Federal Communications Commission
Broadband Deployment Advisory Council

Increasing Broadband Investment in Low-Income Communities Working Group

December 2020

Table of Contents

PART I: INTRODUCTION

The Federal Communications Commission ("Commission", or "FCC") directed the Broadband Deployment Advisory Council (BDAC), *Working Group on Increasing Investment in Broadband Deployment to Low-Income Communities* (Working Group, or WG) to "develop recommendations for the Commission on new ways to encourage deployment of high-speed broadband infrastructure and services (including at least 25 Mbps download/3 Mbps upload fixed and high-quality mobile broadband service) to low-income communities."

1.1. Working Group Charges

- Identify regulatory and other barriers that deter the deployment of high-speed broadband infrastructure and services to low-income communities.
- Recommend actions to increase incentives to invest in deployment of high-speed broadband to low-income communities.
- Identify barriers to adoption and use of high-speed broadband services in low-income communities.
- Recommend actions to increase broadband adoption and use among low-income Americans. Examine whether greater broadband adoption rates among low-income Americans would give internet service providers (ISPs) strong incentives to deploy more broadband infrastructure to low-income communities.
- Recommend best practices for states and localities to encourage deployment of high-speed broadband to low-income communities and to encourage broadband adoption within such communities.
- Examine and explain how the Commission should identify low-income areas where additional action or reform would most increase broadband deployment.

The Commission further encouraged the Working Group to consider "different challenges facing urban areas and rural areas [and to] focus on both the deployment of services to low-income communities that do not presently have high-speed broadband services available and the deployment of additional facilities-based competitive options."

Soon after constituting the Working Group in July, 2019, members of the Working Group agreed to bifurcate their efforts among issues relating mostly to *deployment* of broadband infrastructure in low-income communities and *adoption* of broadband services in low-income communities, thus informally constituting two subgroups of the WG.

1.2. The Working Group

The Working Group was led by Thomas 'Tom' Ferree, Chairman and CEO of Connected Nation who served as Chairman and assisted by Vice-Chairman, Claude Aiken, President and CEO of the Wireless Internet Service Providers Association (WISA).

Members of the ***Deployment*** subgroup include:

Geoff Feiss, *Montana Telecommunications Association (**Chair**)*
Claude Aiken*, *WISPA*
Elizabeth Bowles*, *Aristotle*
Commissioner Karen Charles Peterson and Mark Merante, *Massachusetts Department of Telecommunications & Cable*
Courtney Dozier, *Office of Virginia Governor Ralph Northam*
Tom Ellefson* and Jane Builder, *T-Mobile*
Ross Lieberman and Mike Jacobs, *ACA Connects*
Tim Walden*, *CenturyLink*
Randy Wilson, *Airosmith Development*
David Young*, *City of Lincoln, Nebraska*

**notes full BDAC member*

Members of the ***Adoption*** subgroup include:

Scott Rudd*, *Office of Lt. Governor Suzanne Crouch, State of Indiana (**Chair**)*
David Don* and Jordan Goldstein, *Comcast (**Vice-Chair**)*
Kevin Donnelly, *National Multifamily Housing Council*
Tom Ferree* and Brent Legg, *Connected Nation*
Marc Ganzi* and Anthony Lehv, *Digital Bridge Holdings, LLC*
Carlos Gutierrez*, *LGBT Tech Partnership*
Paul Mitchell, *Microsoft*
Kimball Sekaquaptewa, *Santa Fe Indian School*
Tim Schneider, *Tilson Technology Management, Inc.*
Christopher Yoo*, *University of Pennsylvania*

**notes full BDAC member*

The subgroups have met continually on alternating weeks, while the full Working Group met on the weeks when the subgroups did not. In other words, every week, with few exceptions, included a meeting of a subgroup or the full Working Group. Several meetings incorporated guest speakers, including:

Dr. Nicol Turner-Lee, *Brookings Institution*
Samantha Schartman-Cycyk. *Connected Insights*

Hunter Newby, *Newby Ventures*
Angela Siefer, *National Digital Inclusion Alliance*
Bryan Darr, *Ookla*
Adrian Berezowski, *Birch Co.*
John Badal, *Sacred Wind Communications*
Richard Lukas, National Governor's Association
Hal Wood, *Kids First of Chicago*
Jimmy Todd, *Nex-Tech*
Dr. Roberto Gallardo, *Purdue Center for Rural Development*
Jodie Griffin, *Federal Communications Commission*
Trent Harkrader, *Federal Communications Commission*

During its proceedings, the Working Group collected dozens of reports, articles, and other reference materials to help guide its deliberations.

The Working Group commends the nonprofit organizations dedicated to digital inclusion and equity whose research contributes in part to this Report. The Working Group may add materially to the considerable body of research and advocacy that has already exists. However, members of the Working Group hope that this report can help synthesize the various interests working to enhance broadband opportunities for low-income communities.

1.3. Preamble

The Working Group is charged with developing recommendations for the Commission on new ways to encourage deployment of broadband infrastructure and services to low-income communities. In developing recommendations, the Working Group finds that there are opportunities for enhancing both *deployment* and *adoption* of broadband connectivity in low-income areas. The WG recognizes this is a work in progress. There is evidence that broadband infrastructure and adoption rates in low-income areas lag behind connectivity in higher income areas. However, the WG finds that more evidence is needed to establish the relationship between income and the deployment and adoption of broadband. Regardless of the exact parameters of this relationship, the Working Group finds that there are opportunities for enhancing both *deployment* and *adoption* of broadband connectivity in low-income areas. The WG therefore identifies a number of recommendations, many of which are based on existing resources, that represent a severable collection of independent proposals that address various aspects of deployment and adoption in low-income areas.

1.4. Definitions

The Working Group agreed that certain common definitions were needed to help inform the WG's deliberations and to provide consistency in its findings and recommendations. Where possible, definitions that were established under the previous BDAC were referenced in the

course of the WG efforts. Four terms were particularly instrumental to the WG; *low-income area*, *broadband*, *broadband deployment (or availability)*, and *broadband access (vs. availability)*.

Low-Income Area

The Working Group chose the standard used in Chairman Pai's Digital Empowerment Agenda: an area (zip code, census block, etc.) where the average (mean) household income is at or below 75 percent of the national median household income (Ajit Pai, Chairman, FCC, Remarks at the Brandery, "A Digital Empowerment Agenda" (Sept. 13, 2016.[1]

Broadband

The Commission asks the Working Group to identify "ways to encourage deployment of high-speed broadband infrastructure and services (including *at least 25 Mbps download/3 Mbps upload fixed and high-quality mobile broadband service*) to low-income communities." (emphasis added). The Working Group therefore adopts 25 mbps downstream and 3 mbps upstream (25/3) as a *minimum* definition of broadband.[2]

However, the Working Group recognizes that the definition of broadband is evolving. Indeed, a wide variety of industry and consumer organizations, including those that focus on low-income consumers, finds that 25/3 may no longer be sufficient to deliver the kind of high-performance broadband service that society demands today, and importantly, in the future.[3]

The coronavirus pandemic has revealed the importance of both download and upload capacity requirements as families work and learn from home. Upload speed growth has been driven by demand for two-way videoconferencing used in remote working and learning, telemedicine and distance education.[4] The Working Group thus encourages

[1] https://www.fcc.gov/document/commissioner-pais-digital-empowerment-agenda

[2] 25/3 is the current standard adopted by the Commission pursuant to 47 USC Sec. 706.

[3] *See, e.g.*, OpenVault, "*OVBI: Upstream Broadband Usage, Faster Speeds Spike Higher in Q2 2020*," https://openvault.com/ovbi-upstream-broadband-usage-faster-speeds-spike-higher-in-q2-2020/ (noting that more than 61% of American households subscribe to fixed broadband service with speeds of at least 100 Mbps.

[4] Doug Brake. *Lessons from the Pandemic: Broadband Policy after COVID-19. Information Technology and Innovation Foundation*. (July 13, 2020), https://itif.org/publications/2020/07/13/lessons-pandemic-broadband-policy-after-covid-19. Home broadband traffic is up 20-40 percent since the onset of the pandemic; upload speeds up over 26%. See also: Joe O' Halloran. *Broadband upstream usage, speeds spike higher in Q2 2020*. ComputerWeekly (Aug. 12, 2020). https://www.computerweekly.com/news/252487540/Broadband-upstream-usage-speeds-spike-higher-in-Q2-2020?vgnextfmt=print (overall upstream consumption was up 56% year-over-year through Q2 2020).

the FCC to continue updating the "standard" broadband speeds to account for higher capacity download *and upload* speeds sufficient to support current and future demand.[5]

Many members of the Working Group prefer removing reference to specific download or upload speeds altogether. Instead, members recommended a "functional definition," which would be both flexible and evolving. Today's discussion is whether 25 mbps down and 3 up is sufficient. Tomorrow's debate may be whether speeds should be higher and symmetric. It depends on the evolving nature of online experience, as well as consumers' individual and collective needs. In short, "broadband" should be whatever the consumer needs to fully engage online to meet his or her needs. In the words of one Working Group member, *"broadband should be defined by what it does, not by what it is.*[6]*"*

The pandemic further has illustrated the resilience of our nation's broadband infrastructure. Broadband providers are investing between $70 billion and $80 billion a year to connect Americans, and the wireless industry is investing another $25 to $30 billion.[7] A fiber network, for example, is capable of delivering symmetric upload and download speeds, and can be scaled efficiently to meet increasing demand.[8] Data from a number of providers and their associations indicate that the mixture of fiber, cable and wireless technologies delivered strong consumer experience in the face of increased consumer demand, notwithstanding the material deployment/investment and adoption challenges discussed in this Report.[9]

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[5] *See, e.g.*, Zoom Help Center "*System Requirements for Windows, macOS, and Linux,*" https://support.zoom.us/hc/en-us/articles/201362023-System-requirements-for-Windows-macOS-and-Linux#h_d278c327-e03d-4896-b19a-96a8f3c0c69c (last visited Sept. 9, 2020) (upload bandwidth required to conduct a Zoom session with more than two participants at 1080p is 3 Mbps).

[6] This simple axiom also addresses another controversial subject: "technological neutrality." In this regard, user experience—what it does—should prevail over specific technology—what it is.

[7] Roger Entner. *Attempts to close the digital divide count wins and losses*. Fierce Telecom. (June 28, 2020). https://www.fiercetelecom.com/regulatory/industry-voices-entner-attempts-to-close-digital-divide-counts-wins-and-losses?mkt_tok=eyJpIjoiWVRoaU56UTJNR1ppTURRMCIsInQiOiJ4RU45Vmp6XC9YOG9Ca1NJTzc4ZkVsdWJ2M0hzRXpxMExvNmlkUWdEY1V5cE91a2FTU01jb0srQkc3RHB6aHpjYlAzQzB2aWs0M0s3aFdIYVphZnhlZVV2V01kMVFvZjR6K0N5YmVwdzZWYUFUMmdpWVBHbDRpM3RxR3VmS1NKazdjcDdmN2R2b09JM2lzM1wvcEtybyswQT09In0%3D&mrkid=51918248.

[8] Gary Bolton. Under the Stress of Covid-19, the Networks that Held Fast Were Symmetrical Fiber Broadband. BroadbandBreakfast. May 29, 2020. http://broadbandbreakfast.com/2020/05/gary-bolton-under-the-stress-of-covid-19-the-networks-that-held-fast-were-symmetrical-fiber-broadband/ See also: Jonathon Sallet, *Broadband for America's Future: A Vision for the 2020s*, Jonathon Sallet, Benton Foundation, (Oct. 2019). https://www.benton.org/sites/default/files/BBA_full_F5_10.30.pdf

[9] *See, e.g.*, NCTA, "*COVID-19: How Cable's Internet Networks Are Performing*," https://www.ncta.com/COVIDdashboard (last visited October 31, 2020) ("[t]hroughout the pandemic, provider backbone networks have showed no signs of congestion."). ACA Connects, *"Network Performance During the COVID-19 Crisis,"* https://acaconnects.org/covid-19/broadband-dashboard/ (last visited Nov. 17, 2020) ("Over the past decade, [ACA Connects'] small to mid-sized broadband service providers, many of which serve smaller

With regard to the Commission's charge to the Working Group to explore "fixed and high-quality mobile broadband service," the WG concurs with the Commission's conclusion that fixed and mobile services are complementary and not substitutes for one another.[10] However, while mobile service is seen as complementary in many parts of American society, in low-income areas, mobile services often serve as a substitute for fixed broadband service.[11] If given a choice of only one device, low-income consumers appear more apt to rely on a mobile device with internet access before they would opt for a fixed broadband service.[12] However, mobile broadband is subject to certain limitations when it comes to accessing high-performance broadband service, such as data caps, constraints on access to spectrum and channel capacity, upstream speeds, latency (re: satellite-based broadband), interference (depending on spectrum frequency of the signal). On the other hand, mobility usually trumps all of these concerns when the choice is limited to a single device. Consumers vote with their wallets; and they prefer to purchase mobile broadband service before they purchase fixed broadband.[13] Ideally, low-income consumers should have the opportunity to have access to both fixed and mobile services comparable to others in society.[14]

Finally, the Working Group wants to include in the definition of broadband a recognition that broadband standards may be different for residential vs. business consumers. For example, while mobile broadband options may be a viable, though perhaps not preferable, option for many residential consumers, businesses are more likely to demand a more resilient, robust and scalable broadband service available only from

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communities and rural areas, have invested billions of dollars to build robust, reliable DOCSIS (Hybrid Fiber-Coax) and Fiber to the Home (FTTH) local broadband networks with high capacity transit links. . . . [D]espite the surge in Internet usage, our members' networks continue to provide the same high-quality experience their customers have come to depend on.").

[10] In the Matter of Inquiry Concerning Deployment of Advanced Telecommunications Capability to all Americans in a Reasonable and Timely Fashion (2020 Broadband Deployment Report). GN. Docket No. 19-285. rel. April 24, 2020.¶12.

[11] Axios, "*Wealth is Driving how People Get the Internet*." (Dec. 1, 2018). https://www.axios.com/wealth-is-driving-how-people-get-the-internet-63c223b3-7b94-4529-8e95-affd6cffde34.html

[12] *See, e.g.*, Monica Anderson, *Mobility Technology and Home Broadband 2019*, Pew Research Center, (June 13, 2019) https://www.pewresearch.org/internet/2019/06/13/mobile-technology-and-home-broadband-2019/ ("Lower-income adults are also more likely than those in higher-earning households to be smartphone only internet users.").

[13] FCC 2020 Broadband Deployment Report. *Op cit*. ¶ 11; *see also*, https://www.ctia.org/news/report-how-wireless-kept-americans-connected-during-covid-19

[14] *See*, *e.g.,* Comments of Mass. Dept of Telecommunications and Cable, (Sept. 21, 2017), *In the Matter of Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*, GN Docket no. 17-199. ("These and other examples of Massachusetts consumers going to great effort and personal expense to gain simultaneous access to mobile and fixed broadband services demonstrate that the marketplace considers these services distinct.").

fixed broadband infrastructure.[15] As noted above, a functional definition would obviate the need for a separate distinction between business and residential broadband, since the definition would match broadband performance to user experience.

Broadband Deployment (or Availability)

As noted above, the Commission charged the Working Group with identifying barriers and/or incentives that influence "deployment of high-speed broadband infrastructure and services to low-income communities." The Working Group adopts the BDAC Model State Code, 2018, definition of "broadband deployment" (or "availability"—see below): "*broadband Services available for purchase by at least 90% of the residents and business of a particular area."* For purposes of this Report, "particular area" refers to "low-income area" as defined above.

Broadband Access vs. Availability

It is important to distinguish between broadband "access" and Internet "availability." The two terms sometimes are used interchangeably. We attempt in this Report to use the term, "access," to refer to consumers' subscribing to available broadband connections. Thus, "access" is akin to "subscription" or "adoption," as explored in the Adoption Report, *infra*. It is hard, however, for consumers to access the Internet if there is no broadband infrastructure available. Availability applies to the physical presence of broadband infrastructure.

Consumer advocates add another layer to the definition of broadband availability. Broadband service may be physically available to a consumer or community, but if it is unaffordable, it effectively is unavailable. For purposes of this Report, the Deployment Subcommittee of the Working Group focuses on the presence of physical broadband infrastructure.

That does not mean, however, that broadband affordability does not affect broadband deployment. If potential broadband customers in a given location have more available income with which to purchase broadband service, demand for broadband in that location would rise which would lead to higher rates of broadband adoption. Higher rates of broadband adoption improve broadband providers' return on investment for deploying broadband infrastructure in a given location, as discussed more fully below. As a result, providers anticipating higher demand for their broadband services in a given location will be more likely to deploy new broadband-capable infrastructure to that location. In this way, broadband affordability (access) may affect broadband deployment (availability).

[15] *See, e.g.*, Samantha Cossick, *What's the difference between residential and business internet?*, allconnect.com (January 27, 2020), https://www.allconnect.com/blog/residential-or-business-internet-for-small-business.

PART II. DEPLOYMENT SUBCOMMITTEE REPORT

As mentioned earlier, the Working Group bifurcated its responsibilities between two sub-committees. One subcommittee explored the FCC's charges relating to broadband *adoption* in low-income communities. The other subcommittee explored barriers and/or incentives to broadband *deployment*. The Working Group recognizes that while "deployment" and "adoption" issues can be treated separately, the two are integrally linked. As one BDAC member pointed out, it is not possible to fund individual "MiFi" hotspots to remote broadband (adoption) if there is not a robust broadband infrastructure (deployment) in place. Part II of this report includes findings and recommendations of the broadband deployment subcommittee.

2.1. The Digital Divide

The evidence is compelling that there is a Digital Divide between broadband "haves" and "have nots" in the United States. The FCC finds that nearly 14.5 million Americans[16] lack access to fixed terrestrial broadband and 44% of adults earning less than $30,000 annually do not subscribe to broadband at home.[17] Pew has conducted extensive research into the Digital Divide. They have identified a number of reasons why consumers do not subscribe to broadband internet services, including age, race, education, relevance, and income.[18]

Much attention has been focused on the "urban/rural" Digital Divide. That is, broadband speeds and infrastructure deployment in rural areas tend to lag behind urban areas. Less reported are the "urban/urban" and "rural/rural" Digital Divides. The "rural/rural divide" refers to rural areas where Americans may or may not have high-speed broadband connectivity available to them, depending on where they live and who their internet service provider is. Similarly, an "urban/urban divide" exists in urban areas where there are pockets of metropolitan communities that lack the broadband availability that other areas in the same metropolitan area may have.

The FCC's up-coming Rural Digital Opportunity Fund (RDOF) Auction 904 map of eligible areas affords an opportunity to visualize where rural America has insufficient broadband internet service today.[19] The map is not exhaustive. There are other rural locations where broadband service is lacking. But the Auction 904 map provides an accurate illustration to date of where

[16] "2019 Broadband Deployment Data Show Digital Divide is Closing." FCC News (November 12, 2020.). https://www.fcc.gov/document/2019-broadband-deployment-data-show-digital-divide-closing

[17] FCC 2020 Broadband Deployment Report. *Op cit*.

[18] Pew Research Center, Internet & Technology, *Internet/Broadband Fact Sheet,* (June 12, 2019) https://www.pewresearch.org/internet/fact-sheet/internet-broadband/

[19] https://www.fcc.gov/reports-research/maps/auction-904-preliminary-eligible-areas/.

broadband service currently is deficient in rural America. It serves as a rough visual estimate of the rural/rural divide.

We note, too, that the Digital Divide is continuously evolving. First, as noted above, the definition of broadband changes with time. Second, providers are continually investing in their broadband network infrastructure; so, an area that may be unserved or underserved today may become served because of continuous network improvement/investment.

2.2. The Need for Accurate, Publicly-Available "Open" Mapping Data

The Working Group spent considerable time trying to define its charge to identify barriers and incentives for deployment of high-speed broadband *in low-income areas*. The most widely available broadband deployment data are filed by a subset of internet service providers (ISPs) via the FCC's Form 477. However, the FCC and others have acknowledged that Form 477 data are insufficient and inaccurate.[20] The data are self-reported by ISPs, leading to potentially inaccurate representation of actual vs. potentially "available" broadband connectivity. In fact, current FCC rules (subject to improved accuracy as the Broadband DATA Act is implemented) require ISPs to report broadband availability in a census block if the ISP reasonably can deliver broadband to a single location in the census block—not whether the location(s) has broadband available at the time of filing the Form 477. Moreover, Form 477 permits an entire census block to be considered "served" with broadband service if only one location in the census block has—or could have—access to broadband at 25/3 speeds within a reasonable period of time.

For purposes of the Deployment Subcommittee's charge, the Form 477 collects broadband deployment by census block, which coincides with the Working Group's use of census blocks to define low-income "area." However, the Deployment Subcommittee ran into difficulty when trying to overlay deployment data with income data, particularly when filtered by the Working Group's definition of "low-income" (i.e., an area (zip code, census block, etc.) where the average (mean) household income is at or below 75% of the national median household

[20] *See, e.g.*, *In re Establishing a 5G Fund for Rural America*, GN Docket No. 20-32, Notice of Proposed Rulemaking and Order, para. 34 (rel. Apr. 24, 2020) ("NPRM"); Arthur Scott, "*Understanding the True State of Connectivity in America*," (March 1, 2020), https://www.naco.org/resources/featured/understanding-true-state-connectivity-america (National Association of Counties developed a speed test app, "TestIT," which showed that mean mobile and fixed wireless internet speeds fell below the FCC's speed standard for broadband service in most American counties, despite providers' contrary claims on Form 477); Vt. Dep't of Pub. Serv., *Mobile Wireless in Vermont* 1 (Jan. 15, 2019), https://publicservice.vermont.gov/content/mobile-wireless-drive-test-report-january-2019 (Vermont's drive testing of that state's 4G LTE coverage showed that, even having measured only along major roads, at least 15% of Vermont's territory lacked qualifying 4G LTE service, as opposed to the 5% providers reported on Form 477); The Center for Rural Pennsylvania, "*Broadband Availability and Access in Rural Pennsylvania*," (June 2019) https://www.rural.palegislature.us/broadband/Broadband_Availability_and_Access_in_Rural_Pennsylvania_2019_Report.pdf (working with M-Lab, the Center collected 11 million consumer speed tests and determined that median broadband download speeds were less than those claimed in FCC Form 477 data in every county in PA).

income). Nonetheless, the Working Group finds the Form 477 data to be the best public data currently available.

The Working Group recognizes that the Broadband DATA Act and the FCC's Digital Opportunity Data Collection will improve the accuracy of broadband service location data. It is essential that consumers can see exactly what broadband speeds are available in a given location and which provider or providers are offering such services. That is, consumers should be able to determine what kind of fixed or mobile broadband is available to them, such as asymmetric 25/3, or symmetric gigabit, or something in between. Consumers should be able to see what technology platform(s) are available at their location, such as copper based DSL, coaxial cable, fiber, fixed or mobile wireless, or some combination thereof.[21] If speaking of wireless, consumers should be able to determine what sort of wireless service is available at their location, such as 3G, 4G LTE or 5G.

Moreover, like fixed broadband, mobile broadband exhibits a wide variety of features, depending on devices and spectrum frequency used. In very general terms, the lower the spectrum frequency used by the wireless provider, the better the signal propagation and larger the transmission area. That is, lower frequency spectrum, in the 700 MHz band, for example, penetrates buildings and other physical barriers far better than signals in the higher end of the spectrum. However, lower frequency spectrum, while exhibiting better propagation characteristics, does not exhibit the same capacity characteristics as higher frequencies. In other words, the lower the spectrum frequency, the better the propagation, but the lower the broadband speed. On the other end of the spectrum, the opposite is true. Millimeter wave spectrum frequencies are capable of gigabit speeds, but the propagation and transmission area of such signals are limited. A millimeter wave signal is limited in its ability to penetrate walls or other obstacles. And the signal quality diminishes after a few hundred feet from its transmitter, requiring "densification" of signal transmitters/receivers. (Figure 1.)

[21] While the definition of "broadband" should be technology or provider-agnostic (i.e., technologically neutral), consumers should have the ability to consider the advantages and/or disadvantages of specific technologies when making their broadband choices.

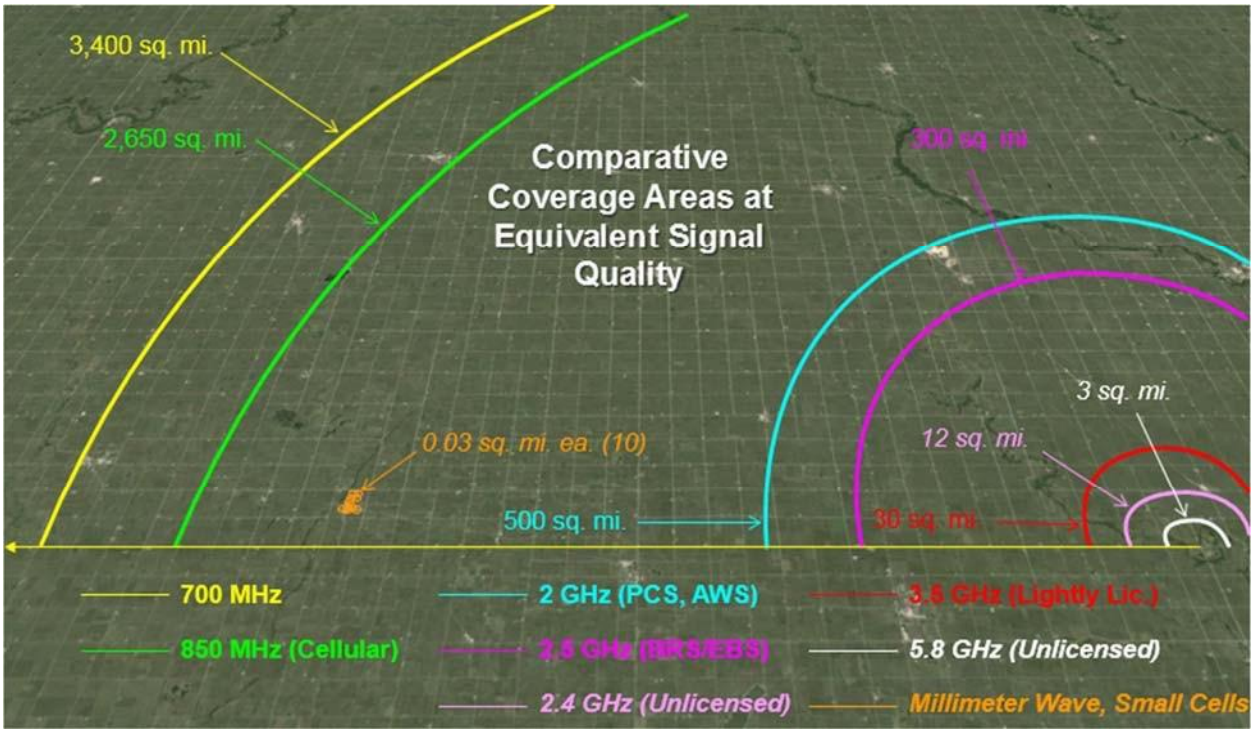

Figure 1. Source: "Evaluating 5G Wireless Technology as a Complement or Substitute for Wireline Broadband." Figure 5, Spectrum vs. Range Comparison. VantagePoint. March, 2017. (Note: T-Mobile is deploying service in the 600 MHz band.)

In short, consumers should have access to granular data relating to broadband availability so that they can determine precisely what kind of broadband services are available, and where. That level of detail does not yet exist. Until it does, making fully informed decisions regarding availability of high-speed broadband services in low-income areas, let alone other areas, becomes problematic.

In this regard, as discussed later in the Working Group Recommendations, the WG recommends not only better, more granular data collection, but greater public access to broadband datasets that the government collects. Open datasets enable greater accountability and transparency. Additionally, open data enables more people with more ideas to develop innovative ways to use, integrate and develop applications that further enhance the broadband experience.[22]

2.3. Correlation between Income and Deployment

The Working Group has found extensive research showing that the higher a household's income, the more likely the household is to subscribe to broadband. But the majority of this research does not distinguish between the effects of broadband availability and broadband

[22] This is discussed in greater detail in the Recommendations section of the Adoption Subcommittee Report, Part III, *infra*.

access on this correlation. Research focusing exclusively on the correlation between broadband *availability*—that is, the deployment of broadband infrastructure and/or the offering of broadband services--and neighborhood median income is less common.

The literature linking broadband *adoption (a.k.a., subscription, access)* and income is plentiful. (See for example: FCC Internet Access Report[23]; NDIA[24] ; Pew[25]; Purdue/Gallardo[26]; NTIA[27]; *inter alia*.) In Figure 2, the National Digital Inclusion Alliance provides a good example of this research.

Percentage of households with no broadband Internet subscription, 2017				
Household Income	Below $ 20,000	$ 20,000 to $ 34,999	$ 35,000 to $ 74,999	Above $ 75,000
All U.S. households	49%	35%	20%	7%
Households in:				
Urbanized areas	46%	40%	18%	6%
Urban clusters	53%	47%	21%	9%
Rural areas	57%	50%	25%	11%

Number of households with no broadband Internet subscriptions, 2017				
Household Income	Below $ 20,000	$ 20,000 to $ 34,999	$ 35,000 to $ 74,999	Above $ 75,000
All U.S. households	9,556,214	6,115,785	7,122,263	3,218,044
Households in:				
Urbanized areas	6,172,454	3,855,782	4,454,733	2,067,829
Urban clusters	1,325,798	766,414	770,227	262,387
Rural areas	2,057,962	1,493,589	1,897,303	887,828

Source: 2017 American Community Survey 5-Year Estimates

Figure 2. Source: National Digital Inclusion Alliance, using data from the 2017 ACS.

Additionally, the U.S. Department of Commerce, National Telecommunications and Information Administration (NTIA) finds "Internet use among Americans with family incomes below $25,000

[23] https://www.fcc.gov/internet-access-services-reports

[24] https://www.digitalinclusion.org

[25] *Op cit*.

[26] Roberto Gallardo, *Digital Divide Index*, https://pcrd.purdue.edu/signature-programs/digital-divide-index.php

[27] https://www.ntia.gov/print/blog/2020/ntia-data-reveal-shifts-technology-use-persistent-digital-divide. (June, 2020).

per year increased from 62 percent in 2017 to 65 percent in 2019, though this was still far short of the 87 percent of those with annual family incomes of $100,000 or more.[28]

Internet use is more specifically measured by network availability and user adoption. Broadband availability and broadband adoption are two distinct challenges, with distinct solutions. Both *availability* and *adoption* among low-income communities are subjects of debate.

The National Digital Inclusion Alliance (NDIA)[29], among other researchers, has frequently argued that there exists a relationship between broadband infrastructure deployment and neighborhood median income in some U.S. metro areas.[30] There is also research suggesting that higher-speed broadband services are deployed to higher-income neighborhoods sooner than they are to lower-income neighborhoods.[31]

Some ISPs and others dispute the existence of such a correlation. They note that broadband investment and deployment are in fact increasing in low-income communities over time, although low-income communities still exhibit a lower level of broadband adoption than higher-income areas.[32] Importantly, they assert that allocation of limited investment resources generally flows first to markets where there is the greatest opportunity for a return on that investment.[33] Thus, a broadband provider is likely to create an investment model based on expected demand for its products and services. Additionally, providers are more likely to invest in markets in which demand for "upstream" products and services augments their return on

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[28] *Op cit.*

[29] www.digitalinclusion.org

[30] *See, e.g.*, Alvaro Sanchez, Economic Growth & Mobility Project, Federal Reserve Bank of Philadelphia, *Toward Digital Inclusion: Broadband Access in the Third Federal Reserve District* (March 2020), https://www.philadelphiafed.org/-/media/egmp/resources/reports/toward-digital-inclusion-broadband-access-in-the-third-federal-reserve-district.pdf; Garrett Strain, et.al., *AT&T's Digital Divide in California*, Haas Institute (2017), https://belonging.berkeley.edu/sites/default/files/haas_broadband_042417-singles.pdf (finding a correlation between faster FTTH deployments and neighborhood income in CA); Allan Holmes and Ben Wieder, *DSL Providers Save Faster Internet for Wealthier Communities*, The Center for Public Integrity (Oct. 18, 2016), https://publicintegrity.org/inequality-poverty-opportunity/dsl-providers-save-faster-internet-for-wealthier-communities/ (nationwide, non-cable ISPs offer faster speeds to 40 percent of households in upper income neighborhoods but only 22% in households in lower income neighborhoods).

[31] *See, e.g.*, Vamsi Gadiraju, et.al., *Who Gets Broadband When? A Panel Data Analysis of Demographic, Economic, and Technological Factors Explaining U.S. Broadband Deployment* (Sept. 22, 2018) https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3142479.

[32] Fact Tank, *Digital Divide Persists even as lower-income Americans make gains in tech adoption*, Pew Research Center, (May 6, 2019), https://www.pewresearch.org/fact-tank/2019/05/07/digital-divide-persists-even-as-lower-income-americans-make-gains-in-tech-adoption/.

[33] *See, e.g.*, Sean Buckley, *AT&T denies claims it is redlining Ohio broadband customers*, FierceTelecom (Aug. 25, 2017), https://www.fiercetelecom.com/telecom/at-t-denies-claims-it-redlining-ohio-broadband-customers (quoting AT&T's response to NDTA's allegations of digital redlining in the Cleveland area: "bases its network investment decisions on where it sees the potential to get a good return on those investments.").

investment. For example, internet-based products like home security systems, over the top (OTT) internet applications like home entertainment systems, and other Internet of Things (IOT) applications (e.g., smart interconnected appliances) all increase broadband demand—and return on investment. The "take rate" in higher-income areas is estimated to be greater than in low-income areas, thereby justifying earlier investment in the former, while using ROI earned in these areas to plan subsequent investment in the areas with lower take rates.

While there is much debate, there is broad consensus for two critical policies:

1. There is an extensive portion of America, at least 14.5 million homes and likely considerably more, where broadband is not available, notwithstanding considerable private sector investment. This problem needs to be resolved.
2. Even where a terrestrial broadband network is available, approximately. 100 million Americans still do not subscribe, for multiple reasons. Likewise, this problem needs to be resolved.

Plainly, given the sheer magnitude of each of these problems, tens of billions of dollars are needed to deploy broadband networks where they are not available, and billions more are needed, annually, to enable adoption where it has not yet occurred.

2.4. Lessons Learned (so far) from the Covid-19 Pandemic

The Covid-19 pandemic has brought to light both strengths and weaknesses of America's broadband ecosystem. The pandemic also provides a number of real-time observations that help inform the Working Group's activities.

In a matter of days, broadband demand went from "normal" to peak surge demand across the entire broadband ecosystem. Stay-at-home orders meant that overnight, workers moved their offices from commercial locations to home. Patients, unable or unwilling to visit their doctors or appear at health care facilities for "routine" medical attention, suddenly discovered the benefits of telemedicine. According to Sen. Brian Schatz (D-HI), Medicare patients increased their use of telemedicine by 11,718 percent.[34] Students and educators transitioned overnight from in-class education to remote learning. And households, forced to stay at home, dramatically increased their use of online entertainment. Broadband networks, designed to handle peak load hours, found themselves handling similar peak usage from morning to night, instead of during just the former peak evening and nighttime peak hours. Notably, demand surged both for downstream and even more for upstream capacity. While there have been reports of consumers receiving slower speed broadband or reaching data caps during the

[34] *Schatz, Wicker Lead Bipartisan Group of 30 Senators in Calling for Permanent Expansion of Telehealth Following COVID-19 Pandemic*, (June 15, 2020), https://www.schatz.senate.gov/press-releases/schatz-wicker-lead-bipartisan-group-of-30-senators-in-calling-for-permanent-expansion-of-telehealth-following-covid-19-pandemic

pandemic, broadband networks, particularly fiber-based broadband technologies, have withstood the test.[35]

The overarching lesson from the pandemic is that access to broadband is critical. While the benefits of broadband connectivity have been well understood in the past, the pandemic forced us to consider access, or lack thereof, essential—not merely beneficial—as people are required to stay at home to mitigate spread of the virus. As Working Group member, Commissioner Karen Charles-Peterson, summarized, the pandemic "brings home" five key attributes of connectivity to high-performance broadband. In short, access to broadband enables people to pursue education, health care, workforce training and development, use of government services and lifestyle activities, such as worship, social engagement and other activities that are good for mental health.

No longer is 10 Mbps downstream and one Mbps upstream (10/1) good enough, as the FCC recognizes with its standard bandwidth definition of 25/3. Observers increasingly are asking whether the FCC's current 25/3 standard is sufficient, especially in households with multiple online users requiring two-way online activity, such as distance learning, remote working via videoconference, or online training. In fact, the pandemic has demonstrated a sudden surge in both downstream and upstream bandwidth demand. While the broadband infrastructure largely has held up to the increase in demand, certain applications more frequently in use require more upstream bandwidth even as consumer consumption remains generally asymmetrical.

Access to devices is important too. As one WG member points out, "you can't write a term paper on a smart phone." Nor is it easy—or possible—to run business financial statements on a smart phone. However, as noted above, wireless broadband services are essential for a balanced, comprehensive online experience.[36]

Notwithstanding the ability of the broadband infrastructure to handle the demand surge resulting from the Covid-19 pandemic, the pandemic also amplified deficiencies in America's broadband ecosystem. The fact that 14.5 million Americans lack access to the internet became abundantly clear. Moreover, as noted above, lack of access may be the result of a number of variables, including age, education, relevance, race, or income. But no longer is the internet access gap an academic subject. Students without a satisfactory, or any, internet connection were unable to participate in online instruction. Elderly patients with no internet access were prevented from receiving remote medical service. Workers who may have relied on their employer's internet connectivity suddenly were sent home where they may not have subscribed to internet service.

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[35] BroadbandBreakfast. *Op cit.*

[36] FCC Broadband Deployment Report, June 8, 2020. ¶ 9-11. https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2020-broadband-deployment-report

In many cases, the lack of consumers' access to broadband brought to light as a result of the Covid-19 pandemic was a matter of prior consumer choice not to subscribe to broadband service. Of course, consumers who must choose between a broadband connection and heating their home or feeding their family have little choice at all. In other cases, consumers may simply have considered broadband access unnecessary. And then Covid-19 happened. Broadband suddenly became much more important for work, education, access to medical care, government services and entertainment.

Where lack of broadband access was a matter of consumer adoption, ISPs generally responded by connecting these consumers—often free of charge—to the internet using existing or nearby broadband infrastructure. In other instances, consumers may already have been subscribing to broadband service, but because of the increased demand for higher bandwidth, ISPs often upgraded—free of charge—the internet service package that the consumers were receiving. Other ISPs provided free devices to students and teachers for distance learning use. As one WG member pointed out, for example, the New York City Department of Education received 300,000 iPads during Covid-19 for tele-education. Other providers accelerated deployment plans and opened free WiFi hot spots throughout their networks at community centers, libraries, schools, and other convenient locations for consumers to access the internet. Over 700 ISPs nationwide signed the FCC's Keeping Americans Connected Pledge to: 1) not terminate service to any residential or business consumer because of their inability to pay their bills as a result of economic hardship from the pandemic; 2) waive late fees for customers unable to pay their bills as a result of the pandemic; and 3) open WiFi hotspots. While the Pledge expired on June 30, Chairman Pai asked companies to continue honoring it through July and many companies already had committed to pandemic-related concessions as long as the pandemic lasts. (Note: the cost of extended pandemic-related responses, combined with reduced revenues particularly for small companies is unsustainable over the long term. Chairman Pai has asked Congress to include reimbursement of these small companies for their on-going costs of maintaining and expanding internet access to consumers affected financially by the pandemic.[37])

Broadband providers were not the only ones responding with pandemic-related actions. At the March 27, 2020 meeting of the BDAC, members raised a number of concerns with obtaining permits for rapid deployment of broadband infrastructure to respond to pandemic-related demand. The National League of Cities responded promptly with updated guidelines designed to facilitate permitting.[38]

Congress and the FCC responded with both supply-side and demand-side policies. For example, on March 27, 2020, the President signed the Coronavirus Aid, Relief and Economic Security Act (CARES), which included $100 million for the USDA's Re-Connect broadband loan/grant program administered by its Rural Utilities Service (RUS); $25 million for the RUS Distance

[37] https://www.fcc.gov/document/fcc-chairman-urges-congress-help-consumers-stay-connected

[38] https://citiesspeak.org/2020/05/04/keeping-local-permits-and-licenses-moving-during-covid-19/

Learning and Telemedicine Program; and $200 million for the FCC's Rural Health Care (RHC) Program's Connected Care pilot.

The FCC, meanwhile modified rules governing the Schools and Libraries Program (E-rate), the Rural Health Care (RHC) Program, the Lifeline Program and spectrum access rules, among other actions designed to mitigate the negative consumer effects of the coronavirus.[39] For the E-rate and RHC Programs, the Commission relaxed gift rules to "enable service providers to offer, and RHC and E-rate program participants to solicit and accept, improved connections or additional equipment for telemedicine or remote learning during the coronavirus [including] improved capacity, WiFi hotspots, networking gear, or other equipment or services to support doctors and patients, teachers and students, and libraries and patrons during the coronavirus outbreak."[40] Further, the Commission waived certain eligibility, recertification and reverification rules for Lifeline subscribers "to assist Lifeline program participants potentially affected by the coronavirus and community efforts to slow its spread."[41] In the wireless market, the Commission granted a series of Special Temporary Authority permits for wireless carriers to use additional spectrum in a variety of spectrum bands to help "meet increased customer demand for broadband during the coronavirus pandemic."[42]

It is too early to measure the effectiveness of private and public broadband access and adoption initiatives in response to the Covid-19 pandemic. However, since these initiatives are specifically designed to promote broadband deployment and adoption (albeit not necessarily aimed at deployment and adoption in low-income areas), the Working Group emphasizes the importance of collecting and making publicly available open data pertaining to coronavirus policies implemented by public and private entities.[43]

2.5. Deployment Subcommittee Recommendations

Proposals to expand and enhance broadband specifically for low-income areas are based on similar principals as discussed above. Supply-side incentives are aimed at reducing providers' cost of investment or removing barriers to deployment. Demand-side incentives increase demand for broadband products and services. The combination of supply-side and demand-side incentives increases provider's prospects for improved ROI.

[39] (https://www.fcc.gov/coronavirus

[40] https://www.fcc.gov/document/fcc-acts-support-telehealth-remote-learning-during-coronavirus

[41] https://www.fcc.gov/document/fcc-waives-lifeline-rules-help-keep-low-income-consumers-connected

[42] *See, e.g.*, *T-Mobile Temporary Access to Additional Spectrum*, https://www.fcc.gov/document/fcc-grants-t-mobile-temporary-spectrum-access-during-coronavirus

[43] The Working Group heard from the FCC's Lifeline Program on August 12, 2020. As a result of various measures, the FCC initiated, primarily relaxing various eligibility verification requirements, consumer demand increased by approximately 500,000 subscribers, indicating a positive correlation between a Covid-19-related initiative and consumer adoption.

Examples of supply-side programs include reducing regulatory costs, grants, loans, tax abatement and other initiatives designed to reduce the cost of investment in broadband infrastructure.

Demand-side incentives include subsidies to consumers to reduce the cost of broadband service or devices to increase demand, and consumer education, which reduces barriers to adoption making the internet easier to approach for reluctant or reticent consumers. The relative size of demand-side vs. supply-side issues is not well established. Some research (e.g., Pew) finds that many consumers have access to broadband infrastructure or services; but they do not subscribe to those services/facilities to which they have access. The reasons include age, education, relevance, and income. These are adoption issues which will be addressed further in this Report. The recommendations in this section primarily address supply-side incentives, recognizing that the likely bigger issue is on the adoption side of the ledger.

Both supply-side and demand-side incentives are intended to stimulate return on investment. In a June 14, 2018 letter to the FCC, the National Association of Telecommunications Officers and Advisors, the National League of Cities, the National Association of Counties, and the National Association of Regional Councils filed comments on the composition of the BDAC. The organizations stated that the scope of the BDAC should "address the underlying deployment problem of finding a way to jumpstart private financing in areas that do not provide private companies a return on their investment."[44]

Another supply-side incentive is workforce development. By facilitating training and education of a broadband workforce, whether it is workers who know how to climb towers and install wireless equipment, or training technicians who know how to build fiber networks, workforce training can steady the cost of broadband deployment, and ensure a stable supply of skilled workers to keep deployment projects launching and progressing. Workforce development, therefore, is an essential ingredient for increasing broadband deployment.

The Working Group also considered the effect of competition on consumer choice and innovation and on the price of products and services. Policies aimed at promoting competition, where feasible, will likely reduce price and increase consumer choice among broadband products and services. As reported previously by the BDAC, the Working Group recognizes that not all "competition" is alike. Government-funded competition puts public resources at risk and can actually harm the competitive environment if private investors find they cannot compete against government-owned networks.[45]Taxpayer resources may be put at risk if governments enter the telecom market for which they are ill-prepared to compete. On the other hand, properly designed and implemented government funded networks offer

[44] Letter from NATOA, NLC, NACo and NARC. June 14, 2018. https://ecfsapi.fcc.gov/file/106141506716895/BDAC%20Letter%20Final.pdf

[45] Lawrence Spiwak, *Problems With Government-Sponsored Broadband Expansion*, Phoenix Center for Advanced Legal & Economic Public Policy Studies (Sept. 25, 2020), https://news.bloomberglaw.com/us-law-week/problems-with-government-sponsored-broadband-expansion.

broadband options in locations that incumbent providers were unwilling or unable to provide. In many cases, government-funded networks involve a public-private partnership, where local governments are able to raise capital for funding a network infrastructure that the community entrusts to a private provider with the experience needed to operate and maintain a telecommunications network. (See US Ignite, Altman Solon, 7/9/20)

The Working Group assembled the comments of public, private, and non-profit stakeholders to identify a number of recommendations intended to encourage investment in broadband generally and specifically in low-income areas. The recommendations come from a variety of sources, including legislative proposals in Congress, recommendations from non-profit organizations, state broadband programs and Working Group members, among other sources. These recommendations share a common theme: improve ROI on broadband deployment by reducing the cost of investment and/or increasing demand.

As the Preamble to this Report indicates, the Working Group's recommendations are intended to provide a "menu" of options for policy makers and communities to consider when trying to determine what is best for their individual circumstances. The Working Group does not consider any specific recommendation(s) more "important" than any others. It is up to individual communities to consider these recommendations, and other policies, that may help encourage broadband investment in their communities.

2.5.1. General Broadband Deployment Incentives

2.5.1.1. State, Tribal, local governments, and other stakeholders should work together to facilitate broadband deployment.

- For example, one BDAC member reports that Arkansas law designed to facilitate broadband deployment was successfully used to cut through traditional administrative red tape to expand broadband facilities to unserved communities.
- See also, San Jose small cell agreements, in which the City and providers collaborated to enable rapid deployment of fiber and small cells with providers making monetary investments in the city's Digital Inclusion Fund.[46]

2.5.1.2. Work with state, Tribal and local governments to identify tax incentives, including job creation tax credits, and other tax exemptions or abatements, etc. designed to result in increased broadband deployment in low-income communities[47].

- Example: The State of Iowa removed telecommunications property from central assessment (which imposed a higher tax rate on telecommunications

[46] https://www.fcc.gov/document/rosenworcel-announces-availability-small-cell-model-agreements

[47] Local governments add that any concessions they extend to encourage providers to build broadband networks need to be tied to actual broadband investment and deployment, particularly to low income communities.

property). The State now taxes telecommunications property on a par with other commercial property.[48]

- Example: The Montana Legislature passed legislation (2019) to provide a temporary tax abatement on deployment of new fiber.[49]

2.5.1.3. Minimize regulatory barriers

- Working with stakeholders, the National League of Cities issued guidelines for local governments to consider for facilitating telecommunications permitting during the Covid-19 pandemic.[50]
  - Many lessons learned during the Covid-19 pandemic may have applications post pandemic and should be considered moving forward.
    - Identify state and local statutes, ordinances, or fees that impede broadband deployment and work with stakeholders to facilitate timely, cost-effective broadband deployment
    - Lease terms for public rights of way, should be non-discriminatory and sufficient to encourage investment
    - Expedite and streamline, within the existing regulatory requirements, environmental reviews of broadband deployment initiatives. See USDA Memorandum of Understanding, June 12, 2020.[51]
    - Several legislative proposals in the U.S. House and Senate from the 116th Congress offer additional material from which to develop programs and policies for facilitating broadband deployment. Examples, but not endorsements, among many, include:
      - S.4789, Sen. Cornyn's "Eliminate the Digital Divide Act" was introduced on 10/1.
      - S.4411, Sen. Graham's "Governors' Broadband Development Fund Act of 2020" was introduced on 8/4.
      - S.4515, Sen. Manchin's "Accelerating Connected Care and Education Support Services on the Internet Act" was introduced on 8/6.
      - H.R.7032, Rep. Clyburn's "Accessible, Affordable Internet for All Act" was introduced on 6/24. (Sen. Klobuchar filed companion legislation, S.4131, in the Senate on 7/1)

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[48] *See, e.g.*, Iowa Chapter 59 of the Acts of 2018, Section 234 (transmission property used for telecommunications, cable television or internet service exempted from a personal property tax, resulting in the value being assessed as land and buildings only; equipment used for storage of data or information exempted from sales tax).

[49] https://leg.mt.gov/bills/2019/AmdHtmS/SB0239GovVeto.pdf, The legislation (SB239) was vetoed. Proponents plan to reintroduce a similar measure in 2021. They argue that since the bill applies to new fiber deployment, there is no loss of local property revenue and in fact any new infrastructure deployed as a result of the tax benefit will promote additional taxable revenue for localities.

[50] National League of Cities, *Keeping Local Permits and Licensing Moving during COVID-19* (May 4, 2020), https://www.nlc.org/article/2020/05/04/keeping-local-permits-and-licenses-moving-during-covid-19/

[51] https://thehill.com/policy/energy-environment/502530-ag-secretary-orders-environmental-rollbacks-for-forest-service

- HR 2. Moving Forward Act. Sec. 1603 "Broadband Infrastructure Deployment." (Dig Once)[52]

2.5.1.4. **Allow public-private partnerships to build broadband networks where appropriate**[53]

- Example: Arkansas Act to Provide Additional Access to Broadband Service. 2/11/19.[54]
- Example: Mississippi Broadband Enabling Act. 1/30/19 [55]
- See BDAC Model State Code, Article 9 (broadband grant programs) and Article 10 (Rural Broadband Networks)

2.5.1.5. Interagency coordination and collaboration on broadband funding options, including access to federal property for broadband facilities deployment

- See American Broadband Initiative Progress Report.[56]

2.5.1.6. Expand use of Community Reinvestment Act for broadband infrastructure projects

- See Recommendations 2.5.2 below.

2.5.1.7. Facilitate middle-mile broadband deployment to facilitate access to un- and under-served areas

- Investing in broadband infrastructure means more than deploying "last-mile" facilities to end-users. It also requires investment in "middle-mile" infrastructure sufficient to deliver broadband from the internet backbone to last mile consumers. Investment incentives should include a comprehensive approach to deploying sufficient broadband to consumers, including middle mile investment.

2.5.1.8. Establish/expand state programs

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[52] https://transportation.house.gov/imo/media/doc/BILLS-116HR2-RCP116-54.pdf

[53] US Ignite and Altman Solon , *Broadband Models for Unserved and Underserved Communities,* (July 9, 2020). https://www.us-ignite.org/news/us-ignite-and-altman-solon-release-extensive-report-on-broadband-models-for-pool-of-6500-unserved-and-underserved-communities/

[54] https://www.arkleg.state.ar.us/Acts/Document?type=pdf&act=198&ddBienniumSession=2019%2F2019R

[55] http://billstatus.ls.state.ms.us/2019/pdf/history/HB/HB0366.xml.

[56] American Broadband Initiative Progress Report, (June 2020), https://www.ntia.gov/files/ntia/publications/abi_progress_report_june2020.pdf (On February 13, 2019, the American Broadband Initiative (ABI) was launched with the release of the Milestones Report, detailing the Administration's strategy to drive changes across Federal Agencies to identify and remove barriers to broadband access and leverage public assets and resources to expand our Nation's broadband infrastructure capacity.)

- Example: State universal service, grants, loans.[57]
- Include broadband in infrastructure investment policy. "Infrastructure" projects often are focused on roads, bridges, water, and sewer projects. "Infrastructure" should include broadband Infrastructure projects.
- Many states have adopted a variety of broadband development incentives. See "Broadband 2020 Legislation" from the National Conference of State Legislatures.[58]

2.5.1.9. Consider expansion of advanced broadband connectivity for rural health care, distance learning and telecommuting (particularly in light of Covid-19 crisis)

- The effectiveness of the temporary coronavirus response initiatives implemented by the FCC and private providers should be measured; and where demonstrated to be effective, these measures should be considered for permanent implementation.[59]
- For example, public/private partnership initiatives to help close the "homework gap" by encouraging providers to work with state or local governments (including school districts) to identify students in need of online education connectivity. Schools confidentially identify households, and providers establish a bulk service agreement.[60]
- States and state government subdivisions can augment federal programs and pandemic related initiatives. For example, as discussed above, the FCC has *temporarily* waived gift rules for the Schools and Libraries Program and the Rural Health Care Program. If these initiatives expire, states and/or localities could implement similar programs.

2.5.1.10. Consider public-private partnerships that leverage public capital resources and private sector broadband operational expertise.[61]

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[57] *See*, "How States are Expanding Broadband Access." Pew Charitable Trusts. February, 2020. (While no one size fits all, many states have adopted broadband expansion programs. "Promising practices" among states include: shareholder outreach and engagement; policy framework; planning and capacity building; funding and operations; program evaluation and evolution.)

[58] https://www.ncsl.org/research/telecommunications-and-information-technology/broadband-2020-legislation.aspx

[59] Op cit. (FN5). Note, there does not appear to be any data available to measure the effects, or lack thereof, from other COVID-19-related initiatives for example in the Rural Health Care or Schools & Libraries (E-Rate) Programs. Thus, regrettably, we do not know if relaxing the gift ban in RHC or E-rate programs had any supply side or demand side effect on broadband deployment.

[60] See, *e.g., Solving the Home Connectivity Gap*, NTCA. (September, 2020), https://www.ntca.org/sites/default/files/documents/2020-08/NTCA%20Solving%20Home%20Connectivity.pdf

[61] *See*, US Ignite and Altman Solon (July 9, 2020), *Op cit.* (Altman Solon worked with US Ignite to create a guide for communities considering ways to expand broadband service. The guide includes models for fully private and fully public broadband networks, but also covers a growing range of municipally enabled broadband strategies that rely on a combination of public and private investment.)

2.5.1.11. Data Resources

- The Broadband DATA Act should be funded to provide for more granular broadband availability and adoption data.
- Publicly available open datasets, including granular broadband maps, will enable identification of discrepancies in broadband availability and produce reports and analyses that can be used for developing broadband policy, planning, and investment decision-making. Users could compare broadband availability with population density or socioeconomic data to prioritize the planning or funding of broadband projects to meet policy objectives.

2.5.1.12. Wireless Infrastructure Deployment Incentives

- Facilitate tower siting.
- Access to spectrum, especially in rural areas. The FCC should consider extending its Special Temporary Authority access to spectrum and find ways to accommodate longer term consumer demand.
- Further, the Commission should require buildout measurements for spectrum license holders that require coverage throughout a wireless license area, based on geographic coverage—not just population served. (See FCC rules re construction requirements https://ww.fcc.gov/wirelless/support/universal-licensing-system-uls-resources/construction-requirements-service. The rules vary by spectrum frequency.
- Spectrum holders should not be permitted to hold spectrum unreasonably without using it to serve intended users throughout their licensed areas. The Commission should investigate a "use it or share it" or other policies to reduce the possibility of spectrum hoarding. If the spectrum holder is unwilling or unable to extend service throughout their service areas in a reasonable time, they should return to the FCC the unused spectrum to allow its use.
- See "How Wireless Kept Americans Connected during COVID" CTIA Report. June 23, 2020.[62] Recommendations include:
  - Continue policies that incentivize investment, promote competition, prioritize the additional licensed spectrum, and speed the buildout of new wireless infrastructure.
  - An investment-friendly framework that promotes streamlined deployment is key to continued investment in the wireless infrastructure that powers our economy.
- Provide Tribal Priority Window in future spectrum auctions
  - Example: 2020 2.5GHz Tribal Priority Window, in which more than 400 tribes applied for licenses on rural tribal lands.

[62] https://www.ctia.org/news/report-how-wireless-kept-americans-connected-during-covid-19

2.5.1.13. Workforce Training

- Build on the Telecommunications Industry Registered Apprenticeship Program (TIRAP), a collaboration among telecommunications providers, industry associations and academic institutions to encourage apprenticeships in the telecommunications sector.
- See U.S. Department of Labor's "Apprenticeships: Closing the Skills Gap" program. February 18, 2020.
- See S. 3355. Telecommunications Skilled Workforce Act. Sen. Jon Tester.

2.5.2. Broadband Deployment Incentives Designed Specifically for Low-Income Areas

The previous subsection scanned policy options that can be adopted on a wider scale by local, state, or federal entities to encourage broadband deployment in the economy. The following recommendations are more narrowly tailored to address deployment incentives in low-income communities specifically. As above, these incentives are designed to: 1) reduce the cost of investment or increase consumer demand in an effort to increase return on broadband infrastructure investment; 2) increase competition to increase consumer choice and reduce consumer costs; and/or 3) enhance workforce development.

2.5.2.1. Create gigabit opportunity zones with preference for low-income communities lacking sufficient broadband availability

- Include streamlined broadband deployment-friendly policies
- See for example, S.1013 (115th Congress) introduced by Sen. Capito.
- See U.S. Department of the Treasury final guidance. December, 2019.[63]

2.5.2.2. **Establish set-asides (RUS, FCC) or other bidding credits for investment specifically in low-income areas.** For example:

- See Sen. Thune's Rural Connectivity Advancement Program (RCAP), which would set aside proceeds from spectrum auctions for broadband network buildout. Such a set aside could be targeted specifically for low-income areas
- Similarly, state broadband programs or state universal service funds could set aside a portion of funds specifically for low-income buildout.
- See also the Bridging the Tribal Digital Divide Act of 2020, introduced by Sens. Udal, et al. This legislation, among other things, would set aside a portion of USDA and FCC funds for broadband deployment on Tribal lands. A similar concept could be applied to other state or local infrastructure

[63] https://home.treasury.gov/news/press-releases/sm864, ("An Opportunity Zone is an economically distressed community where new investments, under certain conditions, may receive preferential tax treatment. Through the establishment of Qualified Opportunity Funds (QOFs), private investors have the potential to defer tax on earlier capital gains by investing the amount of those gains in a QOF, and to eliminate tax on future capital gains in the QOF investment. The QOF, in turn, invests those funds in projects located in Opportunity Zones. QOFs may be an effective vehicle for infrastructure investments like broadband expansion.").

projects, setting aside funds for deployment specifically in low-income areas.[64]

- Provide "extra credit" weighting or scoring for applications from providers that target low-income areas.

2.5.2.3. Encourage partnerships and Strategic planning

- Create community-based organizations (e.g., cooperatives, partnerships) that may identify public and private funding sources, and other broadband investment options.
- Identify deployment obstacles and activities necessary to ensure access to affordable broadband.
- Develop locally-based strategic plans (including adoption) for broadband deployment and adoption.

2.5.2.4. **Focus Community Reinvestment Act (CRA) resources on broadband infrastructure projects in low-income areas**.[65]

Part III. Adoption Subcommittee Report

Part III of this Report includes findings and recommendations of the Working Group's Broadband Adoption Subcommittee.

3.1. Why Broadband Matters to Low-Income Communities

Access to broadband[66] is critical in a world that is increasingly connected. Recent statistics reveal that nearly 14.5 million Americans lack access to fixed terrestrial broadband and 44% of adults earning less than $30,000 annually do not subscribe to broadband at home.[67] The same

[64] The Bridging the Tribal Digital Divide Act also addresses another working group recommendation by establishing a Tribal Broadband Right of Way Pilot Program.

[65] *See,* American Broadband Initiative, *Op. cit*. ("[T]he final CRA rule identifies an investment in 'broadband infrastructure' to expand access to low- and moderate-income (LMI) individuals or communities, distressed areas, underserved areas, disaster areas, or Indian country, as an example of essential infrastructure that qualifies as a community development activity under section 25.04(c)(6) of the final rule.)

[66] For purposes of this Part, we use the Commission's definition of "broadband" as an Internet connection offering minimum speeds of 25 Mbps for downloads and 3 Mbps for uploads, *2020 Broadband Deployment Report,* (April 24, 2020), *available at* https://docs.fcc.gov/public/attachments/FCC-20-50A1.pdf ("*2020 Broadband Deployment Report*).

[67] *See 2020 Broadband Deployment Report* at ¶ 94, Pew Research Center, *Internet/Broadband Fact Sheet* (June 12, 2019), *available at* https://www.pewresearch.org/internet/fact-sheet/internet-broadband/. Slightly more recent data from the FCC's Broadband Map indicate that this number has decreased from 18.3 million to approximately 17 million. (*FCC Fixed Broadband Deployment Map*, https://broadbandmap.fcc.gov/#/)

population is less likely to adopt other modern technologies like the use of a tablet or laptop computer. The examples below illustrate the myriad ways in which we, as a society, rely on the internet and more specifically, a broadband connection. These examples also demonstrate how those without home broadband are at a distinct disadvantage in this connected environment, and such disadvantage will only worsen as more and more everyday tasks and services migrate online.[68] It is therefore essential that we close this adoption gap and enable more Americans to enjoy the benefits of broadband. The Digital Divide, as we all know, is a significant problem for all of those affected not just those with school-aged children.

Health Care

A home broadband connection enables individuals to exert greater control over their health care. They can use that connection to access critical health technologies and pertinent health-related resources, as well as to communicate directly with health care providers, which can improve patient health outcomes. Broadband also enables doctors and health care facilities to better collect and analyze health care data while more efficiently delivering that information to care teams. Whether via an app on a smartphone or TV, a remote monitoring service, or video messaging with a doctor, connected individuals are able to stay on top of their health care more easily than ever before.[69] Those without broadband connectivity must engage solely in more traditional office visits to get their care, which adds time, cost and risk and may involve a less holistic approach to health care delivery.

Education

A broadband connection also has become essential as more resources become digital-only and schools employ broadband-enabled technologies to a greater degree than ever. Children and adults alike who are pursuing educational opportunities often require a broadband connection to complete assignments and even to attend classes remotely, and can benefit greatly from the ability to supplement their learning with online resources.[70] Nevertheless, nearly 12 million school-aged children lack a broadband subscription at home and those who lack access to the internet at home are at a disadvantage compared to their connected peers.[71] Given the Covid-19 pandemic, this is more true now than ever before as schools and students move to fully remote or hybrid learning models. In states such as New Mexico, which ranks 49th in the broadband adoption and despite recent improvements, trails every other state and territory

[68] Digital Empowerment and Inclusion Working Group of the Advisory Committee on Diversity and Digital Empowerment, *Universal Digital Access Observations and Recommendations to Help Bridge the Digital Divide for All Americans* at 1 (June 24, 2019), https://www.fcc.gov/news-events/events/2019/06/advisory-committee-diversity-and-digital-empowerment-meeting-june-2019, *see* Access Subgroup Recommendation, *infra*.

[69] Masha Zager, Broadband Communities, *Crossing the Digital Divide* at 28 (August/September 2019), https://www.bbcmag.com/economic-development/crossing-the-digital-divide ("*Crossing the Digital Divide*").

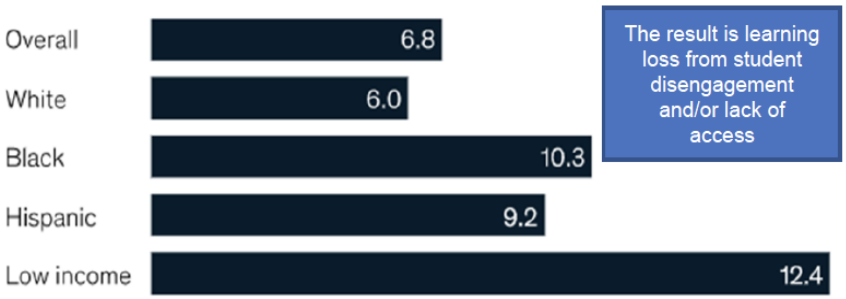
[70] *Id.* at 28-29, 37.

[71] U.S. Congress Joint Economic Committee, Ranking Member U.S. Senator Martin Heinrich, *America's Digital Divide* at 4 (September 2017).

except Mississippi and Puerto Rico in household broadband penetration[72], remote learning presents revealing disparities in the ability to conduct distance learning. A 2020 New Mexico Legislative Finance Committee report highlights that students without the internet at home are more likely to be students of color, from low-income families, or families with lower parental education levels. Teachers surveyed report a lack of internet access, lack of computers, or difficulties with various online learning platforms could be compounding student learning loss.[73]

Moreover, a broadband connection provides an important educational tool for non-students given the wide array of information online about everything from personal finance to healthy living to home repairs and other everyday tasks.

Figure XX. Average Months of Learning Lost if Schools Resume In-Class Schooling in January, 2021



Employment

Today, the majority of employment opportunities are disseminated via online sources. Numerous employers around the country, including the federal government, use the internet to post job openings at all levels and for varying types of skill sets. Those with access to a broadband connection can easily search open job listings and securely upload application materials to online portals that are immediately accessible to potential employers. Home broadband connections also permit applicants to easily communicate with potential employers via email or other messaging services about the status of their application or to provide additional materials as needed. In contrast, those without a broadband connection may have difficulty accessing the growing number of online job postings, communicating with potential employers, and making use of other employment resources, such as networking sites like LinkedIn, that could aid in their job searches. In addition, once a position is secured the pandemic has shown us that having a broadband connection can help employees keep their jobs by working-from-home, even when an employer must shut down offices, increasing the likelihood of continued employment.

[72] https://www.nmlegis.gov/Entity/LFC/Documents/Program_Evaluation_Reports/Program%20Evaluation%20-%20Funding,%20Oversight,%20and%20Coordination%20of%20Broadband%20Programs.pdf

[73] https://www.nmlegis.gov/Entity/LFC/Documents/Program_Evaluation_Reports/Spotlight%20-%20Learning%20Loss%20Due%20to%20COVID-19%20Pandemic.pdf

Civic and Government Participation

A home broadband connection increases the ways in which individuals can engage with their communities. Many neighborhoods have online listservs that enable the sharing of useful information such as emergency information, news about local events and activities, such as street clean-ups and garage sales, and other types of community information, including crime prevention tips. Moreover, home broadband connections allow community members to understand and engage with local governments more easily. Such activities might include watching the live stream of a city council hearing or school board proceeding, contacting government officials about important community issues, applying for a permit, registering a vehicle, or paying taxes. These online services are especially beneficial for elderly individuals who may have physical or other challenges that make it difficult to access these resources in person. Likewise, internet-based options are critical to individuals living in rural areas who may be located far away from community centers or municipal facilities. Absence of broadband connectivity make such civic engagement more challenging.

Commerce

Today, an enormous amount of commercial activity takes place online. Millions of individuals and businesses buy and sell goods in the vast online marketplace, seamlessly exchanging funds and information electronically. Individuals with a home broadband connection benefit greatly from the time-and-cost saving convenience of participating in this marketplace: from purchasing groceries online for their families, to locating and paying for services such as elder care, to selling goods for profit on sites like Amazon, eBay, and Etsy, to keeping track of bills and finances.[74] Those without a home broadband connection may end up dedicating more time and resources to accomplish the same tasks. In addition, those individuals with home-based businesses can better engage the marketplace and run and grow their businesses by having home broadband access.

Inclusion in society

The internet has increasingly become one of the most common forums for people to connect with one another. Individuals communicate online via email, social media, and through other online platforms for a variety of purposes, such as maintaining friendships, sharing photos, dating, and connecting over shared interests. A broadband connection can be a critical lifeline for individuals who have historically been isolated or excluded from the broader community, such as the elderly, recent immigrants with language barriers, individuals with disabilities, LGBTQ individuals, and those living in remote areas.[75] With broadband access, individuals can more easily keep in touch with family and friends, stay up-to-date on the latest news and world events, and even participate in conferences and webinars from the comfort of their own home.

[74] *Id.*

[75] *Id.*

These uses represent just some of the activities and capabilities enabled via a home broadband connection. As time passes and a greater portion of the global population gains access to the internet, additional activities and services will become digitally available, and in some cases may become online-only, which will further disadvantage those who lack a home broadband connection.

3.2. Broadband Adoption

3.2.1 Principal Barriers to Broadband Adoption

Ensuring ubiquitous broadband connectivity is not simple or inexpensive. Prior to the Covid-19 pandemic, it was already evident that despite the efforts of the FCC, broadband providers and others, the Digital Divide remains a persistent problem. While FCC statistics, as shown in the graph below, demonstrate that significant progress has been made in the last several years in closing the Digital Divide, some populations remain stubbornly impacted by the lack of broadband. In particular, according to the *2020 Broadband Deployment Report*, 22.3% of Americans in rural areas and 27.7% of Americans residing on Tribal lands lack broadband coverage, as compared to only 1.5% of Americans in urban areas. However, the gap between urban and rural or Tribal areas has narrowed each year over the past five years.[76]

Deployment (Millions) of Fixed Terrestrial Broadband Services

	2014		2015		2016		2017		2018	
	Pop.	%	Pop.	%	Pop.	%	Pop.	%	Pop.	%
United States	284.246	89.4%	287.853	89.9%	296.320	91.9%	304.473	93.5%	308.913	94.4%
Rural Areas	37.174	60.3%	38.271	61.5%	42.628	67.7%	46.982	73.7%	50.099	77.7%
Urban Areas	247.072	96.4%	249.582	96.7%	253.692	97.7%	257.491	98.3%	258.814	98.5%
Tribal Lands	2.245	57.1%	2.290	57.8%	2.520	63.1%	2.734	68.1%	2.921	72.3%
Pop. Evaluated	317.954	100.0%	320.289	100.0%	322.518	100.0%	325.716	100.0%	327.167	100.0%

Source: FCC, 2020 Broadband Deployment Report, Fig. 1.

Generally, statistics show that individuals residing in low-income communities are less likely to have a computer and subscribe to a broadband service than those living in higher-income neighborhoods. As of 2018, of households with an income of $150,000 or higher, 99% had a computer and 96% subscribed to broadband, as opposed to 72% and 58% of households, respectively, among households with an income of less than $25,000.[77] The same goes for individuals living in rural areas, as compared to their urban and suburban counterparts.[78]

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[76] *2020 Broadband Deployment Report,* at Figure 1.

[77] *See* Camille Ryan, U.S. Census Bureau, *American Community Survey Reports, Computer and Internet Use in the United States* at 1 (Aug. 2018), https://www.census.gov/content/dam/Census/library/publications/2018/acs/ACS-39.pdf .

[78] *2020 Broadband Deployment Report at* ¶ 36

While the availability of a reliable broadband connection is certainly a concern, it is not the sole cause for the digital divide. There are several times as many Americans not connected to the internet even though broadband is available to them than there are Americans who do not subscribe to broadband because of lack of deployment in their communities. Recent data from the FCC indicate that less than six percent of the U.S. population lacks an available fixed terrestrial broadband service. However, as of December 2018, approximately 34.9% of U.S. households with available fixed broadband connections do not subscribe to such service. Furthermore, approximately 13.6% of U.S. households do not subscribe to either a fixed or mobile internet access service. A critical question is why this gap between broadband availability and subscribership exists.[79]

Aside from availability, some of the factors contributing to this lack of adoption include the cost of service and equipment, lack of proper equipment, and various digital literacy and relevance issues.[80]

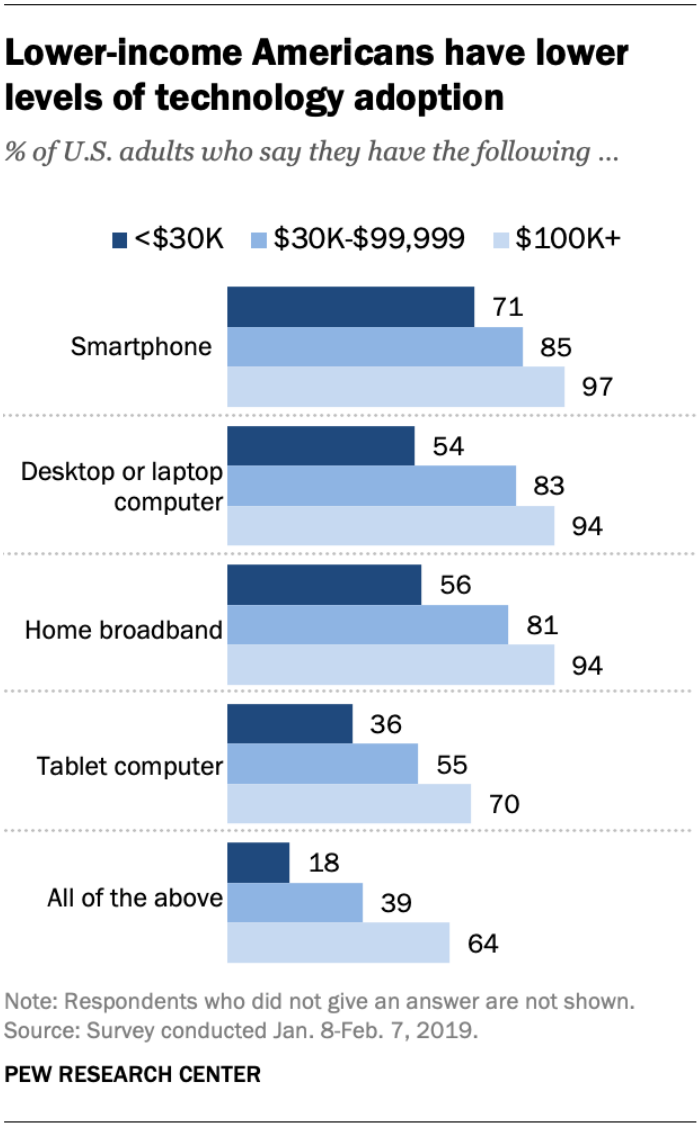
Cost of Service and Other Financial Issues

For some individuals for whom broadband is available but nonetheless choose not to subscribe, the cost of service or equipment, or lack of proper equipment, are key factors cited as barriers to online adoption.[81] As described more fully in subsequent recommendation 3.4.1, we encourage federal, state and local governments, as well as providers and the non-profit sectors, work to address these barriers in holistic fashion. The Technology Policy Institute's ("TPI") 2017 American Community Survey data shows 65.6% of households with annual incomes below $35,000 (about 30% of all households) had a home broadband subscription, compared with 95.0% of homes with annual incomes at or greater than $75,000. Encouraging these low-income households to subscribe can be a challenge.

[79] *Id.*

[80] NTIA, *Digital Nation Data Explorer* (June 10, 2020), https://www.ntia.doc.gov/data/digital-nation-data-explorer#sel=noNeedInterestMainReason&disp=map, *see also*, Monica Anderson, *Mobile Technology and Home Broadband 2019*, Pew Research Center (June 13, 2019), https://www.pewresearch.org/internet/2019/06/13/mobile-technology-and-home-broadband-2019/ ("*Mobile Technology and Home Broadband*").

[81] *Report on Promoting Broadband Internet Access Service for Veterans, Pursuant to the Repack Airwaves Yielding Better Access for Users of Modern Services Act of 2018* at 12, FCC WCB (May 2019), https://www.fcc.gov/document/report-promoting-internet-access-service-veterans. *see also, Crossing the Digital Divide* at 30.



Many individuals who cite cost and lack of equipment as barriers are not aware that there are multiple broadband adoption programs available to them, such as existing broadband subsidies. According to a recent study, only 28% percent of respondents were aware of the federal Lifeline program, only 27% were aware of low-cost basic service plans from internet providers and only 11% were aware of the availability of low-cost refurbished computers from local agencies.[82] Such programs could help low-income individuals get online, for example, by offering access to free digital literacy training and low-cost equipment and broadband service.

[82] *Crossing the Digital Divide* at 30.

Independent research shows that such programs can actually increase broadband adoption among households that would not otherwise have subscribed.[83]

Though new internet adopters may quickly learn skills and gain confidence; the cost of equipment and internet service remains a challenge. One strategy to encourage broadband adoption and enable people to reap the benefits of internet use would be to better publicize the financial assistance available to them.[84] Ensuring that non-adopters are aware of such programs is critically important to getting more Americans online. In 2019, Angela Siefer of the National Digital Inclusion Alliance ("NDIA") informed the FCC's Digital Empowerment and Inclusion Working Group of the Advisory Committee on Diversity and Digital Empowerment that many internet Service Providers ("ISPs") are leading the way providing adoption programs, but urged the Committee to nevertheless recommend to the FCC that it continue to encourage such adoption programs. Ms. Siefer argued that because cost continues to be a barrier to broadband adoption in vulnerable communities, low-cost broadband programs[85] are essential for both urban and rural communities.

Digital Literacy and Inclusion Issues

For many low-income individuals for whom broadband is available but do not subscribe, myriad digital literacy factors[86] account for their decision not to adopt.[87] For instance, many such individuals lack interest in a broadband subscription. Indeed, November 2019 NTIA data show that approximately 60% of households that do not subscribe to home broadband cite lack of need or necessity as their main reason for not going online.[88] Additionally, approximately two-

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[83] George Zuo and Daniel Kolliner, *Wired and Hired: Employment Effects of Subsidized Broadband Internet for Low-Income Americans* at Table 1, p. 40 (August 19, 2020), https://github.com/georgewzuo/georgewzuo.github.io/raw/master/Broadband_Zuo_AEJ_Final.pdf.

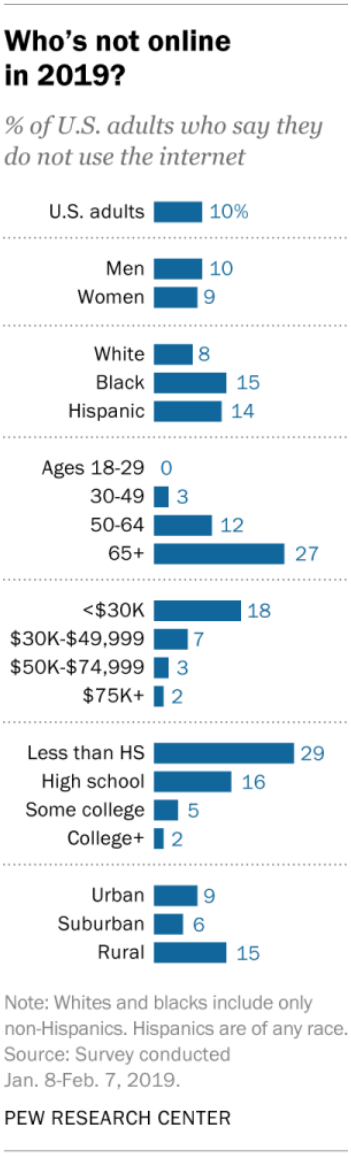
[84] 2019 Urban Low-Income Digital Divide Study, Broadband Communities & RVA LLC, August/September 2019, https://www.bbcmag.com/economic-development/crossing-the-digital-divide.

[85] NDIA and Public Knowledge developed a resource to help digital inclusion practitioners in their outreach activities. *See* Bill Callahan, *et al.*, *The Discount Internet Guidebook* (2018), https://www.discounts.digitalinclusion.org/pdfs/Discount%20Internet%20Guidebook%20v3.1.pdf.

[86] *Report on Promoting Broadband Internet Access Service for Veterans, Pursuant to the Repack Airwaves Yielding Better Access for Users of Modern Services Act of 2018*, FCC WCB (May 2019), https://www.fcc.gov/document/report-promoting-internet-access-service-veterans. *See also*, *Crossing the Digital Divide* at 30.

[87] John B. Horrigan, *Technology Policy Institute, Reaching the Unconnected: Benefits for Kids and Schoolwork Drive Broadband Subscriptions, But Digital Skills Training Opens Doors to Household Internet Use for Jobs and Learning*, (August 2019), https://techpolicyinstitute.org/wp-content/uploads/2019/08/Horrigan_Reaching-the-Unconnected.pdf.

[88] Michael J. R. Martin, Education and Social Stratification Branch, U.S. Census Bureau, *Deconstructing the Digital Divide: Identifying the Supply and Demand Factors That Drive Internet Subscription Rates* at 20, https://www.census.gov/content/dam/Census/library/working-papers/2019/demo/sehsd-wp2019-15.pdf.



thirds of military veteran households that do not use the Internet indicate the primary reason is lack of interest or necessity.

Experiments run by the FCC and several ISPs in 2014 found signing up unconnected, low-income households to be more difficult than expected despite very low-priced offerings. Pew Research Center ("Pew") has also looked beyond income to other demographic categories to better understand the American population that does not use the internet.[89] The following graph contextualizes the challenge that lies in the digital divide.

While age can certainly be a factor in some cases (i.e. older generations are less likely to use the internet), in many other cases individuals simply lack the proper technological training or "digital literacy skills" to feel like they can successfully use and benefit from an internet connection[90] or may harbor a generalized fear of going online.[91] Dr. John Horrigan of TPI has previously discussed this topic, which he calls "digital readiness," focusing on subscriber preparation to engage in routine online behaviors such as email.[92] He has argued the importance of not just focusing on broadband adoption, but also focusing on the fears, attitudes, and behaviors people may have that impact their engagement with the internet. Digital readiness includes an individual being able to carry out online tasks efficiently and being able to determine the trustworthiness of online information. Dr. Horrigan has recommended expanding digital readiness outreach and using public community spaces, such as libraries, religious institutions, schools, and community centers to provide training to help individuals navigate the internet safely and allay fears about using the internet.

[89] Monica Anderson, Pew, *10% of Americans Don't Use the Internet. Who Are They?* (April 22, 2019), https://www.pewresearch.org/fact-tank/2019/04/22/some-americans-dont-use-the-internet-who-are-they/.

[90] NTIA, *Digital Nation Data Explorer* (June 10, 2020), https://www.ntia.doc.gov/data/digital-nation-data-explorer#sel=noNeedInterestMainReason&disp=map, (As of November 2019, 59.4% of households earning less than $25,000 a year said that lack of need or interest was their main reason for non-adoption.).

[91] *Report on Promoting Broadband Internet Access Service for Veterans, Pursuant to the Repack Airwaves Yielding Better Access for Users of Modern Services Act of 2018* at 12, FCC WCB (May 2019), https://www.fcc.gov/document/report-promoting-internet-access-service-veterans (citing NTIA, *Digital Nation Data Explorer* (June 6, 2018), *available at* https://www.ntia.doc.gov/data/digital-nation-data-explorer#sel=internetUser&demo=veteran&pc=prop&disp=chart.

[92] *See* Digital Empowerment and Inclusion Working Group of the Advisory Committee on Diversity and Digital Empowerment, *Recommendation for the FCC to Host a Digital Inclusion Workshop* at 4 (June 24, 2019),

Availability of a Broadband Connection

Recent data from the FCC show that the Digital Divide does continue to narrow. The percentage of Americans lacking an available terrestrial fixed broadband connection dropped from 6.5% at the end of 2017 to 5.6% as of year-end 2018.[93] And Americans appear to have greater choice than ever before when it comes to choosing a broadband provider. The FCC reports that in 81% of developed census blocks (those that contain housing units), households have access to three or more broadband providers and an additional 18% have access to two providers.[94]

However, these statistics mask the availability gap between urban and rural areas. As previously discussed in the *Deployment* section above, more than 22% of Americans in rural areas and over 28% of Americans on Tribal lands lack an available fixed terrestrial broadband, compared to only 1.5% of Americans in urban areas.[95] Moreover, 22% of those who do not subscribe to broadband say that "broadband service not being available or available at an unacceptable speed where they live is a reason for not subscribing to home broadband."[96] What explains this lack of availability? Rural areas have low population density, and it may not be cost-effective for providers to deploy the infrastructure needed to support high-speed services, often in challenging terrain, given the limited number of potential subscribers.[97] The National Agricultural and Rural Development Policy Center found that nonmetropolitan counties that had high levels of broadband adoption (greater than 60%) had higher growth in median household income in 2010—23.4% versus just over 22%—between 2001 and 2010 when compared to counties that had similar characteristics in the 1990s but were not as successful at adopting broadband.[98]

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https://www.fcc.gov/news-events/events/2019/06/advisory-committee-diversity-and-digital-empowerment-meeting-june-2019, *see also,* Adoption Subgroup Recommendation, *infra.*

[93] *2020 Broadband Deployment Report* at ⁋⁋ 36, 41. Likewise, only 3% of the U.S. population lacks access to fixed terrestrial Internet at 10/1 Mbps. *Id.* at ⁋ 41, Figure 4.

[94] *Internet Access Services Report* at 6, Figure 4 (Satellite service providers are included in this analysis. Satellite service providers report offering Internet access at bandwidths of at least 25 Mbps downstream and 3 Mbps upstream in 99.8% of developed census blocks.)

[95] *2020 Broadband Deployment Report* at ⁋ 36, Figure 1.

[96] *Mobile Technology and Home Broadband 2019* at 8-9.

[97] NTIA, *American Broadband Initiative Milestones Report* at 9 (February 2019), https://www.ntia.doc.gov/files/ntia/publications/american_broadband_initiative_milestones_report.pdf.

[98] Brian Whitacre, Roberto Gallardo, and Sharon Strover, *Broadband's Contribution to Economic Health in Rural Areas*, Research & Policy Brief Series, Community and Regional Development Institute, Cornell University (February 2015), https://cardi.cals.cornell.edu/publications/research-policy-briefs/broadband%e2%80%99scontribution-economic-health-rural-areas/.

3.3. Covid-19 Impact on Broadband Adoption

The Covid-19 pandemic of 2020 has proven to be a unique laboratory for assessing both the barriers to adoption and potential solutions. The experiments in this laboratory have played out in real-time since March 2020 and we continue to learn from the responses to Covid-19 from the government, the communications industry, and Americans from all walks of life.

3.3.1. A Case Study in Adoption Barriers

The Covid-19 pandemic has unquestionably highlighted the critical importance of having a fixed or high quality mobile broadband connection. As Covid-19 spread across the nation, shelter-in-place orders were issued, forcing millions of Americans to spend virtually all their waking hours in their homes. As a result of widespread shelter-in-place orders and social-distancing mandates, Americans have been forced to rely on broadband connections to conduct nearly all aspects of their lives virtually. Schools have moved to remote learning; employers have sent workers home to log-on from their kitchens, couches, and home offices each day; and once-ordinary tasks such as buying groceries suddenly have become more difficult as people have had to place their orders from behind a screen. Each of these critical activities requires not only a broadband connection, but one that is stable and fast enough to support the bandwidth required. And many of these tasks rely on video conferencing, a bandwidth-intensive technology. For many, that meant seamless connectivity. For others, it exacerbated a disconnect that could hinder or prevent home-schooling, remote work, or tele-health appointments from taking place.

What the Covid-19 crisis has laid bare, as in so many other areas of society, is the harsh reality of what that data point means on the ground in our communities. The negative effects of the Digital Divide and the lack of adoption of the internet by some Americans can be seen most clearly during the pandemic through the estimated 12 million students who do not have reliable access to the internet at home during an unprecedented move to virtual and online learning.[99] Students without access to broadband have been forced to sit in school parking lots or other locations with free Wi-Fi. This "Homework Gap" is the latest sign that the Digital Divide in this country is significant and has the potential to do long-term damage to educational outcomes.

Because so many daily activities have shifted online, the vast majority of Americans believe the internet has been essential or important to them during the pandemic.[100] A Pew survey conducted in April 2020 indicates that approximately half of U.S. adults (53%) say the internet

[99] Lara Fishbane and Adie Tomer, Brookings, *As Classes Move Online During Covid-19, What Are Disconnected Students To Do?* (March 20, 2020), https://www.brookings.edu/blog/the-avenue/2020/03/20/as-classes-move-online-during-covid-19-what-are-disconnected-students-to-do/.

[100] *53% of Americans Say the Internet Has Been Essential During the COVID-19 Outbreak* (April 30, 2020), https://www.pewresearch.org/internet/2020/04/30/53-of-americans-say-the-internet-has-been-essential-during-the-covid-19-outbreak/.

has been essential for them personally during the Covid-19 crisis and another 34% describe it as "important, but not essential."[101] In this environment, those without a broadband connection have been greatly disadvantaged as work, education, health care, and other everyday activities have necessarily shifted online. For example:

- ***Telehealth.*** Since the pandemic began, healthcare facilities have increasingly turned to telehealth platforms to provide care. In June 2020, the American Medical Association estimated that "[p]hysicians and other health professionals are now seeing 50 to 175 times the number of patients via telehealth than they did before the pandemic" and that "46% of patients are now using telehealth to replace canceled in-person visits, up from the just 11% of patients who used telehealth in 2019."[102] However, community health centers ("CHC"s), which serve a significant number of patients in rural and underserved urban areas, are less likely to be set up for telehealth use. One study found that "[a]cross the [U.S.], 56 percent of 1,330 CHCs did not have any telehealth use in 2018," and "47 percent of the centers using telehealth were doing so only with specialists such as those at referral centers, rather than with patients."[103]

- ***Remote Learning.*** When the pandemic began, schools across the country shut down and moved classes online for the remainder of the 2019-2020 school year, presenting a serious challenge for students without access to broadband and/or a computer. The U.S. Census Bureau estimated that during Covid-19-related school closures in the 2019-2020 school year, 1 in 10 of the poorest children in the [U.S.] had little or no access to technology for learning."[104] Since the 2020-2021 school year began, more than half of K-12 public school students have started the year remotely,[105] and some schools and colleges that started the year in-person have already moved online, at least temporarily, due to Covid-19 outbreaks on campus.[106] Experts predict that "[d]ivergent access to the

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[101] Emily Vogels, et al., *53% of Americans Say the Internet has been Essential During the COVID-19 Outbreak* (April 30, 2020), https://www.pewresearch.org/internet/2020/04/30/53-of-americans-say-the-internet-has-been-essential-during-the-covid-19-outbreak/.

[102] Tanya Albert Henry, *After COVID-19, $250 billion in care could shift to telehealth*, American Medical Association (June 18, 2020), https://www.ama-assn.org/practice-management/digital/after-covid-19-250-billion-care-could-shift-telehealth.

[103] June-Ho Kim, Eesha Desai, Megan Cole, *How the Rapid Shift to Telehealth Leaves Many Community Health Centers Behind During the COVID-19 Pandemic*, Health Affairs (June 2, 2020), https://www.healthaffairs.org/do/10.1377/hblog20200529.449762/full/.

[104] Emiliana Vegas and Rebecca Winthrop, *Beyond reopening schools: How education can emerge stronger than before COVID-19*, Brookings Institution (Sept. 8, 2020), https://www.brookings.edu/research/beyond-reopening-schools-how-education-can-emerge-stronger-than-before-covid-19/.

[105] Tim Moran, *Most U.S. Schools Going Virtual Amid Coronavirus Pandemic*, Patch, (Aug. 12, 2020), https://patch.com/new-york/pelham/most-u-s-schools-going-virtual-amid-coronavirus-pandemic.

[106] Noah Higgins-Dunn, *Fraternities blamed for campus coronavirus outbreaks as universities struggle to keep students in class*, CNBC (Sept. 11, 2020), https://www.cnbc.com/2020/09/09/coronavirus-universities-blame-greek-life-for-campus-reopening-headaches-were-having-a-significant-issue.html; Associated Press, *Georgia school shifting online after students and staff test positive for coronavirus*, L.A. Times (Aug. 9, 2020),

resources necessary for successful remote learning . . . could further worsen racial disparities in educational outcomes."[107]

Covid-19 has also presented challenges in addressing cost-related barriers to adoption and digital literacy. Research shows that many Americans are experiencing substantial financial struggles as a result of the pandemic, and in early April 43% of Americans reported that someone in their household lost their job or had their pay cut due to the pandemic.[108] The Covid-19 pandemic thus provides a unique opportunity to examine broadband adoption programs during the pandemic and to use that experience to inform future, post-Covid-19 efforts to expand adoption. In addition, we strongly urge the continued examination of program and consumer adoption trends, post-pandemic, to more precisely measure which programs and program elements proved most effective in sustaining broadband adoption. Even more fundamentally, post-pandemic analysis should answer whether people who connected during the pandemic, remain connected post-pandemic?

3.3.2. A Case Study in Covid-19 Rapid Response

The public and private sectors have developed new and forward-thinking initiatives (and updated existing initiatives) to aid broadband adoption during the Covid-19 pandemics, with an emphasis on low-income communities and individuals. The FCC has partnered with providers and school districts to deploy technology solutions, waive certain Lifeline eligibility or renewal requirements, and make free or subsidized service available where, possible. Additionally, multiple providers have partnered with EducationSuperHighway recently to announce a new "K-12 Bridge to Broadband" initiative aimed at connecting students to broadband for remote and hybrid learning.[109] Additional examples of these initiatives highlight the swift response to attempt to narrow the broadband adoption gap during the Covid-19 pandemic.

- ***Keep Americans Connected Pledge:*** FCC Chairman Pai announced the Keep Americans Connected Pledge on March 12, 2020, requesting that broadband and telephone service

https://www.latimes.com/world-nation/story/2020-08-09/georgia-school-shifting-online-after-infections-reported.

[107] Dania Francis and Christian E. Weller, *The Black-White Wealth Gap Will Widen Educational Disparities During the Coronavirus Pandemic*, Center for American Progress (Aug. 12, 2020), https://www.americanprogress.org/issues/race/news/2020/08/12/489260/black-white-wealth-gap-will-widen-educational-disparities-coronavirus-pandemic/; *see also* Moriah Balingit, *A national crisis: As coronavirus forces many schools online this fall, millions of disconnected students are being left behind*, Wash. Post (Aug. 16, 2020), https://www.washingtonpost.com/education/a-national-crisis-as-coronavirus-forces-many-schools-online-this-fall-millions-of-disconnected-students-are-being-left-behind/2020/08/16/458b04e6-d7f8-11ea-9c3b-dfc394c03988_story.html.

[108] *Id.*

[109] NCTA, *U.S. Cable Industry Announces New "K-12 Bridge to Broadband" Initiative to Help Connect Students to Broadband for Remote and Hybrid Learning* (September 10, 2020), https://www.ncta.com/media/media-room/k12bridgetobroadband.

providers and trade associations agree (1) not to terminate service; (2) to waive any late fees residential or small business customers incur due to circumstances related to the pandemic; and (3) to open Wi-Fi hotspots to the public.[110] Chairman Pai urged companies to expand and improve low-income adoption programs and called on broadband providers to relax their data usage limits in appropriate circumstances and take steps to promote remote learning and telehealth. The private sector response was robust and unprecedented, with more than 800 companies signing the pledge. The pledge formally expired on June 30, 2020, but many companies are continuing efforts to help keep customers connected.

- ***Lifeline, E-Rate & Rural Health Care Requirements:*** The FCC has waived several Lifeline, E-rate, and Rural Health Care Program rules to address concerns during the Covid-19 pandemic. Specifically, the FCC took action to help ensure that no current Lifeline subscribers are involuntarily removed from the program during the Covid-19 pandemic, and the agency waived gift rules in the E-Rate and Rural Health Care programs to enable broadband providers to better support telehealth and remote learning. Furthermore, the FCC opened a second funding window this year to provide schools an opportunity to apply for more bandwidth to accommodate distance-learning needs.

- ***CARES Act:*** Congress' coronavirus response allocated $200 million for FCC telehealth programs, and the FCC acted quickly to put these funds to work. Congress also allocated billions to other agencies to assist with the Covid-19 response, including $30.75 billion in emergency educational funding, $13.2 billion of which was set aside for the Elementary and Secondary School Emergency Relief Fund ("ESSER"). ESSER funds are distributed by the Department of Education ("DoE") through a grant program and are intended to help elementary and secondary schools manage the Covid-19 crisis.[111] The money is specifically intended to help states and local school districts fund remote learning efforts, such as providing educational services while schools are closed and developing and implementing plans for the return to normal operations. The Veterans Health Administration has used appropriated funds to ramp up its resources to care for veterans during the pandemic by increasing telehealth services. Additionally, the Department of Commerce is permitted to allocate funds to entities to deploy broadband "for purposes including supporting telehealth and remote learning for job skills"[112] and funds appropriated to the Treasury Department may be used in certain instances for broadband-related purposes such as assisting with distance learning and telework.

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[110] FCC, *Keep Americans Connected*, https://www.fcc.gov/keep-americans-connected.

[111] U.S. Department of Education, Office of Elementary & Secondary Education, Elementary and Secondary School Emergency Relief Fund, https://oese.ed.gov/offices/education-stabilization-fund/elementary-secondary-school-emergency-relief-fund/.

[112] *U.S. Department of Commerce Announces Availability of $1.5 Billion in CARES Act Funds to Aid Communities Impacted by the Coronavirus Pandemic* (May 7, 2020), https://www.commerce.gov/news/press-releases/2020/05/us-department-commerce-announces-availability-15-billion-cares-act.

- ***Internet Service Providers:*** ISPs are taking other significant steps to maintain and expand connectivity for households during the pandemic. Even though the FCC's Keep Americans Connected pledge officially ended on June 30, 2020, many ISPs are continuing to provide low-cost or no-cost internet access, access to Wi-Fi hotspots, equipment subsidies; expanding eligibility for service and/or offering increased speeds for existing low-income programs; and waiving installation costs and/or other fees.[113] For example, NewWave Communications has extended through the end of this year access to free public Wi-Fi hotspots throughout its footprint,[114] and CableONE/Sparklight is offering through the end of the year access to free public Wi-Fi hotspots and offering low-cost introductory broadband packages to low-income families and other new customers impacted by the pandemic.[115] Additionally, providers from across the industry are working to help increase home connectivity solutions for students nationwide as schools and students engage in remote and hybrid learning.[116] Efforts to close the Homework Gap include initiatives such as Chicago Connected which is one of the largest efforts by any city to provide no-cost, high-speed internet to students and their families, and will help as many as 100,000 Chicago students and their families get connected through a public private partnership that includes Mayor Lori E. Lightfoot, Chicago Public Schools, Kids First Chicago and providers including Comcast, RCN and T-Mobile. These are just a few examples of the many initiatives companies are undertaking to continue helping customers stay connected during the ongoing pandemic.

3.3.3. Chicago Connected — A Case Study

In June 2020, Mayor Lori E. Lightfoot announced Chicago Connected, a partnership between the City of Chicago, Chicago Public Schools (CPS), the City's philanthropic community, and leading Internet Service Providers (ISPs), to launch the most extensive, long-term effort by any American city to provide high-speed internet to students and their families.

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[113] *See* Federal Communications Commission, *Companies Have Gone Above and Beyond the Call to Keep Americans Connected During Pandemic*, https://www.fcc.gov/companies-have-gone-above-and-beyond-call-keep-americans-connected-during-pandemic; *see also* Benton Institute for Broadband & Society, *What Are ISPs Doing to Get More People Online at Home During the Pandemic?* (April 10, 2020), https://www.benton.org/blog/what-are-isps-doing-get-more-people-online-home-during-pandemic.

[114] *NewWave Communications Extends Covid-19 Relief Efforts* (June 24, 2020), https://www.newwavecom.com/news/newwave-communications-extends-covid-19-relief-efforts.

[115] FCC, *Companies Have Gone Above and Beyond the Call to Keep Americans Connected During* Pandemic, https://www.fcc.gov/companies-have-gone-above-and-beyond-call-keep-americans-connected-during-pandemic.

[116] ACA Connects, *ACA Connects and EducationSuperHighway Announce Partnership on 'K-12 Bridge to Broadband' Initiative to Meet Student Connectivity Needs* (Oct. 13, 2020), https://acaconnects.org/aca-connects-and-educationsuperhighway-announce-partnership-on-k-12-bridge-to-broadband-initiative-to-meet-student-connectivity-needs/.

Inspired by the firsthand accounts of parents struggling to get their students connected for remote learning amid the Covid-19 pandemic, Kids First Chicago partnered with the Metropolitan Planning Council to study the issue in the Chicago area. The report they released found that city-wide roughly 1 in 5 primarily Black or Latinx/a/o children under 18 lack in-home internet, and in some communities, nearly 50% of households with school-age children do not have broadband. Census data shows that an estimated 100,000 students lack access to high-speed internet (25/3 Mbps) in Chicago. The City and CPS partnered with founder and CEO of Citadel, Ken Griffin, who spurred philanthropists to work with government and nonprofit partners to develop a sustainable solution for all of Chicago's most vulnerable students, enhancing equal access to education and the myriad additional benefits the internet provides.

Chicago Connected adopts a sponsored service model, providing high-speed internet to households for at least four years by directly subsidizing the full cost of internet service for families most in need. Chicago Connected also provides digital literacy support to help newly connected families make the best use of their new access. To date, no other city or school district in the nation has provided high-speed internet access to students over multiple years. The program is funded in the first two years by contributions from philanthropic partners and $5 million of the City's CARES Act funds. In years three and four, the program will be funded by CPS. After issuing an RFP to identify ISP partners able to offer households a best-possible package with internet service speeds of up to 25/3 Mbps, Chicago Connected selected Comcast Internet Essentials and RCN as ISP partners.

In addition to providing wired internet access, Chicago Connected has also partnered with T-Mobile to provide hotspot services to students in temporary living situations for up to four years.

An essential first step for CPS in connecting students for remote learning was identifying those who lack access to devices and high-speed internet. CPS worked collaboratively with the city and ISPs to correct household addresses and analyze the updated address-level data to gain insight into connectivity options for CPS student households. With the support of these ISPs, they were able to answer three crucial questions: whether (1) high-speed internet was being delivered at a specific address; (2) what speeds were being delivered; and (3) whether an ISP could readily serve an address with no current subscription.

Chicago Connected has a robust communications and marketing plan to contact families, especially those most in need. Each eligible household receives a general robocall, robotext, and flier to raise awareness of the program, followed by U.S. Postal mail, emails, and text messages containing their specific activation codes. Community-based organizations (CBOs) also play a critical role in supplementing CPS outreach to sign-up eligible families. CBOs contact households to survey installation experiences and provide them with digital literacy training and support. The training is designed to serve a wide variety of household needs and interests. It is intended to equip households with the power to create an individualized learning plan (e.g., developing online safety and job readiness skills, accessing telehealth resources, completing the census online, and registering to vote). It will also link newly-connected

households to critical support services offering by CBOs, including food, housing, employment, and healthcare assistance.

3.3.4. Sacred Wind Communication — A Case Study

Sacred Wind Communications, Inc. ("SWC") offers a mix of technologies (e.g. fixed wireless, fiber to the home, 5.8 GHz, 2.5 GHz, etc.) to a territory spanning 3,200 square miles of mostly Navajo Nation lands, to bring broadband service to rural homes in rugged and remote areas of New Mexico.[117] SWC's Navajo customers are part of the lowest-income tribe in the United States -- over 42.9% of Navajos live under the national poverty level, the highest poverty rate among native tribes.[118] In fact, prior to 2006, only 26% of the Navajo reservation households had land-line telephones and there was no broadband coverage on the reservation in New Mexico. Even now, 12-15% of the reservation's homes do not have electricity.

Despite these challenges to providing broadband availability, in the past two years SWC has quintupled broadband speeds and expanded service to more than 90% of homes in its service territory. Broadband adoption, however, remains a challenge because many of SWC's tribal customers cannot afford the higher costs associated with traditional and mobile broadband, even with the current Lifeline subsidy. Indeed, almost 75% of SWC's customers participate in the Tribal Lifeline program. SWC continues to explore creative measures to deploy broadband to tribal communities and remote homes in the Navajo Nation, including a recently announced pilot with Navajo Technical University ("NTU") to use the 2.5 GHz band to deliver 5G wireless service to rural unserved and underserved communities.

The Covid-19 pandemic has been particularly devastating to the Navajo Nation and, therefore, to the population served by SWC. While only representing 11% of New Mexico's population, tribal cases of Covid-19 accounted for 57% of total cases in the State. In fact, the Navajo Nation as a group experienced the highest per capita cases of Covid-19 in the United States. Yet, during the Covid-19 pandemic, the percentage of households in SWC's territory that have signed up for broadband service or upgraded to higher speeds has spiked over 300% compared to 2019.

Much of the increase is attributable to the partnership between SWC and its customers. For example, SWC was part of the first batch of companies to sign the FCC's *Keep Americans Connected Pledge*, on March 13, 2020. SWC has waived late fees and suspended terminating services for residential and small business customers who experienced hardships due to the Covid-19 pandemic even though the pledge itself has formally expired. In addition, SWC has undertaken the following actions to keep the Navajo Nation connected:

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[117] On May 28, 2020, John Badal, CEO of SWC gave a presentation to the Increasing Broadband Investment in Low-Income Communities Working Group.

[118] The Navajo Nation, An Overview of the Navajo Nation – Demographics. http://www.navajobusiness.com/fastFacts/demographics.htm

- Boosted internet speeds to broadband levels for all current customers subscribing below that threshold at no extra charge to the customer, where facilities and capacities allowed.
- Reduced the price of broadband service by over 50% for households with students and mapped over 300 students' homes for expanded service.
- Purchased additional backhaul capacity to satisfy increased demand.
- Installed Wi-Fi hotspots at ten locations, covering a population of over 12,000 residents in and around the Navajo Nation. Usage data and information shared by community users indicate that the Wi-Fi hotspots have been accessed approximately 335 times per week during the Covid-19 pandemic.
- Funded the purchase and installation of Customer Premises Equipment ("CPE") for 104 students at Farmington Municipal School to enable remote learning. SWC is currently working with other school districts for similar partnerships.
- Instituted a public-private partnership with Microsoft's Airband Program and the Bureau of Indian Education To'Hajiilee Community School to install a mobile tower on wheels and provide CPE to enable remote learning for 111 students.
- Delivered emergency voice recorded messages, when deemed necessary, in both English and Navajo over its voice phone network to over 3,000 customers in its Network.

SWC has continued to partner with and support its customers during the Covid-19 pandemic despite having experienced a 50% increase in uncollected fees and increases in per customer operating costs. Nevertheless, without compensation or subsidies from the FCC, SWC and other rural providers will not be able to continue to bear the burden of increasing capital and operational expenditures required to keep rural tribal communities connected during the Covid-19 pandemic that does not seem to have an immediate end in sight.

3.4. Recommendations to Increase Broadband Adoption and Use Among Low-Income Americans

3.4.1. Address Issue Holistically. The Covid-19 pandemic has highlighted that effectively addressing adoption gaps requires addressing multiple barriers to adoption: cost of service, device affordability, and lack of digital skills and relevance. Beyond supply-side efforts to close the coverage gap, closing the usage gap requires policy actions as well as initiatives by the private sector and community organizations. Federal, state, and local governments can expand access and address device shortages that may pose challenges to students, jobseekers, and others who rely on connectivity and devices for critical tasks. Companies can continue to expand their programs targeted at increasing connectivity in low-income communities, where possible. Civil society organizations can lead capacity building efforts by providing community support for citizens and local programs that help bridge the digital skills divide that can be delivered remotely and in collaboration with local government offices. Which government agencies, companies, and civil society organizations are involved in adoption efforts and what training is

necessary may depend on particular demographics. Having a one-size-fits-all or siloed approaches may be counterproductive to the goals of fostering adoption.

3.4.2. Improve Data. Both the telecommunications industry and various governmental entities have emphasized the need for improved data in broadband deployment and mapping in order to better understand where broadband service is available and where it is lacking.[119] More accurate broadband maps would enable better targeting of universal service support. The FCC is currently undertaking a rulemaking to eventually "develop a nationwide broadband map that will have unprecedented detail: ISPs, who have the most intimate knowledge of where their networks reach, provide granular and detailed coverage data; that coverage data is compared against a fabric of locations that are, or could be, serviced by a broadband connection; and consumers, plus state, local, and Tribal government entities, provide feedback on the accuracy of the broadband coverage data directly to the Commission." Broadband availability data are not the only input that should be considered as part of policymaking decisions; socioeconomic, geographical, public, and private information should be made available as they will all be needed to determine the best course of action to take.

Similarly, to effectively tackle broadband adoption difficulties, it is imperative to first know where adoption gaps exist. Data sources and data validation mechanisms are lacking. To better target adoption efforts, there is a need for data that:

- Is as localized as possible;
- Is as accurate as possible;
- includes utilization data, longitudinal studies, and adoption trend data;
- focuses on both fixed and mobile broadband; and
- is broken down geographically and demographically.

[119] While this Report relies heavily on data reported to the FCC by providers as part of the FCC's biannual Form 477 data collection, the FCC and many observers have noted the inaccuracies in and lack of verification of this data. *See, e.g.*, *In re establishing a 5G Fund for Rural Am.*, GN Docket No. 20-32, Notice of Proposed Rulemaking and Order (rel. Apr. 24, 2020) ¶ 34; *In re Inquiry Concerning Deployment of Advanced Telecomms. Capability to All Ams. in a Reasonable & Timely Fashion*, GN Docket No. 20-269, Sixteenth Broadband Deployment Report Notice of Inquiry, FCC 20-112 (rel. Aug. 19, 2020) ¶ 16; Arthur Scott, "Understanding the True State of Connectivity in America," Mar. 1, 2020, https://www.naco.org/resources/featured/understanding-true-state-connectivity-america (using a speed test app, "TestIT," to show that mean mobile and fixed wireless internet speeds fell below the FCC's speed standard for broadband service in most American counties, despite contrary claims on Form 477); Vt. Dep't of Pub. Serv., Mobile Wireless in Vermont 1 (Jan. 15, 2019), https://publicservice.vermont.gov/content/mobile-wireless-drive-test-reportjanuary-2019 (using drive testing of 4G LTE coverage in Vermont to show that, even having measured only along major roads, at least 15% of Vermont's territory lacked qualifying 4G LTE service, as opposed to the 5% providers reported on Form 477); The Center for Rural Pennsylvania, "Broadband Availability and Access in Rural Pennsylvania," June 2019, https://www.rural.palegislature.us/broadband/Broadband_Availability_and_Access_in_Rural_Pennsylvania_2019_Report.pdf (collecting 11 million consumer speed tests and determining that median broadband download speeds were less than those claimed in FCC Form 477 data in every county in Pennsylvania).

It is not enough to know that a particular municipality generally has broadband available. To increase adoption rates, more granular data are necessary to pinpoint not only who has available broadband (and at what speeds, and whether mobile or fixed), but which of those households actually subscribe to service. Once specific household statistics are available, adoption advocates can work to determine why, and then target adoption efforts accordingly.

Once reliable data exist, special consideration should be given to improve frequency and timeliness (vintage) of any such data that are collected and subsequently shared. Improving predictability of data releases allows for better planning and better outcomes due to improved relevancy of the data. A repository of this nature must include the most up-to-date information from a variety of resources that must be made publicly accessible.

3.4.3. Improve Data Sharing. The data surrounding broadband adoption can now be separated into two periods -- that which existed in the *pre*-Covid-19 crisis world and the data and its implications in a *current*, as well as *post* Covid-19 world. Overall, research, survey data and academic reports on the status of broadband adoption across the United States are plentiful. The FCC, NTIA, the GAO, and other federal entities have provided a wealth of information in recent times that documents the progress made in improving broadband adoption across the board. State and local governments and private institutions provide a host of other data sets and sources for exploration. While data can be considered plentiful and complementary, data is not often coordinated or shared even among different agencies or levels of government. Nor is data necessarily robust enough to enable a full understanding of the root causes of the digital divide. Data sharing and coordination are necessary steps for both public and private stakeholders. Policy makers should consider steps to improve data sharing and coordination to gain a full understanding of the adoption gap and its causes, for both public and private stakeholders while simultaneously taking into account appropriate levels of aggregation and confidentiality concerns.

To effectively bridge the Digital Divide and provide opportunities for all Americans to engage in the digital world, data need to be more readily shared among groups seeking to improve adoption while preserving the confidentiality of the information. Data should be freed from its silos. Currently, data are gathered by states, communities, USDA, NTIA, FCC, as well as a host of other federal and nonprofit sources. But such data are not effectively shared. As this information is shared with other parties, best practices and trends can be identified regarding data collection and implementation.

Data categories should include and provide best practices guidelines, recommendations, and incentives to encourage interested parties to collect and report data in formats that will be useful not only to researchers or decision-makers in a narrow field, but across the spectrum both geographically and across fields of study. By formally or informally promulgating a body of standards or best practices for like-data, the efficiency and

efficacy in the use of this data from disparate sources is improved. Numerous entities have statistics and reports, that when combined with other sources, would enable a more accurate picture of where the needs exist, and how resources could flow to those households to improve adoption rates. Data sharing among these entities, with appropriate protections for confidential and personal information, can help identify the specific needs of households on a local level.

Just as patients might share their personal health records with their health care provider through a HIPAA-compliant mobile app, so too should data collected at the federal, state, and local levels be shared among entities to reach a common goal. An example of this is NTIA's State Broadband Mapping project, which provides a venue where federal, state, local, and private entities can combine critical data to paint a more accurate picture of where adoption and access issues exist throughout the U.S. For this effort to realize its full potential, it is necessary for the full spectrum of entities involved to actively engage with one another and remove any barriers to data sharing, while continuing to protect confidential and personal information, as well as network security.

Another example of beneficial data sharing is in the veteran's affairs context, where a number of agencies play an important role in helping veterans transition back into civilian life. The Department of Labor, for instance, plays a critical role helping provide veteran-tailored employment resources and expertise, including online job search tools. However, to effectively reach these veterans, the agency needs to coordinate with the Department of Defense to identify veterans in need of assistance. Likewise, public and private sector entities should equally share data they collect amongst themselves so that no entity wastes precious resources, for example, by collecting data that already exists.

Moreover, to the extent practical, consideration could be given for access to information from one secure, user-friendly location. This singular location could include data from public and private sources, from all levels of government, and from a variety of government agencies. Albeit, this 'clearinghouse' function may be most appropriate for government/public-sector collected data. Consideration also could be given to an online inventory of all federal assets that can help in the adoption of broadband, particularly in rural and tribal areas. This data repository could include information about more than current broadband access as numerous physical, geographical, socioeconomic, and policy element all play roles in identifying current needs, as well as predicting future needs.

3.4.4. Engagement and Coordination. Engagement and coordination amongst broadband stakeholders is critical, not only for the identification and collection of relevant data as discussed earlier, but it is a vital element for the effective use of the shared data, the implementation of ensuing programs, and the measuring of a program's efficacy against its intended outcome.

Entities should consider ways in which to more intentionally support and encourage such activity. Past years have seen an increase in the engagement and coordination between the private sector, schools, counties, state grant programs and the federal government. Such activity has more recently been highlighted as a response to the Covid-19 pandemic, where necessity spurred its occurrence. Instances of stakeholders engaging individuals through such things as association-wide speed tests, school system wide data collection (see Chicago Connected—a Case Study, section 3.3.3), and collaborative mapping efforts are examples where an increased focus on bringing disparate resources together, with more visibility and coordination, have helped advance the cause for broadband adoption.

A good example of engagement and coordination amongst public sector, state officials is the State Broadband Leaders Network ("SBLN") hosted by NTIA's Broadband USA program. NTIA convenes and facilities this informal, open community of practitioners who work on state broadband initiatives, where SBLN participants also share priorities and best practices, as well as discuss emerging telecommunications policy issues. The network also provides a forum to strengthen policy and program connections among states, local jurisdictions and federal agencies.

3.4.5. Improve Affordability. Available data sources have shown that some segment of those Americans who elect not to subscribe to broadband cite affordability as the reason for their lack of adoption. Broadband can be made more affordable with demand side and supply side interventions. On the demand side, subsidies can make existing broadband options more affordable to those for whom such service is financially out of reach. On the supply side, increasing the number of providers offering service to a given location can decrease prices and improve service quality. In this way, broadband adoption and deployment are linked: greater deployment can improve service affordability and quality, thereby, increase adoption. Higher adoption rates can, in turn, spur deployment by improving projected service profitability.

3.4.6. Improve Outreach. The Covid-19 pandemic has reinforced the necessity of improving outreach efforts to ensure that individuals and communities are aware of the adoption programs currently available to them from the public (federal, state, and local) and private sectors. Strategies may include engaging with local community organizations and non-profits to identify specific digital literacy and inclusion needs, as these organizations often have valuable information about the specific needs of their communities and have built networks through which information about programs and resources can be distributed. Furthermore, there should be defined partnerships between schools, public libraries, health care providers and broadband providers to raise awareness of programs.

3.4.7. Recognize and Encourage Corporate Philanthropy. More than 800 companies signed the FCC's Keeping Americans Connected Pledge to keep consumers connected despite economic hardship caused by the coronavirus pandemic. Providers should be

encouraged to retain or extend such philanthropic initiatives, particularly on behalf of low-income consumers. AT&T, Cox, and other providers initiated separate programs aimed at low-income households[120].

End.

[120] Benton, *Coronavirus-related service plans aimed at low-income households*, (April 10, 2020), https://www.benton.org/blog/what-are-isps-doing-get-more-people-online-home-during-pandemic