREAS

Deploying all-fiber networks ubiquitously, including in rural areas, is realistically achievable, and such networks can exceed the 100 Mbps/100 Mbps standard. A September 2020 study completed for FBA by consulting firm Cartesian showed that between innovative deployment models by all-fiber providers, government efforts to lower access to essential infrastructure, and efficiently provided government support, by 2029, all-fiber networks can be deployed to 80% of households with an additional $52 billion of investment and 90% of households with $18 billion more.[37]

The economics of deploying all-fiber networks are also favorable on a total life cycle basis because of lower operational costs.[38] A study completed by FBA concluded that the

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comes to spending federal dollars contributed by taxpayers and ratepayers, however, the national strategy must be fiber first. The argument that support should be "technology neutral" too often has the practical effect of being "technology suboptimal."

"In the end, America's broadband connectivity will be an ensemble of multiple solutions. That there are non-fiber solutions is fortunate, and they should be subsidized if fiber is not feasible. But we should try to build the optimal fiber solution first before funding alternatives. And, regardless of technology, a condition of federal money should be delivery of at least 100 Mbps in the new construction of internet infrastructure."

"The beauty of fiber-delivered broadband is that once the network is built, increases in throughput are an improvement in electronics without the need to string or lay more fiber. Moore's Law—that microprocessor power grows while costs fall every couple of years—is the friend of rural broadband's future ability to keep pace. But first it is necessary to pay to run the fiber.").

37 *See* "All-Fiber Deployment Cost Study 2019," Cartesian for the Fiber Broadband Association, at 2 (Sept. 10, 2019), available at www.fiberbroadband.org.

38 *See Fiber for Breakfast, Fiber and Fixed Wireless – An FBA Look*, Fiber Broadband Association, at 21:00 (March 10, 2021), recording available at https://www.fiberbroadband.org/page/fiber-for-breakfast.

operational expenses ("OpEx") of all-fiber networks are below other delivery mediums—fiber offers 50% OpEx savings over hybrid fiber-cable and 63% over DSL—in large part because fiber has fewer active (*i.e.*, powered) components from central office or headend to the home.[39] Another study similarly found that the total cost of operations of all-fiber connections over a 10-year period would be roughly half that of fixed wireless in the same unserved areas—primarily because of the need to replace wireless equipment at relatively short intervals and the cost of leasing space on commercial towers.[40]

Contrary to some perceptions, the economics of deploying all-fiber in rural areas do not vary considerably from urban deployments. A September 2020 report by MoffettNathanson explained that the higher costs to deploy all-fiber networks in rural areas as compared to urban areas is largely offset by greater penetration.[41] And this does not even account for the long-term costs savings from fiber's lower maintenance and upgrade costs.

The fiber industry is actively playing its part. A study by FBA member Corning shows the costs to deploy fiber have already been driven down by industry-led investments in technology and deployment efficiencies,[42] and the fiber industry continues to invest in cost-saving innovations. NTIA can play its part by prioritizing all-fiber broadband deployments.

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39 *See* FBA OpEx Study, at 6-12.

40 "Broadband Access Study: Prepared for King County," Washington, CTC Technology & Energy, at 21 (Dec. 2019).

41 "Q2 2020 Broadband: The Footprint Expansion Game," MoffettNathanson (Sept. 10, 2020).

42 *See* "Getting More Gigabit Service from the Rural Digital Opportunity Fund," Corning, at 2 (Dec. 19, 2019).

D. FAVORING HIGH-PERFORMANCE, SYMMETRICAL, AND FUTURE-PROOF ALL-FIBER BROADBAND NETWORKS IS CONSISTENT WITH CURRENT MARKET AND POLICY TRENDS

The communications industry has chosen all-fiber deployments as the smartest investment. No other technology—cable, DSL, fixed wireless, or satellite—combines all the benefits of fiber, including performance, reliability and security, and low operational and upgrade costs.[43] And there is industry-wide consensus that fiber is the only network technology that can support the ever-increasing broadband performance needs for consumers.

Broadband providers are working fast to deploy fiber networks to meet consumer needs. Over the last 18 years, all-fiber network growth has exploded. In 2003, 50,000 homes had access to all-fiber connectivity. Today, that number had increased more than 1000 times to over 56 million households (43% of total households) – with over 25.1 million households connected (a take-rate of almost 45%). All-fiber deployments continue to surge with average increases of more than 10% annually.[44] By 2024, 50% of American households will be passed with fiber.[45] In fact, fiber is the fastest growing fixed communications network technology in the nation's history,[46] outpacing the growth rates of copper and coaxial last-mile transmission connectivity,

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43 For additional evidence, *see The Case for Fiber to the Home, Today: Why Fiber is a Superior Medium for 21st Century Broadband*, EFF (Oct. 16, 2019), https://www.eff.org/wp/case-fiber-home-today-why-fiber-superior-medium-21st-century-broadband.

44 *See* "Results of the Fiber Provider Study 2021," RVA, LLC for the Fiber Broadband Association, at 3-12 (Dec. 1, 2021) ("RVA 2021 Report"), available at www.fiberbroadband.org.

45 "U.S. Fiber Broadband Growth and Share," RVA, LLC for the Fiber Broadband Association, at 2 (Sept. 6, 2020), available at www.fiberbroadband.org.

46 *See* RVA 2021 Report, at 12.

which took 40 years and 25 years, respectively, to reach 40% of homes. And that growth is expected to continue.[47] AT&T's McElfresh said:

> In 2021, we expect to increase our fiber footprint in more than 90 metro areas by expanding to 3 million new customer locations. The marginal economics are attractive. These areas are adjacent to our current footprint, driving cost efficiencies in our build as well as our marketing and distribution efforts. This results not only in improved cost but speed and cycle times from build to revenue. Fiber is a durable solution and a superior technology to address the demands for broadband. It delivers 1 gigabyte speeds, has low latency, is symmetrical for downlink and uplink demand and is easily upgradable to multi-gig with minimal investment as demand growth continues.

Federal, State, and local entities also are pursuing and implementing policies that support all-fiber broadband deployments, including all-fiber networks. First of all, the Biden Administration's American Jobs Plan would prioritize "future proof" broadband networks in achieving its goal to bring 100% coverage of high-speed broadband.[48] Further, in its just-announced rules for use of American Rescue Plan Act State and local government block grants, the Treasury Department encourages these governments to "prioritize investments in fiber-optic infrastructure wherever feasible."[49] The FCC's Rural Digital Opportunity Fund ("RDOF")

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47 AT&T Investor Day Transcript, at 5.

48 FACT SHEET: The American Jobs Plan, The White House (Mar. 31, 2021), https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/31/fact-sheet-the-american-jobs-plan/.

49 Department of the Treasury, 31 CFR Part 35 RIN 1505-AC77, Coronavirus State and Local Fiscal Recovery Funds, Final Rule, effective April 1, 2022 (to be published in Federal Register), at 295, available at: https://home.treasury.gov/system/files/136/SLFRF-Final-Rule.pdf

auction also favored awarding funds to Gigabit tier projects.[50] Beyond that, municipalities continue to choose fiber to build out municipal broadband networks to their communities.[51]

E. FIBER CONNECTIONS ARE ESSENTIAL FOR BUSINESSES, INSTITUTIONS, AND INDUSTRIES

Beyond household use, the all-fiber connections are advantageous because they can deliver the performance, reliability, and security that businesses, institutions, and industries need. These connections allow businesses to process transactions, post job opportunities, and buy and sell products in regional, domestic, and international markets.[52] They also enable businesses to access resources and opportunities to collaborate so that they can develop innovative products and services. High-performance broadband allows healthcare facilities to incorporate innovative services, like remote surgery, and educational institutions to tap into national and global educational resources. The reliability, security, and high throughput of all-fiber connections also increases productivity, efficiency, safety, and sustainability for industries, including manufacturing, mining, and forestry.[53] In rural America, an all-fiber connection is the critical element of precision agriculture.[54] The tourism industry also relies on fiber connections, which

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50 *See Rural Digital Opportunity Fund et al.*, WC Docket Nos. 19-126 *et al.,* Report and Order, FCC 20-5, ¶ 38 (rel. Feb. 7, 2020) ("we adopt weights that reflect our preference for higher speeds, higher usage allowances, and low latency.").

51 In August 2020, Lexington, KY became the largest gigabit city in the United States when its fiber network was completed through a public-private partnership with MetroNet, an all-fiber provider. *MetroNet Completes Construction of 100% Fiber Optic Network in Lexington, Lexington Becomes Nation's Largest Gigabit City*, Business Wire (Aug. 25, 2020), https://www.businesswire.com/news/home/20200825005826/en/MetroNet-Completes-Construction-100-Fiber-Optic-Network.

52 USDA Report, at 5; Task Force Report, at 10.

53 *See* Task Force Report, at 17, 30.

54 *See id*., at 31.

can allow attractions to advertise broadly and incorporate new entertainment features.[55] Additionally, fiber sensing capabilities play a critical role in improving the safety, reliability, and efficiency of utilities and infrastructure. For example, fiber sensing can enable real-time automatic monitoring of building and structural integrity, energy grid functionality, oil and gas pipeline safety, water line leaks, border patrol movement, and seismic activity. Internet of Things ("IoT") services, such as autonomous vehicles and robotics in factories, also rely on fiber.[56] In addition, fiber facilitates operation of complex industrial control systems and supports big data management and transmissions.[57]

At a higher level, all-fiber connections are beneficial because they provide a more stable economic environment for businesses, institutions, and industries by facilitating modern infrastructure, reliable utility services, access to capital, and sufficient consumer demand[58] while also allowing communities to attract and retain an ample and skilled workforce.[59]

F. FIBER WILL DELIVER FURTHER BENEFITS AS THE ESSENTIAL UNDERLYING INFRASTRUCTURE FOR 5G

Any BEAD Program investment in all-fiber networks will doubly benefit unserved and underserved communities by providing them with a path to accessing 5G connections. Fiber is the essential underlying infrastructure for all fixed and mobile communications services and applications, including 5G. Unlike traditional wireless networks, where computing and processing power is co-located at the cell sites, 5G networks place more of the processing power

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55 *See id.*, at 8, 35.

56 *See id.*, at 41.

57 *See id.*, at 30.

58 *See id.*, at 10.

59 *See* USDA Report, at 5; Task Force Report, at 26.

in the network core, and fiber is the only transmission medium that can carry multi-gigabit traffic today and evolve over time to meet the exponential growth in mobile data traffic.[60] 5G networks are also designed to tie together small cells with fiber to increase performance and reliability. In short, there is no 5G without fiber.[61] That is why John Stankey of AT&T, said that:

> [P]riority #1 is to make sure that we're investing in our core businesses, and that's fiber and making sure that we have broadband connectivity on 5G. And when you think about it, those two aren't dissimilar. When you have a great 5G network, you're deploying a lot of fiber, and that's something that we think are married well. And we think we're in a very unique position because the fiber that we deploy, not only powers our wireless business, but it helps our consumer business and fixed broadband. It helps our enterprise customers and how we deal with them as well, and so we strategically want to make sure we're doing that.[62]

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60 *See e.g.*, "What are Radio Access Networks and 5G RAN?," Verizon (Feb. 2, 2020), https://www.verizon.com/about/our-company/5g/5g-radio-access-networks ("Most base stations (aka transceivers) are primarily connected via fiber backhaul to the mobile core network."). Technologies such as Integrated Access Backhaul can be a useful augmentation in locations where fiber is difficult to deploy, but fiber densification throughout the network is essential.

61 For more discussion, *see* "The Road to 5G is Paved with Fiber," A White Paper by the Fiber Broadband Association (Dec. 2017), available at www.fiberbroadband.org; *Why Fixed 5G Will Never Completely Replace Wired Internet*, gvec.net (June 10, 2019), https://www.gvec.net/fixed-5g-will-never-completely-replace-wired-internet/.

62 "AT&T at Goldman Sachs Communacopia Conference (Virtual)," Edited Transcript, Refinitiv StreetEvents (Sept. 15, 2020), https://investors.att.com/~/media/Files/A/ATT-IR/events-and-presentations/jts-at-goldman-transript-sept-15.pdf. *See also*, *Verizon CEO: Fiber build out is paying off for more than 5G*, Fierce Telecom (Jan. 30, 2020), https://www.fiercetelecom.com/telecom/verizon-ceo-fiber-build-out-paying-off-for-more-than-5g ("While Vestberg acknowledged that fiber played a key role in serving its cell sites, he said on the earnings call that fiber has more use cases ahead of it, specifically for business services. 'I think this is one of the most critical assets in a network today – in today's world, especially as we build Verizon Intelligent Edge Network and you want actually to start delivering the 5G experience that we're expecting. . . . And I can tell you during 2019, I met so many large corporations that we now can actually work with, because our offering is so strong when it comes to fiber and 5G.'").

III. PROPOSED POLICIES TO IMPLEMENT THE BEAD PROGRAM

The Statute, while elaborate and specific in many aspects, gives the NTIA sufficient authority to define terms and provide direction to States and Territories on processes and substantive standards that grantees should use to award funding to subgrantees for projects permitted under the Statute. In this section, we address issues related to grantee awards and provide recommendations on aspects of the program that FBA believes would better ensure its success. Where appropriate, we reference questions raised in the Notice.

A. DEFINING PRIORITY BROADBAND PROJECTS

The Statute provides a definition of the term "Priority Broadband Project," and States and Territories are directed to "prioritize funding for deployment of broadband infrastructure" for such projects.[63] The Assistant Secretary of Commerce for Communications and Information ("Assistant Secretary") is given the authority to deem what projects are a priority. First, the Assistant Secretary is directed to determine the broadband service performance, reliability, and other related criteria that would make a project a priority. Second, the, the Assistant Secretary has the authority to give meaning to the words: "ensure that the network built by the project can easily scale speeds over time."

As discussed in the prior section, only all-fiber projects should be deemed to be priority projects. All-fiber networks deliver the highest performance and most consistent service quality, far exceeding the performance of any other network, e.g., no other network delivers 10/10 Gbps performance today and now plan to roll out 25 Gbps and even 50 Gbps service, and has latencies far below 100ms. All-fiber networks are more reliable than other technologies, especially when

63 Sec. 60102(a(I); Sec. 60102(h)(1)(A)(ii).

installed below ground. All-fiber networks can readily scale performance over time, i.e. without a major network re-build and upgrade.

All-fiber networks also offer a sustainable and environment-friendly means to deploy broadband infrastructure. Fiber uses substantially less energy than coaxial cables which contain copper. Moreover, unlike coaxial cables, fiber does not generate heat, and therefore, does not require cooling systems that emit carbon dioxide. Fiber's sustainability is demonstrated by the fact that its primary raw material is silicon dioxide, which had the advantages of being the second most abundant element on earth after oxygen and causing minimal negative environmental impact when extracted.[64] For these reasons, all-fiber projects are an important tool that the communications industry can use to slow global warming and achieve a net zero carbon footprint.

As the Treasury Department just stated in its final rules for spending ARPA funds, "Treasury continues to encourage recipient to *prioritize* [emphasis added] investments in fiber-optic infrastructure wherever feasible, as such advanced technology enables the next generation of application solutions for all communities and is capable of delivering superior, reliable performance and is generally most efficiently scalable to meet future needs."[65] FBA thus urges the Assistant Secretary to deem an all-fiber network project as a "Priority Broadband Project."

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64 *See Concerned about environmental sustainability? Fiber optic internet service is your best option* (May 3, 2021), https://www.allconnect.com/blog/concerned-about-environmental-sustainability-fiber-optic-internet-service-is-your-best-option; *Fiber Optics: Road to an Eco-Friendly Network*, https://nexus-net.info/fiber-optics-road-to-an-eco-friendly-network/.

65 *See* Department of the Treasury, Coronavirus State and Local Fiscal Recovery Funds, 31 CFR Part 35, RIN 1505-AC77, Final Rule, at 306-307 (Jan. 6, 2022), available at https://home.treasury.gov/policy-issues/coronavirus/assistance-for-state-local-and-tribal-governments/state-and-local-fiscal-recovery-funds.

B. ESTABLISHING COMPETITIVE BIDDING PROCESSES AND STANDARDS FOR STATES AND TERRITORIES

[The information in this section responds to Notice Question 6 concerning States' and Territories' subgrant award process.]

The Statute gives the Assistant Secretary the authority in developing the Notice of Funding Opportunity ("NOFO") to establish competitive bidding processes and standards for assessing "the capabilities and capacities" of subgrantees, including broadband providers seeking funding for deployment projects.[66] FBA believes the Assistant Secretary should exercise this authority to ensure States and Territories use their substantial, albeit limited, funding most cost effectively. Fortunately, there are a plethora of federal and State government competitive bidding models upon which NTIA can draw to shape the subgrantee award processes and standards. For instance, NTIA's recent NOFO for the Broadband Infrastructure Program is a good model for direct awards by NTIA,[67] but it does not provide sufficient direction to ensure that multiple States and Territories will make subgrantee awards cost effectively and pursuant to directives and criteria in the Statute. This NOFO also does not account for the need to have uniform processes and standards that facilitate participation by providers that operate in many States, as well as to will ensure accountability.

The NTIA additionally should examine the FCC reverse-auction process in the RDOF,[68] which has the potential to ensure awards maximize performance with the least amount funding.

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66 Sec. 60102(e)(1)(A)(i)(IV); Sec. 60102(e)(1)(A)(v);

67 *See* "Notice of Funding Opportunity, Broadband Infrastructure Program," available at: https://broadbandusa.ntia.doc.gov/sites/default/files/2021-05/NTIA%20Broadband%20Infrastructure%20Grant%20Program%20NOFO.Final_.pdf.

68 *See* "Auction 904: Rural Digital Opportunity Fund," available at: https://www.fcc.gov/auction/904/releases.

However, as the FCC has demonstrated in the RDOF and other programs, running a successful multi-round reverse auction requires significant expertise and experience, which States and Territories do not have. Further, the integrity of a reverse auction – or for that matter any competitive bidding process - can only be maintained if applicants are vetted sufficiently upfront to ensure they are truly qualified to carry out the project. Here, the RDOF came up short, as the FCC permitted providers to participate even when they lacked the necessary experience and financial wherewithal and did not seek to use currently commercially deployed technologies. In addition, the penalties for default and non-compliance were insufficient to deter non-complaint conduct.

FBA also believes it is worth examining the recent rules the Rural Utilities Service ("RUS") adopted to award grants and loans for the ReConnect program.[69] FBA commends this program for providing funding in past rounds largely to private sector providers to deploy all-fiber networks in more remote areas. However, the new rules inject policy objectives (e.g., preferences for offering wholesale broadband service and meeting labor standards) that are not directly related to deploying infrastructure to unserved locations into the decision making (evaluation) process, thus undermining the goal of selecting projects that are most cost effective.[70] In other words, by adopting these rules, RUS will award funding for projects that serve fewer unserved locations at a higher cost. The NTIA should eschew this aspect of the ReConnect model.

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69 *See* "Reconnect Loan and Grant Program," available at: https://www.usda.gov/reconnect.

70 *See* "Evaluation Criteria," available at: https://www.usda.gov/reconnect/evaluation-criteria.

Based on these and other federal and State grant programs, FBA asserts the following should be the critical attributes of the competitive bidding process that States and Territories should follow for subgrantee projects:

Transparency – All procedural aspects of the competitive bidding process should be public, fair, and reasonable and all substantive requirements and standards by which applications are judged should be clear and made public well in advance of the application submission date.

Uniformity – Applications, processes, and evaluation standards for subgrantee projects should be uniform across grantee jurisdictions.

Precise Evaluation Metrics that Are Consistent with the Statute and Maximize Cost Effectiveness – Applications should be evaluated based on a precise set of quantitative standards that are consistent with statutory goals and requirements and maximize cost effective projects.

Accountability – Grantees should regularly audit subgrantee compliance with deployment and performance mandates; NTIA should regularly audit grantee compliance in making subgrantee awards.

Building on these attributes, FBA proposes that the NTIA mandate that States and Territories use a single-round "sealed" bidding process that evaluates all qualified deployment project applications simultaneously based on a point system with minimum thresholds and additional points for capabilities that exceed those thresholds, as follows:[71]

Experience in Network Construction and Operation and Financial Wherewithal (100 points maximum)

[71] FBA's framework is based upon the framework used by the FCC in the "Bringing Puerto Rico Together and Connect USVI Fund Stage 2" Order. *See* https://www.fcc.gov/bringing-puerto-rico-together-and-connect-usvi-fund-stage-2.

Minimum Threshold (10 points): The entity filing the application must not have defaulted on any loan or other debt instrument in the past 5 years, and not have been excluded from participating in any federal or State deployment grant or loan program.

Additional Points (up to 90 points) -- Additional points would be awarded based on the length of experience in constructing and operating broadband networks using the technology proposed in the application.

Area of Deployment (25 Points)

Minimum Threshold (25 Points): The eligible unserved or underserved area is in a persistent poverty county or high-poverty area.[72]

Speed of Deployment, Network Performance, Reliability, and Marketing (200 points maximum)

Minimum Threshold (20 point): The entity must propose to deploy a network technology within 4 years of receipt of funding that it has already deployed at the time the application is submitted, that delivers speeds of at least 100/20 Mbps continuously with less than 100ms latency, with annual downtime of less than 0.01%.

Additional points (180 points maximum) – Additional points would be awarded for the following:

- Providing deployment in less than 4 years (in one year increments)
- Greater symmetrical speeds (including beyond 1/1 Gbps)
- Lower latency (including below 20 ms)
- Greater reliability (such as below-grade fiber), and
- Guarantees (subject to penalty) of additional customer take-rate within a limited timeframe.

Amount of Support Requested (75 points maximum)

Minimum Threshold (1 point): Support requested is 25% below the Reserve Price in the FCC's Connect America Cost Model.[73] (The Reserve Price is set on a census block basis, and the applicant would need to overlay each location in the eligible unserved or underserved area where support is requested with the appropriate census block.)

Additional points (1 point) for each additional 1% below the Reserve Price.

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72 Sec. 60102(h)(1)(A)(iv)(I).

73 The reduction is amount is set to comply with the general "Matching Requirement" in Section 60102(h)(3) and should be altered for high-cost areas.

FBA recognizes its bidding framework can be adjusted in various ways to reflect different objectives and priorities; however, it believes that a quantitative system for ranking applications is essential. It also believes that based on lessons learned from prior deployment support programs, it is crucial to prioritize provider experience and financial wherewithal and use of future-proof, high-performance and reliable network technology that a provider has deployed.

C. GRANTEE ACCOUNTABILITY MEASURES

The Statute requires grantees to submit semiannual reports describing how they expended funds and certifying that they comply with requirements mandated by the NTIA.[74] To ensure grantees are accountable for implementing the competitive bidding process according to requirements the NTIA adopts, FBA recommends that the NTIA require, as part of these semiannual reports,[75] grantees submit, along with a description of all grants awarded, their evaluation of all subgrantee grant applications. FBA notes that this oversight will be greatly facilitated – and will tend to ensure compliance with the Statute and the NTIA's requirements -- by the NTIA requiring States and Territories to use FBA's proposed uniform processes and standards (including scoring system) for competitive bidding.

D. SUBGRANTEE ACCOUNTABILITY MEASURES

To ensure broadband deployment projects comply with grant deployment, performance, and related requirements, the Statute directs subgrantees to submit semiannual reports to the grantor.[76] The Statute further directs the Assistant Secretary and the FCC to work together to

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74 Sec. 60102(j)(1)(B).

75 Sec. 60102(j)(1)(B)

76 Sec. 60102(j)(2).

provide a "standardized methodology" for subgrantee reports.[77] To that end, FBA believes the NTIA should direct States and Territories to require subgrantees to submit information consistent with the performance testing methodology and requirements established by the FCC[78] and the High Cost Universal Broadband ("HUBB") reports.[79]

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77 Sec. 60102(3)(B).

78 *See* https://www.usac.org/high-cost/annual-requirements/performance-measures-testing/

("Starting in 2020 with CAF Phase II Model participants, carriers that receive CAF support to provide fixed-location broadband service must conduct speed and latency testing of their networks and submit the results to USAC as part of the annual compliance process. As established by FCC orders in 2018 and 2019, the performance testing aims to maximize the impact of CAF investments to close the digital divide in rural America and ensure that people living in rural communities have access to the same high-quality networks as those living in urban areas."

"The FCC mandates that at least 80 percent of network speed measurements be at 80 percent of required speeds and 95 percent of latency measurements be at or below 100 milliseconds round-trip time. Carriers that fail to meet the performance measures standards required of their funds may face potential withholding of support.").

79 *See* https://www.usac.org/high-cost/annual-requirements/submit-data-in-the-hubb/

("USAC closely monitors compliance with broadband build-out obligations to ensure that carriers receiving Connect America Fund (CAF) support are deploying broadband in rural America as required. Carriers participating in modernized funds must file deployment data with the High Cost Universal Broadband portal, or HUBB, showing where they are building out mass-market, high-speed Internet service using CAF support. This information includes latitude and longitude coordinates for every location where service is available, as well as the broadband speeds offered and the date of deployment."

"The HUBB conducts automated, real-time validation checks of the deployment data submitted by the carriers. The system validates, for instance, that a location's latitude and longitude coordinates fall within an area eligible for funding and that the location is not a duplicate of one that has already been filed. The HUBB also calculates carrier progress toward meeting broadband build-out obligations, including interim deployment milestones.").

E. LOW-COST BROADBAND SERVICE OPTION

[Response to Questions 22 and 23]

The Notice requests comment on the BEAD Program's requirement that subgrantees offer at least one low-cost broadband option and the program's directive that the NTIA determine which subscribers are eligible for that option.[80] The most direct way to satisfy the Statute on these issues is for the NTIA to rely on a subscriber's and provider's participation in the Affordable Connectivity Program ("ACP").[81] First, the ACP contains a definition of "eligible subscriber" that is widely seen to cover those households most in need of a low-cost broadband option, especially because Congress altered and expanded the ACP's definition from that used in the predecessor program.[82] Second, the ACP provides those subscribers with funding to help ensure the service is in fact low-cost – and is often offered at no cost – and here again, Congress in enacting the ACP established a reimbursement amount that is sufficient to connect eligible subscribers. Thus, any subgrantee participating in the ACP should be deemed to satisfy the requirement to offer a low-cost broadband option, so long as one of the service options is at no or *de minimus* cost to the eligible subscriber.

F. OTHER BEAD PROGRAM OBJECTIVES

[Response to Question 18]

The BEAD Program enables States and Territories to use funds of other purposes, including adoption[83] -- all of which are critical to bringing high-performance, reliable broadband

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80 Sec. 60102(h)(4)(B).

81 *Affordable Connectivity Program*, WC Docket No. 21-450, *Emergency Broadband Benefit Program*, WC Docket No. 20-445, Report and Order and Further Notice of Proposed Rulemaking, FCC-22-2 (rel. Jan. 21, 2022).

82 47 C.F.R. § 54.1500(j).

83 Sec. 60102(f)(5).

service to all Americans. The Statute also enables the Assistant Secretary to permit use of the funds for other activities that "facilitate the goals of the Program."[84] FBA recommends that the Assistant Secretary permit States and Territories to use the funds for digital equity, cybersecurity and workforce training efforts, which are all integral either to construction, operation, or use of broadband networks. Further so that funds are spent most efficiently, all of these activities should be done in concert with – that is, not duplicate and be consistent – federal and other State and Territory efforts. Thus, the NTIA should require States and Territories in spending funds for these purposes to set forth and report how they are coordinating use of BEAD Program funds for the purposes.

IV. CONCLUSION

The President and Congress have given the NTIA an enormous responsibility in overseeing the BEAD Program. With the substantial funding provided, the NTIA has a great opportunity to close the digital divides. FBA is confident it will make the most of this opportunity, and we stand ready to assist in any way.

Respectfully Submitted,

Gary Bolton
President and CEO
Fiber Broadband Association
3050 K Street, Suite 400
Washington, DC 20037
(202) 524-9550

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[84] Sec. 60102(f)(6).