BEFORE THE
DEPARTMENT OF THE TREASURY
WASHINGTON, DC 20220

Coronavirus State and Local Fiscal Recovery Funds Interim Rule Comments	))	RIN 1505-AC77

COMMENTS OF ACA CONNECTS –
AMERICA'S COMMUNICATIONS ASSOCIATION

I. INTRODUCTION AND SUMMARY

ACA Connects – America's Communications Association ("ACA Connects") hereby submits comments in response to the Department of the Treasury's ("Treasury Department's") issuance of the Interim Final Rules ("IFRs") implementing the award of Coronavirus State and Local Fiscal Recovery Funds (the "Funds") and the accompanying notice asking for comments.[1] ACA Connects focuses its comments on those parts of the IFRs and supporting discussion setting forth the permitted use of Funds for broadband infrastructure by State, local, and Tribal governments (collectively "Governments").

ACA Connects has approximately 600 small- and medium-size members providing wireline broadband services, as well as video and phone services, to more

[1] Department of the Treasury, Coronavirus State and Local Fiscal Recovery Funds, RIN 1505-AC77, 86 Fed. Reg. 26786 (May 17, 2021) ("FR Notice"). These funds are contained in the American Rescue Plan Act ("ARPA"), Pub. L. No. 117-2, Title IX, Subtitle M, § 9901 (2021).

than 11 million households and businesses and having service available to many times more locations. Most of these providers serve smaller communities and rural areas, and almost half deploy gigabit service today. With owners and employees who live in their service territories, these providers are committed to serving their entire communities and take a long-term approach to building networks and providing services. Indeed, many participate in federal and State programs to deploy reliable, high performance broadband service to unserved areas. As such, ACA Connects members well understand the critical import of broadband connectivity in general and most especially during the COVID emergency. From the first days of the emergency and ever since, as people lived and worked at home, our members' broadband networks provided reliable, high performance connectivity to their millions of customers even as their networks were tested by unprecedented levels and types of traffic. From a study we conducted two months after the emergency was declared, we documented the dramatically increased use of our members' networks and found that, on average, download consumption increased by 27% and upload consumption increased by 36% from March 10, 2020 and until the end of that month; yet, few customers experienced network issues, and for those that did, these issues were typically addressed within normal timeframes – in less than one day.[2] Not only did our members provide the broadband experience their customers expected, but they went above and beyond

[2] "Network Performance During the COVID-19 Crisis," ACA Connects available at https://acaconnects.org/covid-19/broadband-dashboard/.

standard practices to ensure consumers stayed or became connected despite not being able to pay because of the emergency.[3] Accordingly, ACA Connects members are well positioned and eager to participate in the new Government programs to deploy broadband infrastructure to unserved communities as envisioned by the ARPA.

As a threshold matter, ACA Connects believes the IFRs and actions by Governments to award broadband support need to be data-driven. As we elaborate on below, one month ago, ACA Connects and the business consulting firm Cartesian released a report examining the broadband availability and adoption gaps in depth with the most recent data. Our report not only identified the magnitude of these gaps but found that the adoption gap, because of its size and persistence, requires greater attention by governments at all levels. We also examined how much government support is required to close these gaps for various scenarios dependent upon governments' goals. We believe this report provides a framework that the Treasury Department should use as it adopts Final Rules and Governments should use as they implement the program.

There are five key issues the Treasury Department should address in providing guidance to Governments to implement the broadband infrastructure program:

First, what is the definition of an unserved area? ACA Connects agrees with the definition proposed in the IFRs that Governments should direct Funds to support the

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[3] "Keep Americans Connected," ACA Connects available at https://acaconnects.org/covid-19/fccs-keep-americans-connected-pledge/.

deployment of fixed broadband service in census blocks "if they lack access to a wireline connection capable of reliably delivering at least minimum speeds of 25 Mbps download and 3 Mbps upload."[4] These areas are the most in need of high performance broadband service, and this definition is consistent with the FCC's current benchmark, as well as the benchmark used by other federal agencies. Further, the likely amount of funding that Governments will dedicate for broadband infrastructure[5] should be sufficient to provide future-proof service in areas without 25/3 Mbps service.[6] By contrast, if the benchmark for determining unserved areas was raised to 100/20 Mbps (or even 100/100 Mbps), the amount of funding Governments would likely dedicate to broadband infrastructure would be sufficient to bring service to only a fraction of the locations without access to this higher speed service – and more importantly, by siphoning away funding from where it is most needed, it may result in locations without 25/3 Mbps service continuing to be stranded without access to even minimally sufficient broadband service Further, it is likely providers offering these services with speeds above 100/20 Mbps (and potential even above 25/3 Mbps) will make additional investments over time to upgrade their infrastructure, thus saving the government from providing support.

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4 FR Notice at 26806.

5 *See* n. 19, *infra*. for our explanation of this assumption.

6 In its recently released report, ACA Connects found that networks capable of offering gigabit broadband service could be made available to all 12 million locations with less than 25/3 Mbps service for approximately $20-$37 billion.

ACA Connects, however, disagrees with the expansive interpretation of this interim rule that the Treasury Department added to the Frequency Asked Questions on June 17th, which would give Governments significant discretion to include served locations in an eligible area.[7] In effect, the Treasury Department's interpretation has no limiting principle, thus permitting Governments to award Funds in areas with few unserved and many served locations, thereby leading to Funds being wasted and unproductive overbuilding. Moreover, the fact that there are served locations near unserved locations indicates that sufficient network infrastructure and broadband service is already proximate to unserved locations and that the most efficient solution might well be, for instance, to subsidize an existing provider to connect the unserved location – and not to give funding to some new provider to build network facilities *de novo*. ACA Connects urges the Treasury Department to rethink providing open ended discretion to Governments to provide support for served locations within an eligible area. Rather, including served locations should be the exception, and the onus should be placed on Governments to justify inclusion of any served location in an eligible area.

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[7] *See* "Coronavirus State and Local Fiscal Recovery Funds Frequently Asked Questions AS OF JUNE 24, 2021," at 6.8 ("These unserved or underserved households or businesses do not need to be the only ones in the service area funded by the project.") and 6.9 ("It suffices that an objective of the project is to provide service to unserved or underserved households or businesses. Doing so may involve a holistic approach that provides service to a wider area in order, for example, to make the ongoing service of unserved or underserved households or businesses within the service area economical. Unserved or underserved households or businesses need not be the only households or businesses in the service area receiving funds.") available at https://home.treasury.gov/system/files/136/SLFRPFAQ.pdf.

Further, the Treasury Department should adopt, as part of the Final Rules, a requirement that served locations at most should not make up more than 10% of any eligible area. Such a requirement follows the definition in the Rural Utilities Service ("RUS") ReConnect program, where 90% of locations in the eligible area must be unserved.[8]

Second, what should be the minimum broadband performance that funding recipients should provide? ACA Connects agrees with the proposed IFRs that recipients of funding from Governments should offer 100/100 Mbps service except where it is not practical, in which case the network should be scalable to provide this level of performance.[9] This will ensure that residences, businesses, and institutions in unserved areas with get the same reliable, high performance infrastructure that is being deployed in served areas. Further, funding anything less – and then having to fund it again in the near future – is a bad investment.

Third, how should Governments ensure that in-need households are connected? The discussion in the FR Notice encourages Governments to "integrate" affordability into their broadband programs.[10] Given that the broadband adoption problem is so

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8 *See* "Service Area Eligibility Requirements," ReConnect Loan and Grant Program, U.S. Department of Agriculture ("Lack Sufficient Access to Broadband: At least 90% of the proposed funded service area (PFSA) must lack sufficient access to broadband service, as defined in the latest Funding Opportunity Announcement (FOA)") available at https://www.usda.gov/reconnect/service-area-eligibility-requirements.

9 FR Notice at 26823.

10 *Id.* at 26806 ("Recipients are also encouraged to consider ways to integrate affordability options into their program design.").

great and is present in both unserved and served areas, ACA Connects believes the Treasury Department should do more than encourage Governments to spend Funds on adoption and recommends that the Final Rules include a requirement that Governments spend Funds on broadband adoption programs, in any area, that amount to at least 33% of the amount spent on deployment.

Fourth, should Governments prioritize support for certain classes of providers? The discussion in the FR Notice encourages Governments to prioritize support for local governments, non-profits, and co-operatives because they have "less pressure to turn profits" and have "a commitment to serving entire communities."[11] However, the Treasury Department provides no evidence to support prioritizing these entities only and on these grounds alone. We doubt its merits. Accordingly, ACA Connects recommends it refrain from providing any preferences that are not supported with hard evidence. ACA Connects' view is based on its familiarity with broadband builds by all types of providers. We have well over 100 municipally-owned and co-operative providers as members and, as such, we know first-hand the valuable role they play in bringing broadband to their communities. And, we know that hundreds of our other members, most of whom are small, privately-held businesses, have owners and employees that live and work in the communities they serve. These members also have a deep commitment to serving their entire communities and take a long-term approach to building networks and providing services. Further, because of their

11 *Id.*

experience, they know how to build networks efficiently and on time and provide innovative and responsive service. In addition, other factors are equally or more meaningful with respect to choosing entities to build into unserved areas. For example, there are significant economies of scale and scope in deploying broadband, and the Treasury Department should acknowledge this factor if it considers providing priorities. While we do not believe that priorities are warranted, should the Treasury Department believe differently, it should encourage Governments to provide any small entity that is an experienced broadband provider with the highest level of priority.

Fifth, how should Governments award support? Here, the FR Notice and IFRs are silent, and ACA Connects believes this a significant omission. Simply put, auctions have proven to be a much more efficient distribution mechanism than grants, and as such, they will result in more unserved areas becoming served. As a result, the Treasury Department should mandate that Governments award support using auctions. Should the Treasury Department permit Governments to use grants, it should at least capture some of the benefits of auctions, such as by directing Governments to prioritize applications that would most cost effectively deploy broadband infrastructure. Further, the Treasury Department should recognize that because many millions of unserved locations are in partially served census blocks, they may be served most cost effectively by proximate existing providers, including by providers targeting a limited number of locations. Accordingly, the Treasury Department should direct Governments, when implementing grant programs, to facilitate participation by smaller providers, including

by setting-aside funds for proposals to connect a limited number of locations and by providing lower-cost means for smaller operators to apply for funding.

II. STATE, LOCAL, AND TRIBAL GOVERNMENTS SHOULD USE A DATA-DRIVEN FRAMEWORK TO SPEND FUNDS TO CLOSE THE DIGITAL DIVIDE

ACA Connects believes that in using the Funds for broadband infrastructure, Governments should base their actions on the most recent data and rigorous analysis from credible and diverse sources. On June 10, 2021, we joined with the business consulting firm Cartesian to release the attached report – ***Addressing Gaps in Broadband Infrastructure Availability and Service Adoption: A Cost Estimation & Prioritization Framework*** – that provides a framework for policymakers to use to evaluate the amounts of government funding that would be needed to address the wireline broadband availability and adoption gaps based on different definitions of success ("ACA Connects Broadband Report"). Our framework uses the most recent and complete data and conducts a detailed analysis to estimate costs across multiple deployment and adoption program scenarios. As such, it is a tool that policymakers, including those receiving and expending Funds, can use to achieve their objectives based on the level of funding available for broadband-related initiatives.

Based on the data and analysis, our framework finds –

State of Fixed Broadband Availability and Adoption

- There are approximately 12 million locations that do not have access to 25/3 Mbps fixed broadband service and approximately 19 million locations that do not have access to 100/20 Mbps service.[12]
- The number of households that have access to gigabit service climbed appreciably from June 2018 to June 2020 – from 25% to 37% of all households[13] – but the number of households with access to less than 100/20 Mbps service declined only from 12% to 9% of households in the same period.
- An estimated 30 million households (about 25% of the total number of households) do not subscribe to fixed broadband at home for reasons other than network availability, and 36% of households without fixed broadband earn less than $20k per year. A comparable percentage of homes in rural and non-rural areas (29% versus 28%) do not subscribe even when service is available.
- Thus, the adoption gap (30 million households) is much larger than the availability gap (12 million locations without access to 25/3 Mbps service).

Cost to Address Wireline Broadband Availability Gaps

[12] This includes an estimated 8.2 million locations in census blocks that are reported on the FCC's Form 477 as "served" that do not have service available.

[13] The areas that received gigabit speeds in the last three years were mostly areas that had service of at least 100/20 Mbps.

- Networks capable of offering gigabit broadband service could be made available to all 12 million locations with less than 25/3 Mbps service[14] for approximately $20-$37 billion, and to all location with less than 100/20 Mbps service for approximately $35-67 billion;[15]
- Building gigabit speed service to every currently sub-gigabit location in the U.S. could cost between $117-$198 billion, and building to all locations with less than 100 Mbps/100 Mbps service would cost approximately the same amount – $106-$179 billion.

Cost to Address the Wireline Broadband Adoption Gap

- Over a five-year timeframe, it would cost to provide a $50/month/household subsidy between $26 billion (assuming a 25% take rate) and $102 billion (assuming a 100% take rate).

ACA Connects also worked with Cartesian to examine the methods for awarding support to determine which methods would maximize use of government funding by providing the highest performance broadband service to the greatest number of unserved locations. We found that by using auctions to award support rather than providing grants that cover 100% of the project's cost, approximately three times more

[14] The 12 million locations do not include areas that are part of the recent Rural Digital Opportunity Fund Phase I program.

[15] The lower part of the range reflects support the government will provide to RDOF auction winners providing gigabit fiber service, and the upper part of the range is based on a cost model for fiber deployments developed by Cartesian.

unserved locations across the country would become served with at least the same, if not better, broadband service.[16] We will discuss that result and its bearing on the IFRs more fully below.

As can be seen, the ACA Connects Broadband Report and our analysis of mechanisms to award support bear directly on the policy choices made in the IFRs, and we urge the Treasury Department to use them as it drafts Final Rules and Governments to use them as they implement these rules. In the next sections, we will discuss the applications of our work more fully.

III. THE FINAL RULES SHOULD DEFINE UNSERVED AREAS AS THOSE WHERE ALL LOCATIONS LACK ACCESS TO 25/3 MBPS FIXED BROADBAND SERVICE, EXCEPT IN LIMITED, JUSTIFIED INSTANCES

Following the lead of the FCC,[17] the IFR defines "unserved or underserved" as "one or more households or businesses that are not currently served by a wireline connection that reliably delivers at least 25 Mbps download speed and 3 Mbps of

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16 Our conclusion is based on a comparison of the final bid prices for the Rural Digital Opportunity Fund Phase I auction as compared to the reserve price, which is in effect the cost of a 100% grant.

17 *Inquiry Concerning the Deployment of Advanced Communications Capability to All Americans in a Reasonable and Timely Fashion*, GN Docket No. 20-269, Fourteenth Broadband Deployment Report, para. 12 (Jan. 21, 2021) ("This finding adopts the proposal in the Notice, and the record reflects significant support for maintaining the current fixed 25/3 Mbps speed benchmark. We agree with ACA Connects that "broadband service at this speed tier continues to provide users the ability 'to originate and receive high-quality voice, data, graphics, and video telecommunications', and that maintaining the same benchmark across multiple years' reports makes it easier to measure deployment progress over time.").

upload speed."[18] ACA Connects supports that definition and that performance benchmark because it will ensure that Funds are targeted to those locations most in need of high performance broadband service and, because they are generally the highest cost to serve, most unlikely to get that service from providers without a government subsidy.

There are several additional reasons to adopt a 25/3 Mbps performance benchmark to define unserved and underserved areas. First, it is unlikely Governments will use their Funds to finance broadband deployment programs at sufficient levels to enable service to areas other than those that lack 25/3 Mbps service.[19] This means there will not be money available for upgrading locations that already receive higher speed service. According to the ACA Connects Broadband Report, the total cost to build to locations without 25/3 Mbps service is in the range of $20-$37 billion.[20] By contrast, if the benchmark were increased, for example to 100/20 Mbps, the amount of funding required would increase to $35-$67 billion, far beyond the amount Governments

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[18] FR Notice at 26821 (§35.3). *See also* FR Notice at 26805 (unserved or underserved locations are those that "lack access to a wireline connection capable of reliably delivering at least minimum speeds of 25 Mbps download and 3 Mbps upload" because it deems this level of service as the minimum required for originating and receiving high-quality voice, data, graphics, and video.).

[19] Our estimate of the amount Governments will spend on broadband infrastructure is based on the amounts provided for broadband infrastructure by those States that have recently enacted laws providing for use of the Funds. The amounts these States have provided for broadband infrastructure ranges from $5-10 million to upwards of $500 million, if not somewhat more.

[20] ACA Connects Broadband Report at 11.

are expected to fund.[21] In addition, if support is awarded in areas without 100/20 Mbps or even higher speeds, funding necessary for areas most in need may be siphoned away, and locations without 25/3 Mbps service may not be upgraded to receive sufficient broadband service. Second, again according to our report, broadband providers are expected to continue investing substantial amounts to upgrade their networks, and thus locations with service above 100/20 Mbps (and below 1 Gbps) are likely to receive higher performance service without any government funding.[22] Third, overbuilding broadband networks that are providing sufficient service will deter investment from the private sector – which provides approximately 90% of the capital invested in broadband infrastructure annually[23] and whose investments have given the country robust broadband infrastructure that has accommodated the remote access needs of people, families, businesses, and communities during over the COVID emergency.[24]

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21 *Id*.

22 *Id*. at 6.

23 "Broadband Remains High in 2019," Michael Saperstein, USTelecom—The Broadband Association ("The U.S. broadband industry continued its impressive stretch of investment in network infrastructure in 2019, investing $78.1 billion—the second highest total over the past 10 years.") available at https://www.ustelecom.org/research/broadband-investment-remains-high-in-2019/.

24 In the discussion on the IFRs (FR Notice at 26806), the Treasury Department shares ACA Connects' concern about overbuilding ("recipients are encouraged to avoid investing in locations that have existing agreements to build reliable wireline service with minimum speeds of 100 Mbps download and 20 Mbps upload by December 31, 2024, in order to avoid duplication of efforts and resources.").

Harm from using Funds to overbuild is not merely theoretical. Rather, spending Funds to support service to already served locations has the potential to result in immediate and significant harm to near-term deployments. Incumbent telephone companies have announced that they will be upgrading their networks with fiber deployments to approximately 30 million locations, and ACA Connects members and other providers with hybrid fiber/coax networks have on the drawing board upgrades to provide higher performance service to millions of locations.[25] While not all of these are in areas where service is currently below 100/20 Mbps, the Treasury Department and Government should proceed cautiously to avoid jeopardizing these investments, or worse yet, allowing limited funding to be used in an area likely to receive higher speeds through private investment.

Since publishing the FR Notice and IFRs, the Treasury Department has issued updated FAQs that make material changes to the definition of an unserved area by giving Governments substantial discretion to include served locations in an eligible area.[26] Most importantly – and most concerning -- the Treasury Department's interpretation contains no "limiting principle," which effectively means Governments have so much discretion that they can include a great many served locations in an eligible area – contrary to goals to spend limited funding efficiently, reach the maximum

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[25] *See* "U.S. Broadband: The Headwind of Fiber Overbuilds and the Tailwind of Stimulus," Moffett Nathanson Research, June 3, 2021, and "Biden's Choice: Cable's Response," New Street Research, June 17, 2021 ("New Street Report").

[26] *See* n. 7, *supra*.

number of unserved locations, and not overbuild networks constructed with private investment. Moreover, the Treasury Department should recognize that where served locations are near unserved locations, it likely indicates that sufficient network infrastructure and broadband service is already proximate to unserved locations. As such, Governments would be better served – and Funds better used – by subsidizing an existing provider to connect such unserved locations – and not giving funding to some new provider to build network facilities *de novo*.

Accordingly, the Treasury Department should reverse course and not provide open ended discretion to Governments to provide support for served locations within an eligible area. Rather, Governments should be able to include served locations only in exceptional instances and where it provides justification – not as a matter of course. Further, the Treasury Department should adopt, as part of the Final Rules, a requirement that served locations should make up at most no more than 10% of any eligible area. Such a requirement would provide some limitation on Government actions so that the definition of "unserved" has real meaning consistent with other important goals. ACA Connects notes the Rural Utilities Service's ReConnect program defines by statute an unserved area as one where at least 90% of the locations in the unserved areas should lack access to the benchmark service.[27] This program is generally viewed as achieving its aim of bringing high performance broadband service to unserved locations consistent with other public interest objectives, and ACA Connects urges the

[27] *See* n. 8 *supra*.

Treasury Department to adopt the same requirement in its Final Rules if it gives Governments discretion to include served locations in eligible areas.

IV. THE FINAL RULES SHOULD REQUIRE PROVIDERS ACCESSING FUNDS TO DEPLOY INFRASTRUCTURE PROVIDING AT LEAST 100/100 MBPS FIXED BROADBAND SERVICE EXCEPT IN THE HIGHEST COST AREAS

The IFRs require Governments to provide Funds for the deployment of broadband infrastructure that "reliably meet or exceed symmetrical 100 Mbps download speed and upload speeds," except in limited instances.[28] The Treasury Department asserts that this benchmark "will support the increased and growing needs of households and businesses," and it refers to various sources to buttress its determination, including the FCC's Broadband Speed Guide, data indicating consumers' increased need to access greater downstream and upstream speeds, especially during the COVID emergency, and benchmarks set in federal and State programs.[29]

ACA Connects supports building future-proof "gigabit" networks, and investing the Funds in broadband infrastructure that can reliability provide speeds of at least 100/100 Mbps is justified for many reasons. First, these are sound investments, even in hard to reach areas: as a rule, if you build such networks right at the beginning – so

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[28] FR Notice at 26823 (§35.6(e)(2)). The exception to the rule provides: "In cases where it is not practicable, because of the excessive cost of the project or geography or topography of the area to be served by the project, to provide service meeting the standards set forth in paragraph (e)(2)(i) of this section: (A) Reliably meet or exceed 100 Mbps download speed and between at least 20 Mbps and 100 Mbps upload speed; and (B) Be scalable to a minimum of 100 Mbps download speed and 100 Mbps upload speed."

[29] *Id.* at 26804-26805.

they can provide 100/100 Mbps service today and be easily upgraded to provide gigabit and multi-gigabit service – the savings in operational expenditures and the low cost to upgrade should more than offset the higher initial cost to deploy. Second, the data from the ACA Connects Report shows that the amounts States are likely to allocate for broadband infrastructure from the Fund can support providing gigabit speeds to all locations that lack access to 100/20 Mbps service. Third, these investments are favorable because consumers will subscribe to such services when made available at rates that are much higher than in urban and suburban areas – even above 60% of homes passed. Fourth, government investments in these high performance networks in unserved areas are warranted because the benefits to residential, business, and institutional customers of having this type of connectivity will be substantial.[30]

Some 25 years ago, when Congress enacted the Telecommunications Act of 1996, it directed the FCC to ensure its universal service programs provided rural communities with "reasonably comparable" telecommunications service to that provided in urban communities, so that all Americans could become one.[31] The Treasury Department effectively is applying the same legislative directive and policy approach

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[30] These high performance upgrades also are justified because they will provide connectivity for 5G, and smart city and smart grid infrastructure, which will generate additional revenues.

[31] 47 USC § 254(b)(3) ("Consumers in all regions of the Nation, including low-income consumers and those in rural, insular, and high cost areas, should have access to telecommunications and information services, including interexchange services and advanced telecommunications and information services, that are reasonably comparable to those services provided in urban areas and that are available at rates that are reasonably comparable to rates charged for similar services in urban areas.").

here. It is sound policy that where the government subsidizes broadband builds, consumers at these locations should receive access to ”reasonably comparable” service.

V. THE RULES SHOULD REQUIRE RECIPIENTS TO USE FUNDS FOR ADOPTION PROGRAMS

The FR Notice briefly encourages Governments to use Funds to make connections to unserved or underserved households and businesses affordable.[32] ACA Connects applauds the Treasury Department for including this directive, but broadband adoption is a substantial and pressing problem that warrants greater attention. The ACA Connects Broadband Report highlights the extent of the adoption problem by citing to the work of the National Urban League, which has found that approximately 30 million households do not subscribe to broadband service when it is available – far more households than those without access to a sufficient broadband connection.[33] Further, this is a problem in both urban and non-urban areas – 29% of rural homes and 28% of non-rural homes do not subscribe to fixed broadband when it is available.[34] In other words, adoption, and not availability, is our principle digital divide problem, and its reach spans all areas of the country. Congress, in fact, has recognized in the very same legislation in which it adopted the Funds the need to address the adoption problem by

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32 FR Notice at 26806. The FR Notice also notes that other provisions of the ARPA provide that “assistance to households facing negative economic impacts due to COVID-19 is also an eligible use, including internet access and digital literacy.”

33 ACA Connects Broadband Report at 7, 8.

34 *Id.* at 7.

enacting a remote learning program (the Emergency Connectivity Fund[35]), which builds upon an enhanced Lifeline program (the Emergency Broadband Benefit Program[36]) enacted months earlier. Thus, given the magnitude of the adoption problem, the Treasury Department should do more than merely encourage Governments to allocate Funds to address this problem. ACA Connects recommends that the Final Rules include a requirement that Governments spend Funds on broadband adoption programs that amount to at least 33% of the amount they spend on deployment. Moreover, such programs should not just support adoption in unserved areas but should do so in all areas where broadband is available or becomes newly available.[37]

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[35] ARPA, 2021, H.R. 1319, Pub. L. No. 117-2, 117th Cong., tit. VII, § 7402 (2021).

[36] Consolidated Appropriations Act, 2021, Pub. L. No. 116-260, div. N, tit. IX, § 904(i), 134 Stat. 2130, 2135.

[37] The Treasury Department should require States that provide reimbursement to a provider for offering a low-cost broadband service to low-income households to follow rules established by the FCC for the Emergency Broadband Benefit Program (47 C.F.R. Part P, §§54.1600 *et seq*.) and not adopt additional conditions. The Treasury Department should prohibit States from conditioning the use of support for broadband infrastructure deployment on offering a low-cost, minimal performance service to low-income consumers. As the New Street Report points out, this would limit the number of locations where high-performance service might be deployed. *See* New Street Report at 2 ("Price regulation would materially increase the upfront subsidy and ongoing support costs."). Moreover, it is unduly burdensome to impose the total cost of assisting all low-income customers residing in a new provider's service area on such provider, rather than paying for such cost by spreading it across a wider base, similar to the way FCC universal service fund fees are collected from all providers to support the Lifeline program. In addition, because of network operations have low marginal costs, providers have an incentive to price service to sign up as many consumers as possible. As such, it would be more efficient to address any concerns about adoption by a low-income consumer by providing a direct subsidy to that individual.

VI. THE RULES SHOULD REFRAIN FROM ENCOURAGING GOVERNMENTS TO PRIORITIZE PROVIDING SUPPORT TO CERTAIN TYPES OF PROVIDERS; BUT IF THE FINAL RULES FAVOR CERTAIN TYPES OF PROVIDERS, IT SHOULD INCLUDE PROVIDERS THAT ARE SMALL BUSINESSES

The FR Notice encourages Governments "to prioritize support for broadband networks owned, operated by, or affiliated with local governments, non-profits, and co-operatives – providers with less pressure to turn profits and with a commitment to serving entire communities."[38] The Treasury Department provides no evidence to support prioritizing these entities only and on these grounds alone. Nor does the Treasury Department consider that these "preferred" providers may encounter substantial challenges in building out a network and providing cost-effective service, which experienced private providers may not face and which would offset any advantage these "preferred" providers may have. As such, overly broad and unsupported directives have little value – and may, in fact, be used for purposes that have little to do with closing the digital divide.

ACA Connects view on this issue is derived from the extensive relationships it has with all sorts of providers. We have more than 100 municipal and cooperative broadband providers as members – most associated with municipal utilities, and we both recognize and appreciate the value they bring to their customers and communities. At the same time, we have hundreds of private providers as members – both small and large – that have the same qualities attributed to providers that are municipalities, non-

38 FR Notice at 26806.

profits, and cooperatives. These qualities are not unique to these "preferred" entities, particularly in their commitment to serving entire communities. Many ACA Connects members live and work in the communities they serve and have the same or greater pressures to reach all customers in their communities.

Moreover, private providers know how to deploy broadband infrastructure efficiently – a critical attribute that the Treasury Department should value and should not underestimate how difficult it is to achieve.[39] Further, private providers are committed to providing service throughout their communities over the long term. The Treasury Department should prioritize these qualities as well. We have learned that different types of providers fit different circumstances, and broad generalizations rarely hit the mark.

Should the Treasury Department believe that priorities for certain providers are warranted, it should support its approach with hard evidence. Further, it should consider, if it does adopt priorities, including smaller, experienced broadband providers in the highest level of priority given. From ACA Connects' experience, these smaller providers have demonstrated both the capability to build and operate broadband networks in the best interests of their communities.

[39] There are numerous examples of inexperienced entities receiving government support to build out networks only to learn that building and maintaining a broadband network is more difficult than first expected. These operators typically end up exiting the business by selling the asset to an experienced provider.

VII. THE FINAL RULES SHOULD DIRECT RECIPIENTS TO AWARD SUPPORT FOR BROADBAND DEPLOYMENTS USING AUCTIONS OR, IF NOT, A GRANT PROCESS THAT APPROXIMATES THE EFFICIENCY OF AUCTIONS AND THAT FACILITATES PARTICIPATION BY SMALLER PROVIDERS, ESPECIALLY TO SERVE A LIMITED NUMBER OF LOCATIONS

The IFRs do not provide direction for Governments on how to award support for broadband deployments. Yet, the method by which support is provided can make a great difference in the number of unserved locations that will become served. As ACA Connects and Cartesian found based on an examination of past auctions and grant programs, if auctions are used to award support, because it is a more efficient method, three times more unserved locations would become served than if 100% grants were used. And, when billions of funding is available, that means that millions more unserved locations would get robust, reliable broadband service. In addition, auctions enable participation by smaller providers due to lower upfront fixed costs (versus grant applications) and the ability to obtain support to serve a limited number of locations. Accordingly, ACA Connects urges the Treasury Department to include in the Final Rules a requirement that Governments use auctions to award support for broadband deployments in eligible areas.

Should the Treasury Department not require Governments to use auctions to award support and permit the use of grants, it should at least seek to capture some of the benefits of auctions, such as by directing Governments to prioritize applications that would most cost effectively deploy broadband infrastructure. At the same time, the Treasury Department should recognize that millions of unserved locations – over seven

million according to the ACA Connects Report – are in partially served census blocks. That means, they may be served most cost effectively by proximate existing providers, including by providers targeting a limited number of locations. Thus, ACA Connects recommends the Final Rules direct Governments, in implementing grant programs, to facilitate participation by smaller providers, including by setting-aside funds for proposals to connect a limited number of locations and by providing lower-cost means for smaller operators to apply for funding.

Respectfully submitted,

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July 16, 2021

Addressing Gaps in Broadband Infrastructure Availability and Service Adoption

A Cost Estimation & Prioritization Framework

June 2021

ACA CONNECTS

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Summary

The digital divide is both an availability problem and an adoption problem

Approximately 12M households do not have access to 25/3 Mbps broadband service (the FCC's current definition), and about 30M do not subscribe to such service when it is available

Policymakers can address both broadband needs with funding under discussion

This analysis offers a framework that policymakers can use to help determine the proper allocation of funding to maximize both the availability of robust broadband service and the number of low-income households that subscribe

More ambitious goals require broadband infrastructure funding amounts to be set at higher levels than what has so far been proposed

For example, building future-proof networks to all locations with less than 100/100 Mbps service would cost approximately $106B - $179B

Source: ACA Connects, Cartesian

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U.S. Broadband | Objectives

There is broad agreement among policymakers that we should deploy future-proof networks in unserved areas, and that all Americans should be able to connect to broadband service

"Our mission [is] to address the digital divide. The disparate effects of that divide have been amplified during the COVID-19 pandemic and exposed the **urgency of ensuring universal access to high-speed internet**."

***– Congressman Jim Clyburn** (D-SC)*

"**High-speed broadband is essential in the 21st Century economy**…
Just like rural electrification several generations ago, universal broadband is long overdue and critical to broadly shared economic success."

– JoeBiden.com

"Our country's technological capabilities are revolutionizing the way Americans communicate and work with each other, but many Americans who live in rural communities are being left behind… **it is critical to support efforts to close the digital divide**."

***– Congressman Bob Latta** (R-OH)*

"Congress needs to explore the feasibility of allocating **more resources for broadband deployment to areas that are not economical to serve or to families that have experienced economic hardships** because of the pandemic."

***– Senator Roger Wicker** (R-MS)*

"With the COVID-19 pandemic now plaguing our nation, our urgency to **ensure all Americans have access to affordable, high-speed broadband** internet has only increased."

***– Congressman Frank Pallone** (D-NJ)*

"When we invest in broadband infrastructure, we invest in opportunity for all Americans … we should be able to **bring high-speed internet to every family in America**."

***– Senator Amy Klobuchar** (D-MN)*

Source: klobuchar.senate.gov, joebiden.com, latta.house.gov, energycommerce.house.gov, connectamericansnow.com, ACA Connects, Cartesian

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U.S. Broadband | Key Questions

As policymakers seek to close the digital divide in America, there are three key questions to consider in developing a comprehensive plan for universal broadband availability and adoption

Key Questions

1. **What is the state of broadband service availability and adoption today?**
2. **What would it cost to address both the availability and adoption gaps?**
3. **How can available funds be prioritized in order to make meaningful progress towards both objectives?**

Source: ACA Connects, Cartesian

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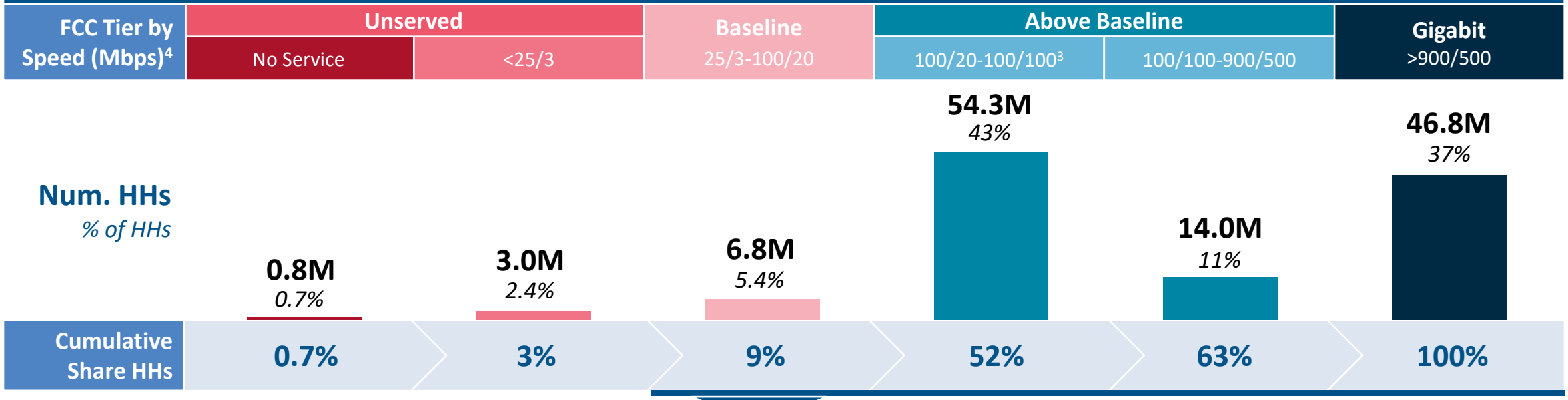
U.S. Broadband | Availability: 2020

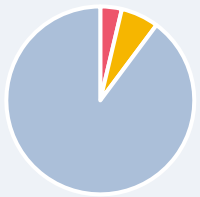
U.S. Households (HH)[1] by Census Block (CB) Max Speed[2] (as of June 2020)

Based on FCC Form 477 Reported Maximum Speeds Available to Each Census Block – Assumes Fully Served Census Blocks



Unserved Households in Partially Served Census Blocks

There are an additional estimated **8.2M households** in census blocks that are reported as 'served'[5] that do not have broadband service available



12M Total HHs without 25/3 Mbps

Accounting for partially served census blocks, an estimated 12M households nationwide do not have access to 25/3 Mbps service

1 Includes all households in the U.S., irrespective of federal or state subsidy status (e.g., including 5.2M locations recently awarded funding through the Rural Digital Opportunity Fund (RDOF))
2 Based on FCC Form 477 data that considers all households in a census block to have access to a given speed tier if any household in the block has access to that speed
3 95% of the 100/20 – 100/100 Mbps group have gigabit or near-gigabit download speeds but below 100 Mbps upload speeds, as a result of being served by cable
4 Speed tiers include all households passed by at least the bottom of the range (i.e., inclusive) without access to the speed at the top of the range (i.e., exclusive)
5 Reflects known issue in FCC Form 477 reporting where a census block is reported with a given speed if a single household in the block is served with that speed, estimated from a BroadbandNow study (see appendix)
Source: FCC Form 477 June 2020 (Apr 7 2021 release), U.S. Census, BroadbandNow, ACA Connects, Cartesian

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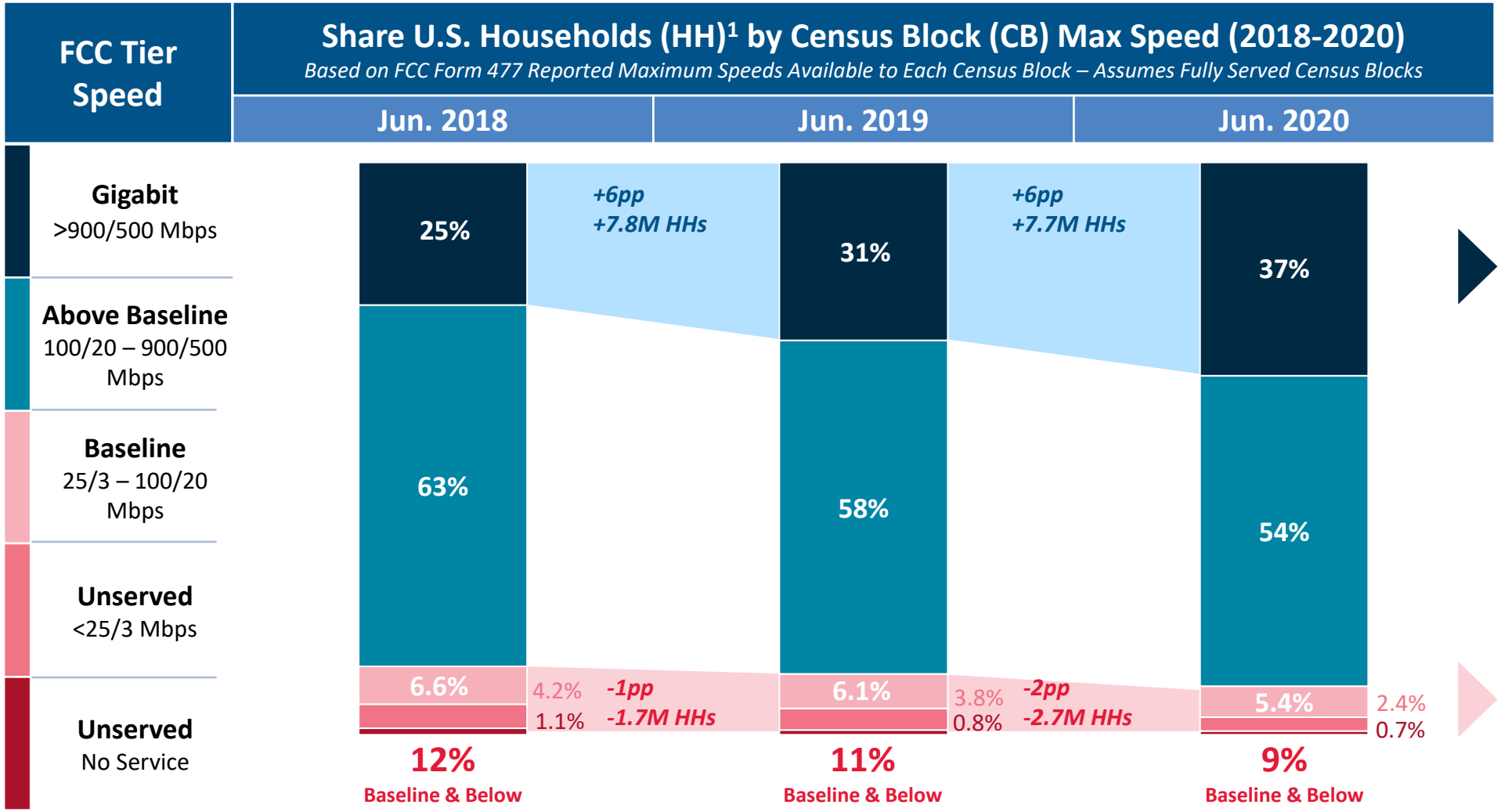
U.S. Broadband | Availability: 2018-2020

Gigabit availability has increased, but many areas continue to have only baseline and below service options



Significant Growth in Gigabit Service

- Gigabit availability has increased by 50% since 2018 as competition drives network upgrades
- Approximately 90% of this growth comes from households that previously had access to above-baseline service

Minimal Reduction in Baseline & Below

- Recent investment has missed the unserved – availability of baseline and below service declined by just 3 percentage points since 2018
- Market forces alone seem unlikely to deliver gigabit service to these areas

Note: pp = percentage points
1 Includes all households, irrespective of state or federal funding status (e.g., includes those recently assigned RDOF funding), does not consider partially served CBs, and reflects share of 2020 households for each year to enable consistent comparison between years
Source: FCC Form 477 June 2020 (Apr 7 2021 release), U.S. Census, ACA Connects, Cartesian

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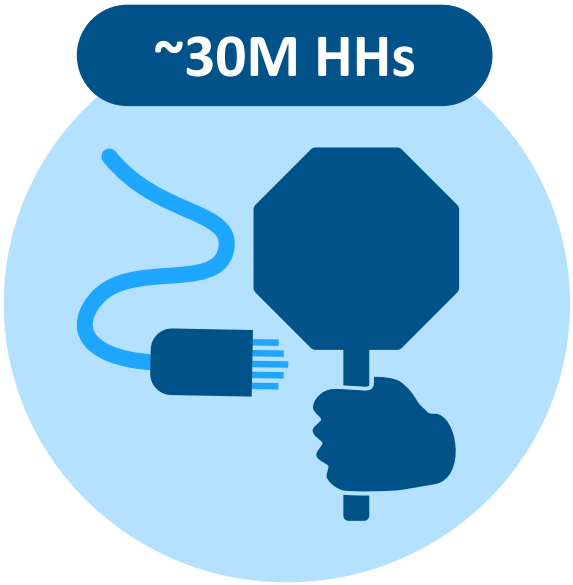
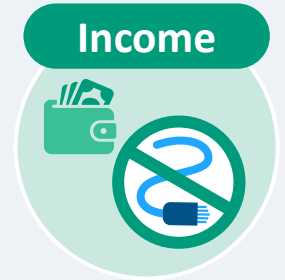
U.S. Broadband | Adoption

Affordability is a significant barrier for lower-income households to adopt fixed broadband



An estimated **30 million households** do not subscribe to fixed broadband at home for "reasons other than network availability"[1]

— National Urban League

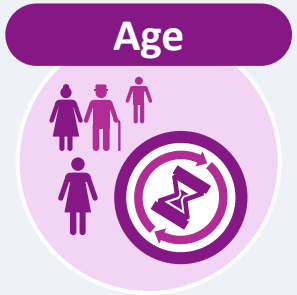


Household income is highly correlated with internet adoption – **36% of all households without a fixed broadband connection make below $20K/year, and 14% make above $75K/year[3]**

— American Community Survey (ACS) 2019[3]

Broadband adoption is a concern in both rural and non-rural areas – **29% of rural homes and 28% of non-rural homes do not subscribe** to fixed broadband when it is available[4]

— Cartesian Analysis of 2019 ACS[3] and Census Data



Age does not seem to be correlated with broadband adoption – **adoption is approximately 28% in areas with and without higher proportions of senior citizens** (i.e., age 65+)[5]

— Cartesian Analysis of 2019 ACS[3] and Census Data

In addition to affordability, studies suggest that digital readiness and perceived lack of relevance are also barriers to broadband adoption[6]

1 Approximation from the National Urban League, which assumes that 80-90% of ACS' 36M non-adoption households have access to at least one available fixed terrestrial service. NUL approximation is based on American Community Survey tally of households with "broadband such as cable, fiber optic or DSL" – this excludes households whose only connectivity is through a mobile provider, but may include a small number of households with a sub-25/3 connection (refer to appendix for further detail)
2 The federal poverty line for a 3-person household in 2020 was $21,720 | 3 Based on American Community Survey 2019 5-year rolling average estimate of households without access to home internet through any technology (e.g., fixed broadband, mobile, satellite, etc.)
4 Around 10% of total households subscribe only to a cellular data plan, which provides some connectivity but is unsuitable for many of the use cases enabled by fixed broadband
5 Higher 65+ population = at least 25% of the census block group as 65+ (see appendix) | 6 Based on the Lewis Latimer Plan For Digital Equity And Inclusion, published by the National Urban League
Source: FCC Form 477 June 2020 (Apr 7 2021 release), American Community Survey 2019 5-year Estimates, Pew Research Center, National Urban League Lewis Latimer Report, ACA Connects, Cartesian

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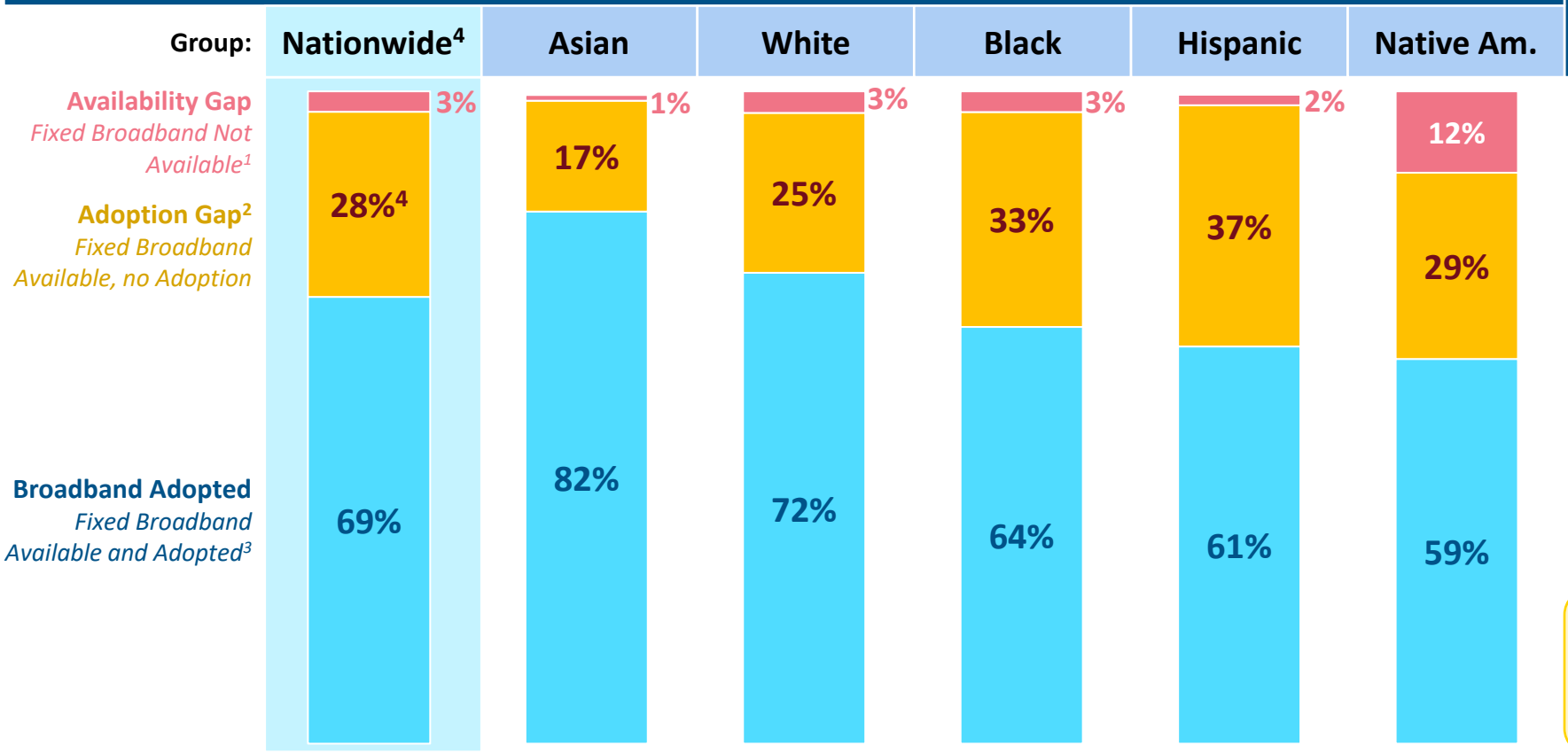
The Digital Divide | Availability, Adoption, Demographics

More households don't subscribe to broadband than don't have it available – availability and adoption both need to be addressed in order to close the digital divide

Broadband Availability and Adoption by Demographic (Approximate)



Notes

Minimal Availability Gap:

- Across all groups except Native Americans, broadband[1] is available to 97%+ of HHs
- This does not account for partially served census blocks, which may represent an additional ~6.5% of U.S. households

Sizeable Adoption Gap:

- There is a gap in broadband adoption across all populations – Hispanic and Black populations have the largest adoption gap
- While **about one third** of households without a fixed broadband connection have mobile connectivity, this is insufficient for some use cases (e.g., remote learning)[5]

Accounting for partially served census blocks, there may be ~2x as many households that don't subscribe to broadband when it's available (22%) than don't have access (10%)

1 Based on availability data from Form 477 of households with access to speeds of at least 25/3 Mbps – availability by demographic is estimated based on demographic and geographic distribution data from Experian
2 Defined as the share of population with broadband available minus the share of population that subscribe to broadband | 3 From a National Urban League report on the share of each demographic with fixed broadband at home based on ACS data. Nationwide data also uses ACS estimates of households with "broadband such as cable, fiber optic or DSL" – this excludes households whose only connectivity is through mobile, but may include a small number of households with a sub-25/3 connection
4 Nationwide average adoption gap implies 34M households that choose not to subscribe to broadband – this is slightly different to National Urban League estimate of 29-32M households as a result of slight differences in methodology
5 Of total U.S. households, ~10% have an internet connection through mobile only – this group is approximately one third of the 28% that do not subscribe to fixed broadband
Source: FCC Form 477 June 2020 (Apr 7 2021 release), Experian, National Urban League, ACA Connects, Cartesian

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ACA Connects Broadband Study | Most Recent, Comprehensive Assessment

Our study uses the most recent data and comprehensive analysis for gigabit deployment cost assessment

2016	2018	2019	2021
Paul de Sa FCC Office of Strategic Planning & Policy Analysis	**Jim Stegeman**[1] CQA	Fiber Broadband Association Cartesian®	ACA CONNECTS Cartesian®
Where prior studies fall short in determining gig availability costs for 2021			***Latest data, most comprehensive***
• Uses outdated (2015) data *(14% of locations were <25/3 Mbps, vs 3% now)* • Only estimates costs to deploy fiber to areas with service below 25/3 Mbps	• Uses outdated (2016 A-CAM) cost estimates • Only estimates costs to deploy fiber to areas with broadband service below 25/3 Mbps	• Uses outdated (December 2017) deployment data • Model only evaluated costs for 90% of U.S. households • Government support amounts assume a high level of private sector investment over a ten-year period (i.e., does not consider minimum support needed to incentivize deployment)	✓ Uses latest data (June 2020) ✓ Incorporates estimates for businesses, anchor institutions, and partially served census blocks and adoption subsidies ✓ Estimates deployment costs[2] for all locations across multiple deployment scenarios (e.g., all locations with <25/3 Mbps service, <100/20 Mbps, etc.)

1 In a webinar titled "Rural Broadband Economics: A Review of Rural Subsides", sponsored by USTelecom and NTCA – The Rural Broadband Association. CostQuest created the cost model used to determine broadband deployment costs for CAF program
2 Our high-end cost estimates use the density-based FTTH cost model derived in the 2019 FBA study, which was based on data collected on historical fiber deployments
Source: Fiber Broadband Association, USTelecom, NTCA, FCC Office of Strategic Planning and Policy Analysis, ACA Connects, Cartesian

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Estimated Costs | Gigabit Deployment

There are three categories of locations that require funding to ensure gigabit is available to all Americans – for each category, we estimate a range of costs to make gigabit available

Location-Based Cost Model Estimation[1]	We estimate a gigabit deployment cost range for each of the location categories below: • **Low end**: Based on winning gigabit bids in the RDOF auction, which estimates the minimum government support needed to incentivize deployment using a reverse auction • **High end**: Full fiber deployment costs based upon actual builds, which estimates the maximum possible support amount, should subsidies for the full cost be needed
 **Unfunded, Unserved Census Blocks**	The cost to provide access to gigabit to all locations – households/housing units, businesses, and anchor institutions – in unserved census blocks that are not currently receiving funding under RDOF or other FCC programs
 **Partially Served Census Blocks[2]**	The cost to provide gigabit to unserved households in census blocks that are reported as served due to a known FCC reporting issue[2]
 **Unserved Areas Receiving Sub-Gigabit FCC Funding[3]**	The cost to provide gigabit to households and businesses in unserved census blocks that are currently receiving funding under FCC programs (i.e., ROR, ACAM, and CAF Phase II Auction) – most of these programs do not require the provision of speeds above 25/3 Mbps and therefore may require supplemental funding

1 Cost assessment is based on model that relies on household density, agnostic of proximity to existing infrastructure – see page 21 in appendix for more detail
2 Reflects known reporting issue in FCC Form 477 data that counts a census block as 'served' with a given speed if any household in that census block is able to purchase that speed – estimates based on a 2021 study from BroadbandNow measuring the extent of this issue
3 Excludes areas that were funded under RDOF, because FCC review of longform applications is still ongoing
Source: ACA Connects, Cartesian

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Estimated Costs | Gigabit Deployment

Estimated deployment costs increase as the 'unserved' threshold increases to higher levels of service

Cumulative Costs to Fund Gigabit for:	All Locations[1] with **<25/3 Mbps** *Current FCC Definition of Broadband*	All Locations[1] with **<100/20 Mbps** *RDOF "Above Baseline" Threshold*	All Locations[1] with **<100/100 Mbps** *LIFT Act Proposed Threshold*	All Locations[1] with **<Gigabit[2]** *RDOF Gigabit Threshold*
Unfunded, Unserved Census Blocks[3]	$4B – $7B *2.2M locations*	$16B – $31B *8.8M locations*	$91B – $150B *75M locations*	$103B – $170B *91M locations*
+ **Partially Served Census Blocks[4]**	$14B – $25B *7.7M locations*	$13B – $24B *7.4M locations*	$7B – $12B *3.9M locations*	$5B – $10B *3.0M locations*
+ **Unserved Areas Receiving Sub-Gbps FCC Funding[5]**	$3B – $5B *1.0M locations*	$6B – $12B *2.3M locations*	$8B – $17B *3.7M locations*	$9B – $18B *5.0M locations*
= **Total** *(Cumulative)*	**$20B – $37B** ***11M locations***	**$35B – $67B** ***19M locations***	**$106B – $179B** ***82M locations***	**$117B – $198B** ***99M locations***

The cost to build to all locations <100/100 Mbps is ~90% the cost of building to all locations <gigabit. In most cases, locations with at least 100/100 Mbps available already have fiber available, and upgrades to provide gigabit (i.e., upgrades to electronics) are significantly less expensive than laying new fiber

Note: Range reflects an approximate subsidy amount based on historical gigabit support amounts awarded in RDOF at the low end, and an approximate fiber build cost at the high end. Both estimates are based on household densities, and costs for both the low end and high end are approximated at 10% of density-based costs in cases where fiber is available, but speeds listed are below gigabit (typically due to constraints that are less expensive to mitigate than laying new fiber, such as upgrading electronics)

1 Not including areas that received funding under RDOF Phase I, as nearly all locations were bid at 100/20 Mbps or Gigabit speeds | 2 Reflects speeds of below 900/500 Mbps | 3 Including household locations, businesses, and anchor institutions – see appendix for methodology

4 Based on a study that estimated unserved households by BroadbandNow – see appendix for methodology. As the threshold increases, the number of potentially unserved households that are missed in other funding categories decreases

5 Including locations previously receiving ACAM, ROR, or CAF II auction funding but excluding RDOF since FCC review of longform applications is currently ongoing – see appendix for cost assessment methodology

Source: FCC Form 477 June 2020 (Apr 7 2021 release), U.S. Census, ACA Connects, Cartesian

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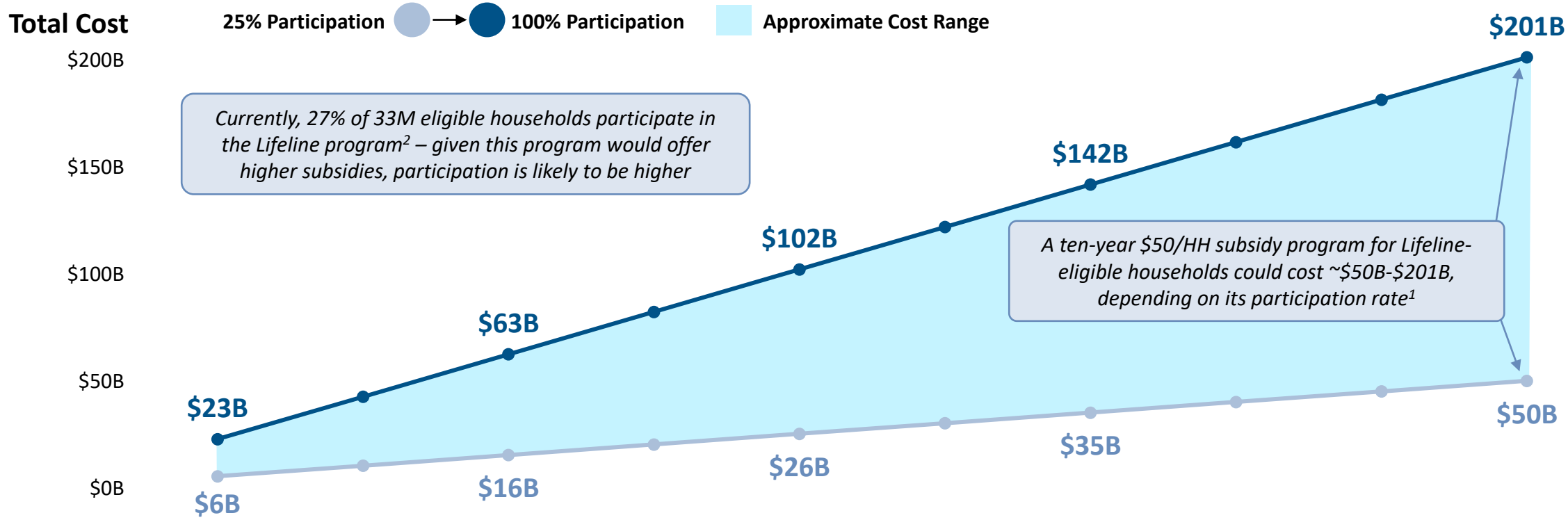
Estimated Costs | Broadband Adoption

Estimated adoption subsidy costs increase as program participation rate and duration increase

Broadband Adoption Cost[1] by Program Participation Rate and Duration										
Duration (Years):	1	2	3	4	5	6	7	8	9	10



1 Based on estimated 33 million households that are currently eligible for the Lifeline program, and $50/mo broadband subsidy plus $100 one-time connected device subsidy
2 From program data on USAC.org (accessed May 2021)
Source: USAC, ACA Connects, Cartesian

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Estimated Costs | Fully Fund Gigabit Availability & Broadband Adoption

With **$400B**, policymakers could ensure full gigabit availability and fund an extended adoption program

Full Gigabit Availability		Full Broadband Adoption		Grand Total
$117B - $198B	+	**$50B - $201B**	=	**$167B - $399B**
ENSURE EVERY HOUSEHOLD, BUSINESS, AND INSTITUTION HAS GIGABIT SPEED BROADBAND AVAILABLE[1]		OFFER HIGH-SPEED BROADBAND SUBSIDIES TO EVERY LOW-INCOME FAMILY FOR 10 YEARS		ALL-IN ESTIMATED COST OF FULLY FUNDING GIGABIT AVAILABILITY AND BROADBAND ADOPTION

1 Not including locations in areas that were assigned RDOF support, where winning providers are mandated to begin offering 100/20 Mbps+ or gigabit service in almost all areas by 2030
Source: ACA Connects, Cartesian

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Prioritizing Broadband Funding

Given the finite – albeit substantial – funding available, how might policymakers set priorities?

Funding Goal: ***Maximize the number of Americans that can access essential digital resources***

Key Questions: How should funding be allocated between programs to address the availability and adoption gaps?

1 Availability Gap

- What threshold should constitute 'unserved' areas that are prioritized for funding?
- What mechanisms[1] should be utilized to allocate funds?
- How should new deployment program(s) coordinate with existing federal and state programs?

2 Adoption Gap

- What households should be eligible for support?
- What per-month subsidy amount should be provided to each eligible household?
- How many eligible households are likely to participate in the program?
- How long should the program last?

1 E.g., Reverse auctions (as seen in RDOF Phase I) prioritize providers that can connect locations the most cheaply, resulting in a subsidy-efficient mix of new builds and upgrade to existing networks

Source: ACA Connects, Cartesian

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Example Funding Approach | Cost Assessment

For **$61B-$118B**, the U.S. could make gigabit available to 19M locations with less than 100/20 Mbps service and substantially increase broadband adoption

Availability

Ensure that the U.S. has adequate infrastructure to enable all households, businesses, and anchor institutions to access speeds of at least 100/20 Mbps

Unfunded, Price Cap Areas[1]

Unfunded, Unserved CBs
All locations in census blocks reported as not receiving 100/20 Mbps service
$16B-$31B
8.8M locations

Partially Served CBs[2]
Households lacking 100/20 Mbps service, in census blocks reported as receiving such service
$13B-$24B
7.4M locations

Areas Receiving Sub-Gigabit FCC Funding[1]

ROR/ACAM
All locations in ROR/ACAM census blocks that lack access to 100/20 Mbps service
$4.4B-$9.1B
1.8M locations

CAF II Auction
All locations in CAF II auction census blocks that lack access to 100/20 Mbps service
$1.4B-$2.9B
522K locations

$35B-$67B, 19M Locations

Adoption

Provide support to low-income households to increase broadband adoption rates

Low-Income Household Broadband Subsidy[3]
5-year subsidy program for Lifeline-eligible households, 25-50% adoption rate
$26B-$51B
8.3M-17M HHs

$26B-$51B

Total Cost of $61B-$118B to Ensure Available, Affordable High-Speed Broadband

1 Not including areas that received funding under RDOF Phase I Auction, as nearly all locations were won at 100/20 Mbps or greater
2 Estimate based on a study by BroadbandNow – data from the FCC around broadband availability will be needed to more precisely assess the number of households impacted by partially served CBs
3 Includes $50/month service subsidy and $100 one-time connected device subsidy for participating households
Source: FCC Form 477 June 2020 (Apr 7 2021 release), U.S. Census, BroadbandNow, ACA Connects, Cartesian

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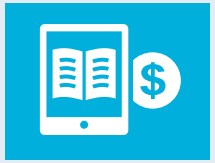
Other Broadband-Related Initiatives

Additional broadband-related initiatives are competing with broadband deployment and adoption programs for limited infrastructure funding

Digital Equity & Inclusion[1]
Investments in digital inclusion initiatives aimed at historically under-connected communities

~$1B



Additional E-Rate Support[2]
Expansion of existing E-Rate funding program to provide support for connectivity and connected devices

~$3B

School Bus WiFi Support[2]
Outfitting school buses for connectivity for commuting students

~$1B

Next-Gen 911[1]
Completion of the transition of all 911 systems from analog to IP-based systems

~$15B

Low Interest Deployment Financing[1]
Provide below market debt financing to accelerate deployments

~$5B

Network Backup Generators[3]
Redundancies to keep Americans connected through climate-related environmental contingencies

~$2.3B

Climate Resilience for New Builds[3]
Funding for new deployments to ensure resilience to climate events (e.g., floods, wildfires, hurricanes)

~$6-10B

Sustainability Incentives[3]
Incentive programs to provide add'l funding for sustainable new builds (e.g., sourcing sustainable materials)

~$4-7B

+ Additional sustainability objectives:

- Installing renewable energy sources to power infrastructure
- Incorporating sustainable materials and processes in network upgrades
- And more…

Education

Environment & Sustainability

Community Investments

1 Cost estimates are as quoted in the LIFT Act legislation – remaining estimates explained in appendix (page 29) | 2 Programs enumerated in the Accessible, Affordable Internet for All Act | 3 Programs enumerated in the GREEN Communications Act (S. 1506)
Source: LIFT Act, Accessible Affordable Internet for All Act, GREEN Communications Act (S. 1506), ACA Connects, Cartesian

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Conclusion

The digital divide is both an availability problem and an adoption problem

Policymakers can address both broadband needs with funding under discussion

More ambitious goals require broadband infrastructure funding amounts to be set at higher levels than what has so far been proposed

See appendix for additional material documenting approaches, calculation methodologies, and supplemental detail

Appendix

Cost Assessment Methodology

Additional Availability & Adoption Analyses

Cost Assessment Methodology & Example Funding Approach Overview

Estimation methods for each cost item of the example funding approach outlined below are explained in further detail in this section

Item in Example Funding Approach	Methodology Summary	Cost Estimate	Pages
Unfunded, Unserved Census Blocks *All locations in census blocks reported as not receiving 100/20 Mbps service*	Estimate household and business counts using Census and FCC data, anchor institutions using Experian and USAF data, and apply cost model framework	**$16B-$31B** *8.8M locations* ($)	22-25
Partially Served Census Blocks *Households lacking 100/20 Mbps service, in CBs reported as receiving such service*	Derive estimate of unserved locations in CBs reported to have service based on FCC and BroadbandNow data and apply average costs from cost model framework	**$13B-$24B** *7.4M locations*	26
ROR/ACAM *All locations in ROR/ACAM census blocks that lack access to 100/20 Mbps service*	Map reported ROR/ACAM-supported locations against FCC Form 477 deployment data and apply cost model framework to remaining unserved census blocks	**$4.4B-$9.1B** *1.8M locations* ($)	27
CAF II Auction *All locations in CAF II Auction census blocks that lack access to 100/20 Mbps service*	Map reported CAF II-supported locations against FCC deployment and apply cost model framework to remaining unserved census blocks	**$1.4B-$2.9B** *522K locations* ($)	
Low-Income Household Broadband Subsidy *5-year subsidy program for Lifeline-eligible households, 25-50% adoption rate*	Model total cost of subsidy based on Lifeline adoption rates, program duration, and stipulated subsidy amounts	**$26B-$51B** *8.3M-17M HHs*	28

($) **Uses location-based cost model estimation explained on page 21**

Source: ACA Connects, Cartesian

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Location-Based Cost Model Estimation

We used RDOF auction funding data and a full FTTH deployment model to establish low- and high-end gigabit deployment cost estimates

Gigabit Deployment Cost Estimation

Approximates range of cost to provide gigabit (i.e., future-proof speeds) to all 'unserved' locations, where 'unserved' threshold varies based on the scenario modeled

Low End: RDOF Auction-Based Gigabit Subsidy Estimates

Use data from the recent RDOF (904) auction around funding per location to predict minimum funds needed to incentivize deployment

We examined the results of the RDOF allocation auction (904):

Winning subsidy per location for each census block to receive gigabit

Assessment of the relationship between HH density and auction subsidies

We used the relationship between HH density and cost to predict support costs associated with new census blocks:

Density Range (HHs/mi²)	Support per Location
1 – 10	$2.7K
10 – 100	$1.4K
100 – 1000	$1.1K
1000 – 10000	$732
10000+	$635

Support = $3,449 - $845 * $\log_{10}$(Density)

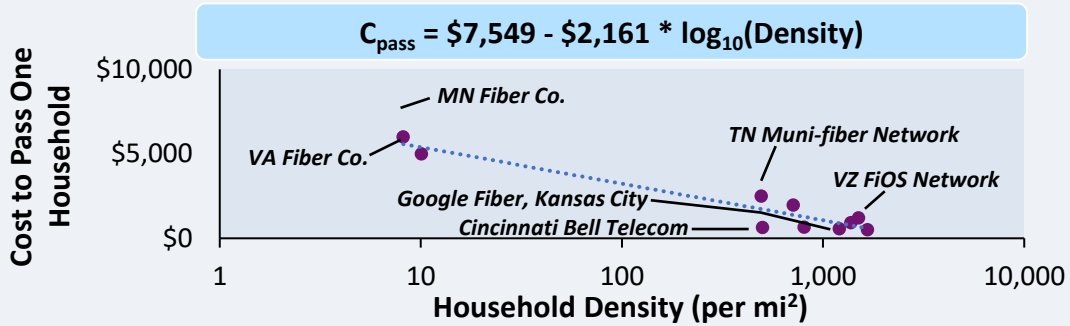
High End: FTTH Build Cost Estimates

Use density-based modeling around cost of fiber to the home deployment to estimate full fiber build costs

FTTH build costs are a good high-end estimate:

- FTTH is currently the only commercially available technology capable of delivering gigabit (i.e., >900/500 Mbps)
- Cost estimates capture the maximum possible support amount, should subsidies for the full build cost be needed to incentivize deployment

We estimate the cost to pass a household with fiber based on the density of that household's surrounding area:[1]



1 Deployment data and analysis conducted in a 2019 Cartesian/Fiber Broadband Association study estimating the cost of increasing fiber deployment in the United States

Note: Locations already served with fiber that have at least 50 Mbps upload have a cheaper upgrade path to gigabit than other technologies – costs in these areas were estimated to be 10% of our model predictions, since existing fiber infrastructure generally removes the need for new pipes, and instead only requires upgrades to electronics

Source: FBA, FCC, ACA Connects, Cartesian

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Unfunded, Unserved Census Blocks

Locations in Unfunded, Unserved CBs

We identified unserved census blocks and calculated a range of estimated gigabit deployment costs

Identify Applicable Census Blocks

- **Exclude Previously Funded Census Blocks**
  Remove census blocks that received funding through existing FCC programs (i.e., ROR, ACAM, RDOF, CAF Phase II Auction) in order to prioritize blocks that have not yet been allocated FCC support

Identify Census Blocks that Are Unserved

- **Exclude Geostationary Satellite Providers**
  Geostationary satellite internet has lower capacity with higher latency, and is therefore insufficient for many critical internet use cases (e.g., video conferencing)
- **Identify Maximum Available Speeds**
  Use FCC Form 477 data (June 2020) to identify reported maximum speeds to each census block
- **Group Census Blocks According to Available Speeds**
  Identify which census blocks are unserved, e.g., with less than 100/20 Mbps speeds available

Identify Households, Businesses, Anchor Institutions

- **Locations within Unfunded Unserved Census Blocks**
  Estimate total locations in each category using various data sources:

Households
Append 2010-2020 U.S. Census Data to census blocks that were unfunded or unserved

Businesses
Estimate based on a ratio of RDOF-supported businesses to household locations

Anchor Institutions
Identify unfunded anchor institutions using Experian and published FCC E-Rate recipients

Source: FCC Form 477 June 2020 (Apr 7 2021 release), U.S. Census, ACA Connects, Cartesian

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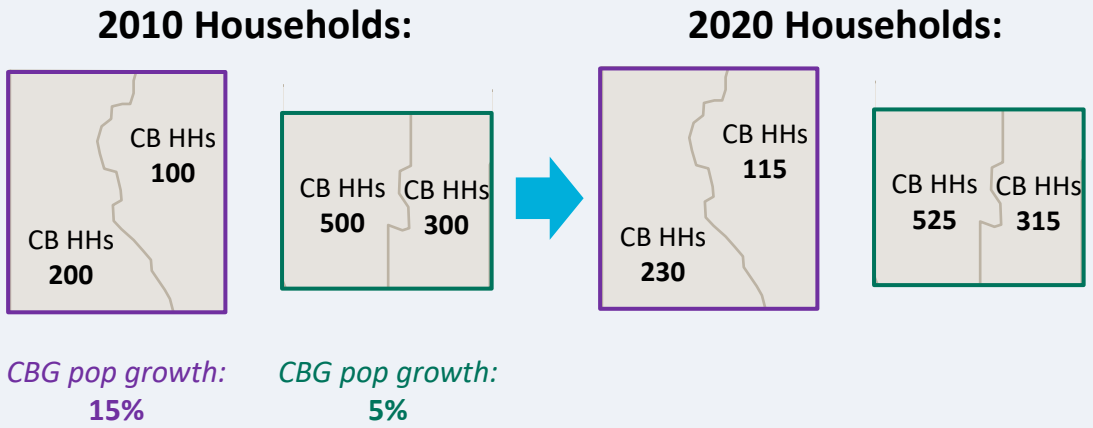
Household Location Tabulation

Locations in Unfunded, Unserved CBs

We estimate households per census block using 2020 census block group level population

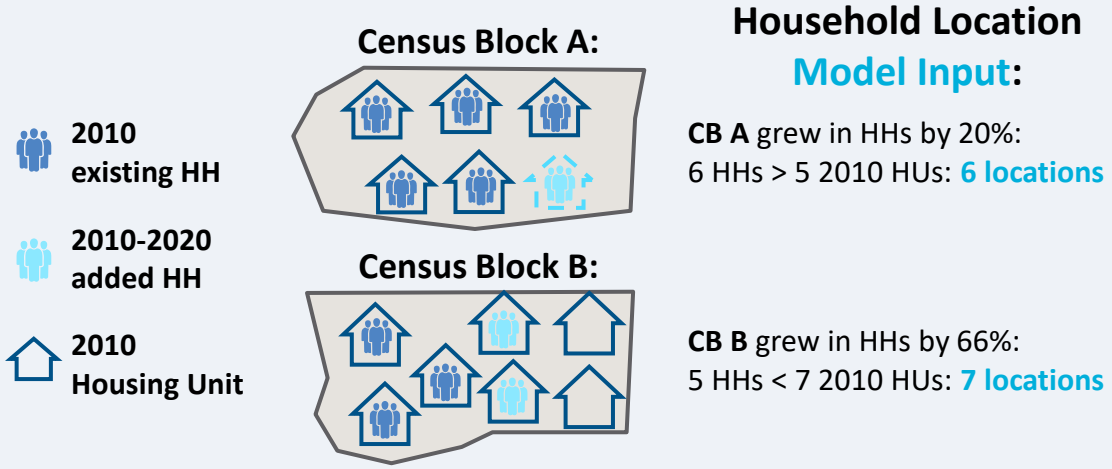
2020 Household Estimation

- **Data Limitations:** At the time this report was created, 2020 census block-level tabulations were unavailable
- **Population Growth**: To approximate 2020 households, we obtained block-group-level 2010-2020 population growth rates from the American Community Survey (via Experian) and applied them to all blocks in each group



Final Household Location Determination

- **Choosing Housing Units or Households**: We use the greater of 2010 housing units or 2020 households per census block to ensure that housing stock with no residents would not be unfairly excluded from our cost model



Estimated Costs to Connect Unserved, Unfunded Households

7.4M UNSERVED, UNFUNDED HOUSEHOLDS <100/20 MBPS → *Location-Based Cost Model* → $14B - $27B

Source: Cartesian, U.S. Census, Experian

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Unserved Businesses

Locations in Unfunded, Unserved CBs

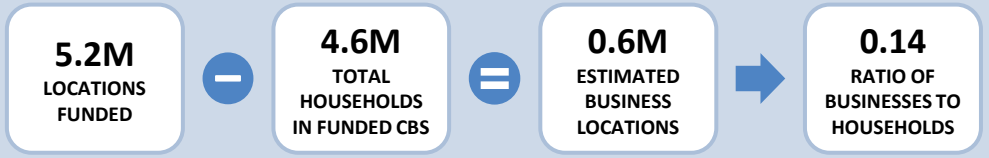
We used the ratio of households to businesses from the RDOF auction to approximate business locations

Calculate RDOF Business to Household Ratio

We approximated the ratio between households and business locations included as part of the RDOF auction

- **Identified Locations for Funded Census Blocks:** Using the FCC RDOF Dashboard, we found all census blocks that received support, and the corresponding number of locations
- **Assessed Households in Each Census Block:** For each census block, we identified the number of households associated with the census block using U.S. census data
- **Inferred Difference as Business Locations:** We subtracted the number of households in these census blocks from number of locations – remaining locations should correspond to businesses

Estimated Business Locations in RDOF (904) Auction:

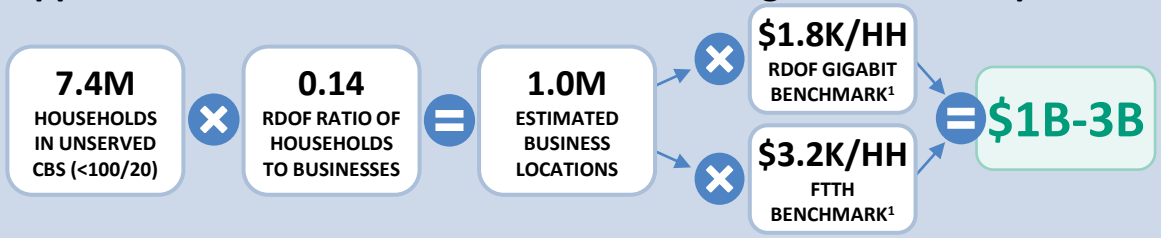


Approximate Businesses in Prioritized Census Blocks

We used this ratio from the RDOF auction to approximate the number of businesses in prioritized unserved census blocks

- **Identified Unserved Households:** Using Form 477, we identified all 'unserved' census blocks, and calculated the number of households in these census blocks
- **Applied Previous RDOF Business Ratio:** We applied the previous RDOF household-to-business ratio to approximate the total businesses that would also require funding in that area
- **Approximated Range of Costs:** We estimated a range of costs associated with gigabit deployment using the average gigabit RDOF award per location (low end), and average fiber deployment cost per location (high end)

Approximate Business Locations and Costs, E.g., <100/20 Mbps:



1 Derived from costs associated with median density of populated census blocks using the location-based cost model

Source: FCC Form 477 June 2020 (Apr 7 2021 release), U.S. Census, AT&T, ACA Connects, Cartesian

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Anchor Institutions Cost Methodology

Locations in Unfunded, Unserved CBs

We identified anchor institutions without service, eliminating any with existing funding

Anchor Institutions

We identified all anchor institutions using Experian SIC and NAICS codes across the US:

- ***Educational Services*** *(320K)*
- ***Hospitals*** *(33K)*
- ***Museums*** *(375K)*
- ***Justice and Safety Activities*** *(79K)*
- ***Religious*** *(351K)*

Identify Unserved (E.g., <100/20 Mbps in Example Below)

818K
Total anchor Institutions

We then removed anchor institutions with sufficient service or those receiving funding through E-Rate:

− **112K**
Previously Funded

E-Rate Funded Institutions:
We removed all institutions that are receiving E-Rate support through other programs

− **321K**
Institutions with 100/20 Mbps+ service

Already 'Served' Institutions:
We removed all institutions in census block groups where service is already available (e.g., >100/20 Mbps)[1]

= **384K**
Remaining anchor Institutions

Unserved Institutions:
Remaining anchor institutions without access to service at the speed threshold (e.g., <100/20 Mbps service)

Estimated Costs to Connect Unserved, Unfunded Anchor Institutions (E.g., <100/20):

384K
Unserved, Unfunded Anchor Institutions

→ *Location-Based Cost Model*

$252M - $436M

1 Anchor institution totals estimated at the CBG level and assigned the lowest speed of any CB in the group.
Source: FCC Form 477 June 2020 (Apr 7 2021 release), U.S. Census, Cartesian

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Unserved Households in Partially Served CBs

There are additional households lacking service in 'served' census blocks due to a reporting limitation

Form 477 Methodology Limitation

Form 477 is known to systematically overstate broadband availability:

- Form 477 does not ask ISPs to report location-level service availability
- If an ISP serves at least one household in a census block, they simply report that the census block is served
- As a result, some census blocks are only ***'partially served'***, with some households in the block having either:
  - A Slower Speeds Than Reported
  - B No Service at All
- Most historical broadband funding programs, including CAF II and RDOF, have determined eligibility at the census block level, thereby withholding funding for households in partially served census blocks

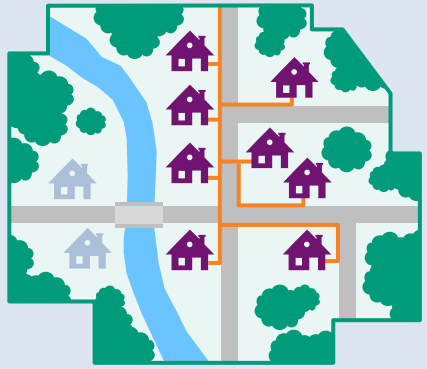
This limitation has been widely acknowledged:

"There's strong evidence…that the percentage of Americans without broadband access is much higher than the figures reported by the FCC."
— John Kahan, Chief Data Analytics Officer, Microsoft

Households in partially served census blocks should be identified and included in future broadband programs

Calculate Households in Partially Served Census Blocks

Illustrative Example of Partially Served 10 Household Census Block



Form 477 would suggest the ISP in this census block serves all 10 households

20% do not have any internet

ESTIMATION METHODOLOGY FOR HOUSEHOLDS IN PARTIALLY SERVED CBS

(E.G., BELOW 100/20 MBPS ESTIMATE)

There is no precise data on the number of households in partially served census blocks – we approximate based on the results of a recent study:[1]

6.7%[1] HHS LISTED AS SERVED THAT ARE NOT × **110.7M** US HHs WITH AT LEAST 100/20 SERVICE, EXCL PREVIOUSLY FUNDED[2] = **7.4M** HOUSEHOLDS IMPACTED × **$1.8K/HH** RDOF GIGABIT BENCHMARK[3] or × **$3.2K/HH** FTTH BENCHMARK[3] = **$13B - $24B**

This estimate assumes a similar distribution of households in partially served census blocks throughout the country, regardless of speeds available to the census block

1 Based on BroadbandNow study that sampled serviceability for 11.6k households and compared to Form 477 data – several assumptions in that study were conservative, including the assumption that smaller providers for which serviceability was not validated always provided Form 477 advertised speeds. Study found that ~6.5% of additional U.S. households are unserved, in addition to those that the FCC reports – these households are all concentrated in areas the FCC reports as having 25/3 Mbps+, which implies that 6.7% of 'served' households are not
2 Based on Cartesian analysis of U.S. households in Census Bureau data (see page 23) | 3 Derived from costs associated with median density of populated census blocks using the location-based cost model
Source: Cartesian, FCC Form 477 June 2020 (Apr 7 2021 release), Microsoft, BroadbandNow Research: 'FCC Reports Broadband Unavailable to 21.3 Million Americans, BroadbandNow Study Indicates 42 Million Do Not Have Access'

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Areas Receiving Sub-Gigabit FCC Funding

Unserved ROR/ACAM, CAF Phase II Locations

We modeled the cost of providing gigabit to unserved census blocks that are currently receiving funding under FCC programs – these programs may require supplemental funding to provide gigabit

Subsidy Program	ROR/ACAM	CAF PHASE II AUCTION
Timeframe	2017-2026	2018-2028
Methodology	Identified census blocks that were part of each FCC-funded program, and applied the location-based cost model to those below the 'unserved' threshold	
Estimated Costs to Connect (e.g., <100/20 Mbps)	5.8M TOTAL HH − 4.2M HHs WITH 100/20+ = 1.6M UNSERVED HHs × .14x BUSINESS TO HH RATIO = 217K UNSERVED BUSINESSES	617K TOTAL HH − 158K HHs WITH 100/20+ = 458K UNSERVED HHs × .14x BUSINESS TO HH RATIO = 64K UNSERVED BUSINESSES
	Location-Based Cost Model: $4.1B - $8.5B	*Location-Based Cost Model*: $1.3B - $2.7B
	$1.8K/HH RDOF GBPS BENCHMARK × $3.2K/HH FTTH BENCHMARK = $380M - $695M	$1.8K/HH RDOF GBPS BENCHMARK × $3.2K/HH FTTH BENCHMARK = $112M - $205M
	$4.4B - $9.1B	$1.4B - $2.9B

Source: FCC, Form 477 June 2020 (Apr 7 2021 release), USAC, U.S. Census, Cartesian

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Broadband Adoption Subsidy Estimated Costs

Low-Income Household Broadband Subsidy

With 25-50% participation, 5-year subsidies for broadband and connected devices would cost $26B-$51B

Program Participation Rate	Program Duration: 1 Year	2 Years	3 Years	5 Years	10 Years
10%	$2.3B	$4.3B	$6.3B	$10.2B	$20.1B
25%	$5.8B	$10.7B	$15.7B	$25.6B	$50.3B
50%	$11.6B	$21.5B	$31.4B	$51.2B	$100.7B
75%	$17.3B	$32.2B	$47.0B	$76.7B	$151.0B
100%	$23.1B	$42.9B	$62.7B	$102.3B	$201.3B

- Program cost[1] includes a $50/month broadband subsidy and $100 one-time connected device credit per participating household
- Overall cost is dependent on participation rate and program duration

- 27% of eligible households participate in the Lifeline program[2] – given this program would offer higher subsidies, adoption may be even higher

Low Cost → High Cost

1 Based on estimated 33 million households that are currently eligible for the Lifeline program, and $50/mo broadband subsidy plus $100 one-time connected device subsidy
2 From program data on USAC.org
Source: FCC Form 477 June 2020 (Apr 7 2021 release), U.S. Census, ACA Connects, USAC, Cartesian

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Costs Associated with Broadband-Related Initiatives

Other Broadband-Related Initiatives

There are significant costs associated with other proposed broadband-related initiatives

E.g., <100/20 Mbps

Line Item	Modeling Approach
Additional E-Rate Support[1] Subsidy to increase on premise connectivity across rural schools	$5K (SUBSIDY FOR MODEM AND/OR ROUTER) + $3K (SUBSIDY FOR HOTSPOTS AND REPEATERS) + $15K (SUBSIDY FOR CONNECTED DEVICES) × 146K (TOTAL E-RATE INSTITUTIONS[3]) = ~$3B
School Bus WiFi Support[1] Subsidy to subsidize WiFi connectivity for rural school buses	114K (CURRENT E-RATE SCHOOLS[3]) × 5 (BUSES PER SCHOOL[4]) × 90% (E-RATE PARTICIPATION RATE) × $1.5K (YEARLY COST FOR BUS WI-FI SERVICE) = ~$1B
Network Backup Generators[2] Redundancies to keep Americans connected through climate-related environmental emergencies	$143K (COST TO OUTFIT A NETWORK CENTRAL OFFICE WITH BACKUP GENERATORS AND FUEL SUPPLY, 2021 DOLLARS[5]) × 32K (CENTRAL OFFICES AND HEADENDS IN U.S. NETWORKS) × 50% (EXISTING LOCATIONS WITH BACKUP) = ~$2.3B
Climate Resilience[2] Funding for new deployments to incorporate additional underground fiber to ensure resilience with climate events (e.g. wildfires, hurricanes)	LOW: $8.5B + $28.5B ($37B) (IMPLIED ALLOCATION OF FUNDS TO AERIAL AND UNDERGROUND FIBER, ASSUMING 60/40 SPLIT[6]) → $7.1B + $35.6B ($6B INCR.) (IMPLIED ALLOCATION OF FUNDS TO AERIAL AND UNDERGROUND FIBER, ASSUMING EVEN SPLIT[7]) HIGH: $15.5B + $51.5B ($67B) (IMPLIED ALLOCATION OF FUNDS TO AERIAL AND UNDERGROUND FIBER, ASSUMING 60/40 SPLIT[6]) → $12.9B + $64.4B ($10B INCR.) (IMPLIED ALLOCATION OF FUNDS TO AERIAL AND UNDERGROUND FIBER, ASSUMING EVEN SPLIT[7]) = $6B - $10B
Sustainability Incentives[2] Incentive programs to provide additional funding for sustainable new builds	$37B - $67B (LOW AND HIGH-END ESTIMATES OF CONNECTING <100/20 MBPS AREAS WITH GIGABIT SERVICE) × 10% (INCREMENTAL PERCENTAGE OF FUNDING NEEDED TO INVEST IN LOWER-FOOTPRINT ENGINEERING TECHNIQUES) = $4B - $7B

1 Programs enumerated in the Accessible, Affordable Internet for All Act | 2 Programs enumerated in the GREEN Communications Act (S. 1506)
3 From USF E-Rate dataset
4 Approximated based on ratio between total school buses in the U.S. and schools in the U.S.
5 Based on Verizon case study of outfitting 8 Texas COs with backup to withstand hurricane-related outages
6 Assuming a 60 aerial/40 underground mile-on-mile split, and underground on average 5X as expensive as aerial
7 Assuming 10% of fiber miles should shift from aerial to underground to prevent cuts in areas prone to extreme climate events
Source: LIFT Act, Accessible Affordable Internet for All Act, GREEN Communications Act (S. 1506), USAC.org, ACA Connects, Cartesian

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Summary of Key Cost Model Assumptions

There are a number of assumptions involved in our cost model

1. Support amounts for gigabit deployment under the RDOF auction are a reasonable proxy for future deployment subsidy requirements in areas with similar household density
2. Future fiber deployment costs would be similar to previous fiber deployment costs in areas with similar household density (i.e., estimation does not account for proximity to existing infrastructure)
3. Number of households per census block would be equivalent to 2010 census data with proportional population growth applied
4. Deployment costs to households in partially served census blocks would be similar to average per-location costs from the location-based cost model
5. Areas currently receiving FCC funding would have similar costs of gigabit deployment as other areas (i.e., same models used to estimate cost of gigabit deployment for all areas)
6. Areas with fiber available but sub-gigabit speeds would require ~10% of modeled costs to upgrade to gigabit speeds (i.e., typically only electronics upgrades required)
7. Businesses have similar geographic dispersion as households (i.e., costs to deploy fiber to businesses are similar to that of households in areas with similar household density)

Source: ACA Connects, Cartesian

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Broadband Cost Assessment Studies

Our fiber deployment costs for unserved rural areas are lower than previously published studies – this is likely because we use updated deployment data, and unserved HHs have decreased over time

Study and Year	Key Finding	Comparison to This Assessment
Fiber Broadband Association **2019**	"…**90% of US HHs** can be passed with fiber for an estimated [incremental[2]] amount of **$70B**"	Fiber to **All Sub-Gigabit Areas**: **$128B – $210B** The Fiber Broadband Association study did not model costs for the top 10% most expensive areas, but methodologies are similar between our study and the FBA assessment
Jim Stegeman[1] CQA **2018**	"The cost to deploy **fiber to unserved U.S. rural areas [23/3 Mbps]** is about **$61 billion**…based on deploying GPON fiber-to-the-premises technology"	Fiber to **All Unserved (<25/3 Mbps) Areas**: **$21B – $37B** Our study estimates a lower cost to deploy fiber to all unserved U.S. areas – differences are likely related to cost modeling methodology, and/or the fact that our study uses later FCC deployment data (June '20)
Paul de Sa FCC Office of Strategic Planning & Policy Analysis **2016**	"We estimate that the total upfront capex required to deploy FTTP to the 14% of locations lacking access [to 25/3 Mbps broadband] would be **~$80B** but, because of the shape of the cost curve, **~98% coverage could be attained for ~$40b**"	Fiber to **All Unserved (<25/3 Mbps) Areas**: **$21B – $37B** Our study estimates a lower cost to deploy fiber to all unserved U.S. areas – differences are likely due to the fact that our study uses more recent FCC deployment data (June 2020, 3% of HHs unserved)

1 In a webinar titled "Rural Broadband Economics: A Review of Rural Subsides", sponsored by USTelecom and NTCA – The Rural Broadband Association. CostQuest created the cost model used to determine broadband deployment costs for CAF program
2 Reflects estimated costs beyond expected substantial private sector investment over 10 years
Source: Fiber Broadband Association, USTelecom, NCTA, FCC Office of Strategic Planning and Policy Analysis, ACA Connects, Cartesian

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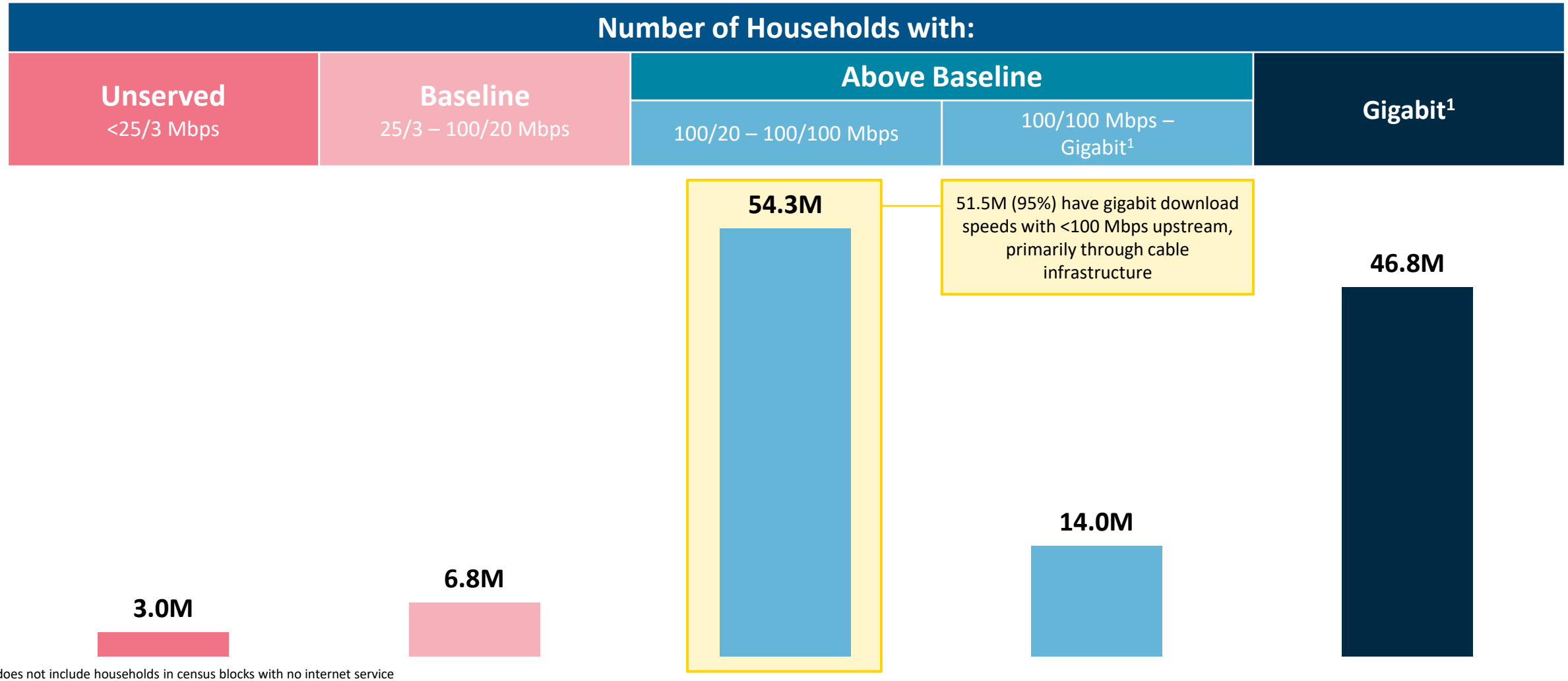
Cost Assessment Methodology

Additional Availability & Adoption Analyses

Gigabit Download Availability over Cable

Over 50 million U.S. households with cable broadband service have access to gigabit download speeds – these networks typically offer at least 20 Mbps upload



Note: does not include households in census blocks with no internet service
1 Reflects available speeds of greater than 900/500 Mbps
Source: FCC Form 477 June 2020 (Apr 7 2021 release), U.S. Census, Cartesian

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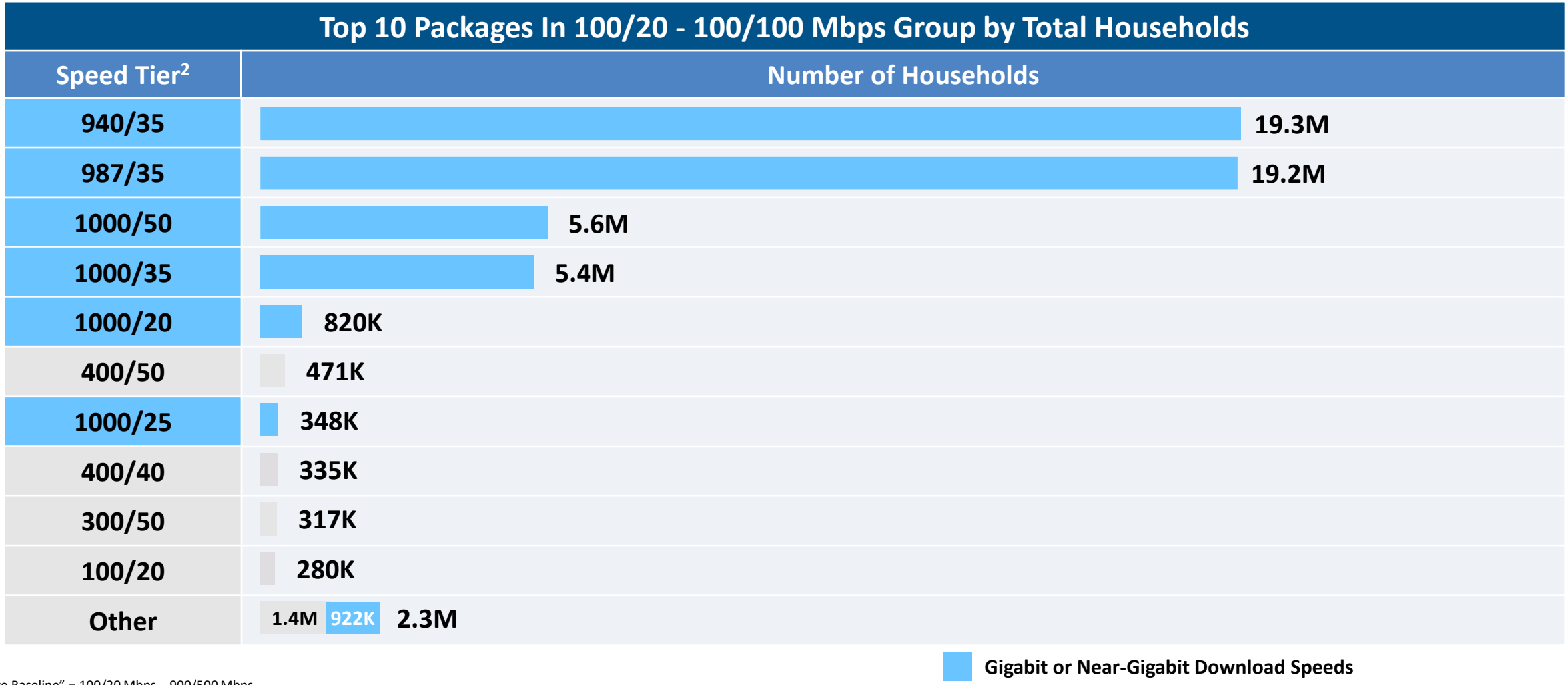
ISP Speed Tiers between 100/20 and 100/100 Mbps

Of 54.3M Americans with access to a sub-100/100 package but above baseline[1] service, 51.5M (95%) have access to gigabit or near-gigabit download speeds



1 "Above Baseline" = 100/20 Mbps – 900/500 Mbps
2 Reflects the maximum speeds available to each census block (highest download speed prioritized)
Source: FCC Form 477 June 2020 (Apr 7 2021 release), U.S. Census, ACA Connects, Cartesian

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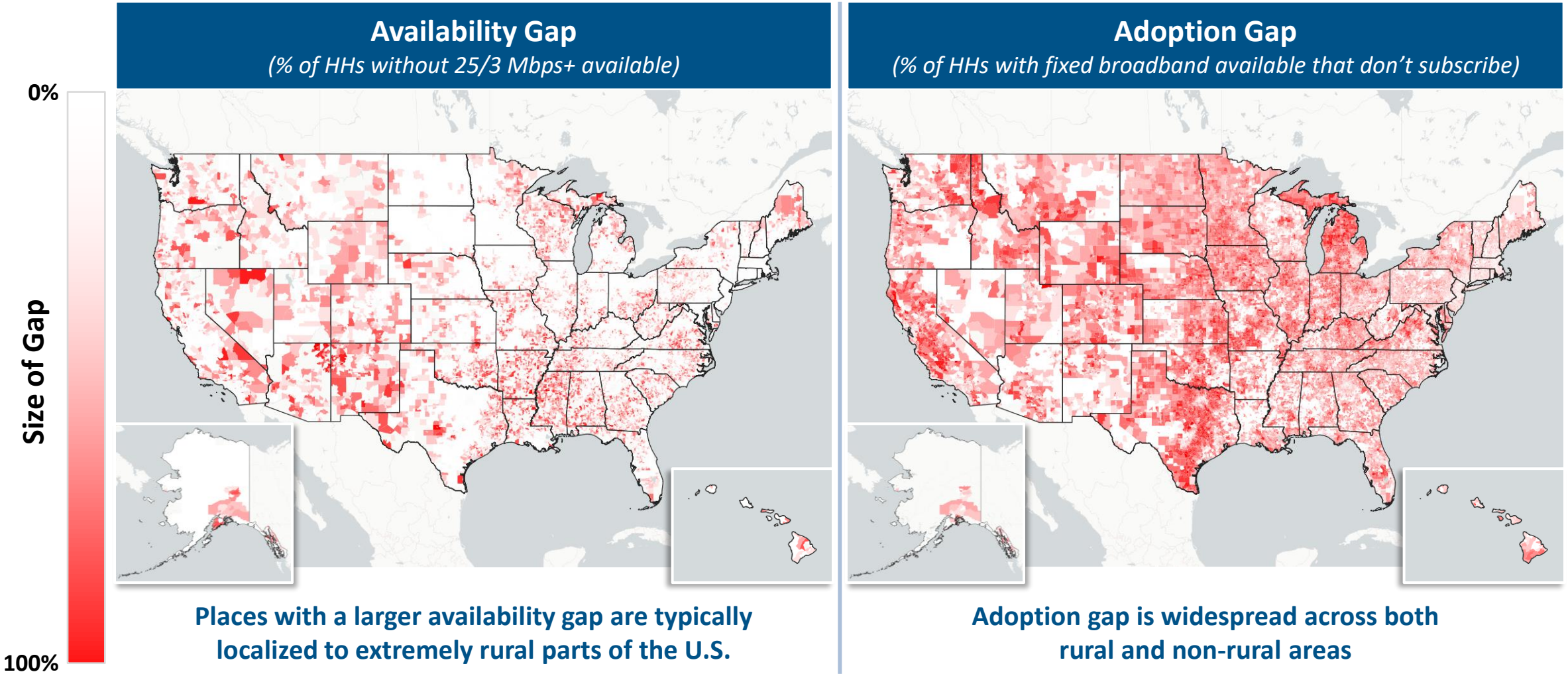
Geographic Distribution of Availability and Adoption Gap

Areas with a larger broadband availability gap are typically rural, while the problem of broadband non-adoption is geographically diverse



Source: FCC Form 477 June 2020 (Apr 7 2021 release), Experian, American Community Survey 2019, Cartesian

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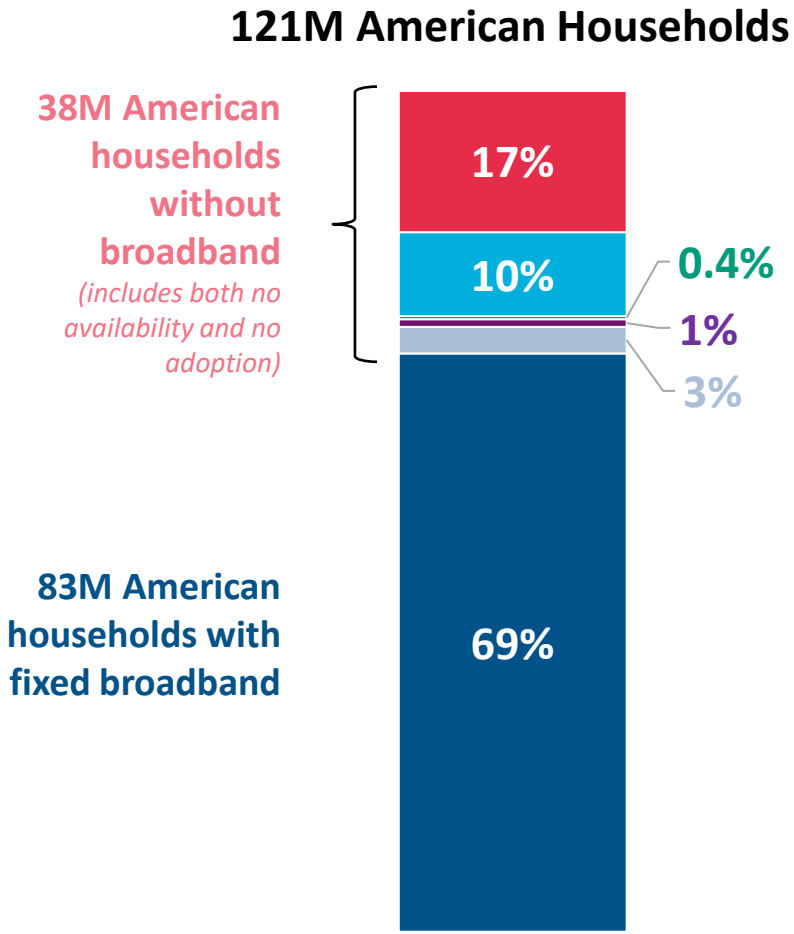
Overview of 2019 ACS Broadband Adoption Data

The American Community Survey provides the most recent statistics on broadband adoption for American families – results from the 2019 ACS are used throughout our report and are summarized below



Connectivity Types and Survey Questions:

	"No access to the Internet": 20.5M *At this house, apartment or mobile home – do you or any member of this household have access to the internet?*	No Internet
	"Cellular data plan with no other type of Internet subscription": 12.1M *Do you or any member of this household have access to the Internet using a cellular data plan for a smartphone or other mobile device?*	Unfixed or Likely Sub-Baseline Service
	"Dial-up Internet service with no other type of Internet subscription": 437K *Do you or any member of this household have access to the Internet using a dial-up Internet service installed in this household?*	
	"Satellite Internet service with no other type of Internet subscription": 1.1M *Do you or any member of this household have access to the Internet using a satellite Internet service installed in this household?*	
	Other combination of services[1]: 3.8M	
	"Broadband such as cable, fiber optic or DSL": 83.2M *Do you or any member of this household have access to the Internet using a broadband (high speed) Internet service such as cable, fiber optic, or DSL service installed in this household?*	Likely Baseline or Above

Note: Specific figures may differ slightly from NUL/Census reporting due to use of 5-year estimate vs. 1-year spot estimates (these figures reflect the 2019 5-year estimates)
1 Including any households with an internet subscription who do not fall under any of the previous four categories, or have some combination of cellular / satellite / dial-up connectivity
Source: FCC Form 477 June 2020 (Apr 7 2021 release), U.S. Census, American Community Survey 2019, Cartesian

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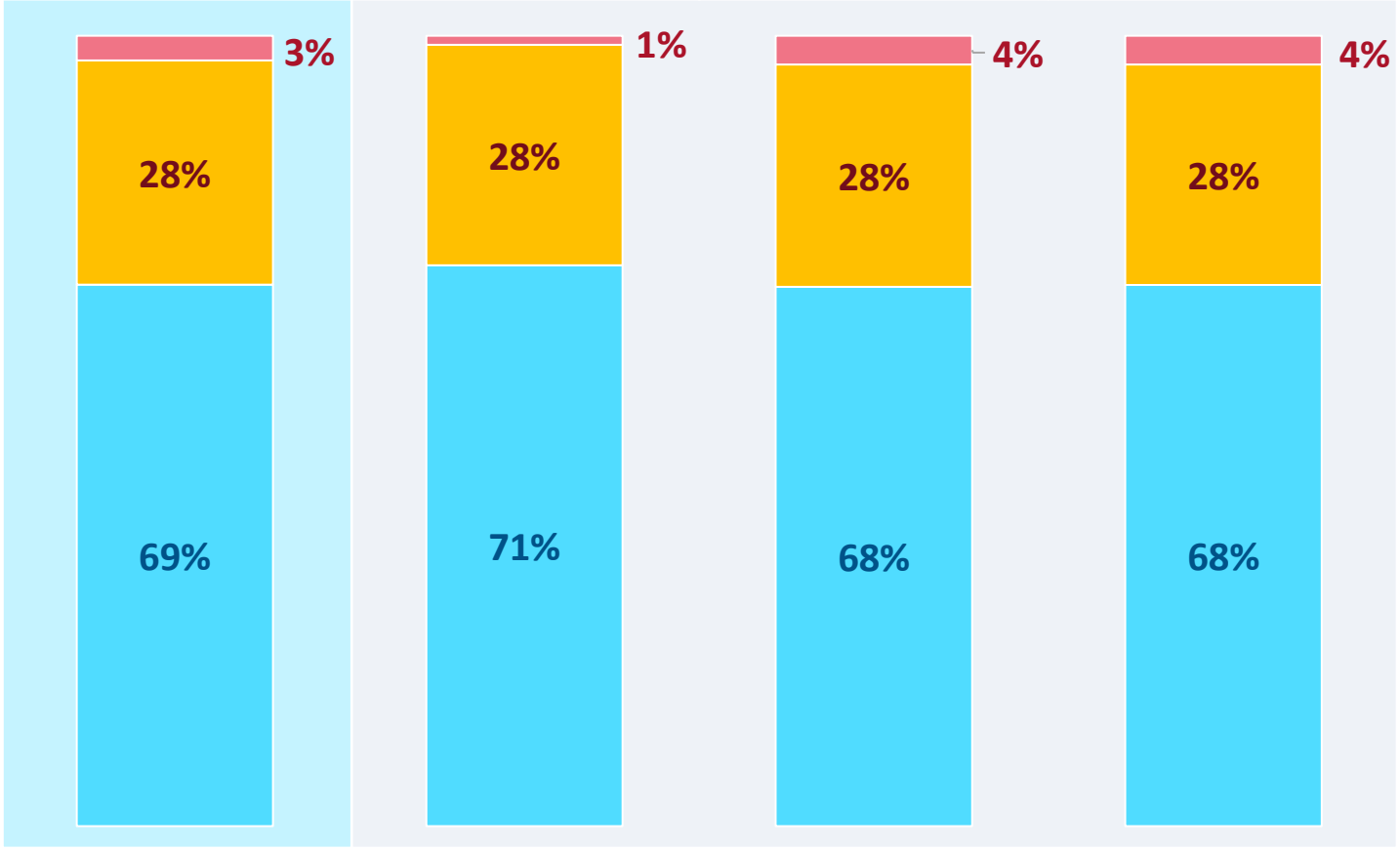
Adoption and Age

Areas with the greatest share of population 65+ have the same adoption gap as younger areas

Broadband Availability and Adoption by % of Population Above 65

Share of Census Block Group as 65+	Nationwide	< 10%	10-25%	>25%
% of Census Block Groups	100%	21%	66%	13%
Availability Gap *Fixed Broadband Not Available*[1]	3%	1%	4%	4%
Adoption Gap[2] *Fixed Broadband Available, no Adoption*	28%	28%	28%	28%
Broadband Adopted *Fixed Broadband Available and Adopted*[3]	69%	71%	68%	68%



Commentary

Based on this analysis, there does not seem to be a correlation between age and broadband adoption

Slight Difference in Availability Gap:
On average, about 16% of the population nationally is above 65. Areas with younger populations tend to have a smaller availability gap as they tend to be located in more developed urban areas

No Difference in Adoption Gap:
The population of retirement-age Americans is not correlated with a difference in the adoption gap – census blocks with a >25% of the population 65+ has a nearly identical adoption gap as the nationwide average

1 Based on availability data from Form 477 of households with access to speeds of at least 25/3 Mbps – availability by group is estimated based on age distribution data from Experian
Source: FCC Form 477 June 2020 (Apr 7 2021 release), Experian, Cartesian

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BOSTON

KANSAS CITY

LONDON

NEW YORK

PARIS