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ENSURING SOLUTIONS TO MEET AMERICA'S BROADBAND NEEDS

HEARING BEFORE THE SUBCOMMITTEE ON COMMUNICATIONS, MEDIA, AND BROADBAND OF THE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION UNITED STATES SENATE ONE HUNDRED SEVENTEENTH CONGRESS SECOND SESSION DECEMBER 13, 2022

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ONE HUNDRED SEVENTEENTH CONGRESS

SECOND SESSION

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ENSURING SOLUTIONS TO MEET AMERICA'S BROADBAND NEEDS

TUESDAY, DECEMBER 13, 2022

U.S. SENATE,
SUBCOMMITTEE ON COMMUNICATIONS, MEDIA, AND
BROADBAND,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, DC.

The Subcommittee met, pursuant to notice, at 10:02 a.m., in room SR-253, Russell Senate Office Building, Hon. Ben Ray Luján, Chairman of the Subcommittee, presiding.

Present: Senators Luján [presiding], Klobuchar, Blumenthal, Peters, Tester, Sinema, Rosen, Thune, Fischer, Moran, Blackburn, Young, Capito, Scott, and Lummis.

OPENING STATEMENT OF HON. BEN RAY LUJÁN, U.S. SENATOR FROM NEW MEXICO

Senator LUJÁN. Well, good morning, everyone. I call the hearing before the Subcommittee on Communications, Media, and Broadband, on “Ensuring Solutions to Meet America’s Broadband Needs”, to order. I want to thank Ranking Member Thune for working with me to hold this hearing. And thank you to our witnesses for your testimony and your participation.

Congress provided \$65 billion for broadband in the bipartisan Infrastructure Investment and Jobs Act to fundamentally reshape the landscape of connectivity in the United States. The law deploys broadband, supports adoption, and requires new rules for inclusion and equity.

This is a historic, bipartisan commitment to close the digital divide and ensure that everyone is able to participate in the digital economy in our interconnected world. I want to acknowledge what we have accomplished so far.

But now it is time to have a different conversation about putting those resources to work. Congress must ensure that our Federal, tribal, State, and local partners are able to deploy these resources efficiently to address real need and not just maximize opportunities and profits.

Every village, colonial, tribe, and pueblo in New Mexico and across the Nation deserves equal access to the opportunities that this law provides. Congress has good reason to be vigilant regarding the use of these funds. It is going to be important that there are guardrails, prudent oversight, and that the investment flows to areas where it is needed most.

Just as historic inequities and redlining in the housing and financial industries meant low income and communities of color were left unserved by housing and access to banking, digital redlining has resulted in worse service at higher prices for those same communities.

An investigation published by the markup in October in partnership with the Associated Press, showed that many Internet service providers offered their worst deals to formerly redlined neighborhoods.

This article demonstrates why it is so important that the FCC implement meaningful new rules to prevent this digital discrimination related to broadband. As public and private partners deploy new broadband programs, Congress must ensure Federal funds meet the needs on the ground, not deepen existing racial and socioeconomic inequities.

We must also work with administration—or sorry, we must also work with Administrator Davidson and the National Telecommunication and Information Administration to allocate funds according to the true state of access to affordable broadband as required by law. With the Broadband Data Act, Congress provided direction and funding to the Federal Communications Commission to develop cutting edge broadband maps.

These maps have already proven to be a leap forward in understanding broadband availability in the United States. I am deeply grateful for the work Chairman Rosenworcel and the FCC have done in the area of implementing the Broadband Data Act, and NTIA will use these maps to make funding allocations for the \$42.5 billion made available through the Broadband Equity Access and Deployment, which will probably be calling BEAD today.

But the initial version of these maps still needs work. The version largely relies on self-reported data from broadband providers. Now, the example that I will give here shows where there was much data that was missing. Whole communities were missing from the fabric of these maps, like in my state, Shiprock, New Mexico, which is out in the four corners on the Navajo Nation, and Conchita Pueblo in New Mexico we are not included.

We cannot afford to get this wrong. Fortunately, the bill recognized that local communities have the best knowledge of their own connectivity issues, and it required the FCC to include a robust challenge process.

We want to encourage everyone across the country to learn about this challenge process, to learn about the app that was developed by the Federal Communications Commission, learn how to use it, and just check the speeds at your house or your business or your schools. And if they are not, as reported on the map site, use the map and let's get better data. NTIA should ensure funding allocations use the most accurate data available.

I will continue to work closely with the Commission and communities on the ground to ensure the maps represent the true state of broadband availability in New Mexico and across the country. We must also continue to find long term solutions to make broadband access equitable across the United States.

That is why I introduced the Digital Equity Foundation Act to create an ongoing source of funds for digital literacy, equity, and

inclusion on an ongoing and sustained basis. As the pace of technological development continues to accelerate, we will always have a divide between those who have access and those who need it.

We must weave digital equity into the fabric of connectivity in America. This bill would supplement the existing digital equity program that was included in the bipartisan infrastructure bill. It would create a permanent foundation to ensure long term nationwide initiatives that can truly reshape the future of the United States, in addition through funding and working to strengthen digital equity for programs like BEAD and tribal broadband, and of course, for affordable connectivity.

We will need to find permanent funding for every one of these important priorities that we have worked on together. Today, tens of millions of Americans do not have a choice between Internet service providers. Their options are limited to whoever has cable running to their apartment or fiber to their houses or wireless service in their valley. There are too many communities where market forces have failed.

Congress acted to ensure that the millions of Americans who do not currently have access to affordable broadband gain access. I look forward to our discussion today that will focus on making that a reality and to identify additional needs that might require additional Congressional action.

I am very honored that our witnesses joined us today, and Mr. Thune, all in person, which I certainly appreciate. Kimball Sekaquaptewa who is a fellow New Mexican and someone that I have enjoyed getting to know throughout the years and watching her work, who is the Chair of the Connect New Mexico Council and Chief Technology Director for the Santa Fe Indian School.

She has been a tireless advocate for connecting unconnected communities across New Mexico, and I deeply appreciate her presence today, and I look forward to hearing more about what has been accomplished and how it might help connect more people across America. Jonathan Spalter was the President and CEO of USTelecom.

The Broadband Association, USTelecom represents a diverse set of telecommunication providers across the country working to expand connectivity through a variety of new and established technologies. The Honorable Michael Powell is President and CEO of NCTA, the Internet and Television Association.

Mr. Powell is former Chairman of the Federal Communications Commission, and now represents most of the cable market and some of the largest residential broadband providers in the United States. And finally, Angela Siefer, who is the Executive Director of the National Digital Inclusion Alliance. She has been a tireless advocate for digital inclusion and equity efforts nationwide.

Thank you all for being here. I look forward to this conversation. And I would just add that this conversation is taking place at a time that we have four FCC Commissioners. And I am certainly hopeful that there is an up or down vote that can be scheduled on the Senate floor over Gigi Sohn's nomination, and I am calling on a vote to take place.

Many of us have been asking for a vote to take place for a while. There were several voices, including mine, that advocated for nomi-

nations a year before they took place, I think, and even the reconfirmation of the chair and others. So I am hopeful that we can have a full Commission soon.

One final note, while this might be my last opportunity to preside over a subcommittee hearing this year, my deepest thanks to Ranking Member Wicker in his tenure as the Ranking Republican Member of the Commerce committee as well, who has shaped national broadband policy, including the Broadband Data Act and many others.

Much of what we will discuss today were possible through the hard work of Senator Wicker and his staff to put these efforts in place, including Olivia Trusty, John Lynn, Kelsey Guyselman, and Matthew Hamilton. The Armed Services committee is going to be very fortunate to have Mr. Wicker as part of that committee as well.

I also want to recognize Chair Cantwell and her staff for their support this Congress, including former staff John Branscome, Shawn Bone, Brian McDermott, and Mary Claire York, and then current staff Christi Barnhart, Mary Huang, and Harsha Mudaliar, and Wes Platt.

I want to thank them all for the work that they do tirelessly every day, and then turn this over to Senator Thune.

**STATEMENT OF HON. JOHN THUNE,
U.S. SENATOR FROM SOUTH DAKOTA**

Senator THUNE. Thank you, Mr. Chairman, and for having today's hearing. And let me begin by saying that it has been a pleasure to lead this subcommittee with you these past couple of years, and I look forward to continue working with you on a number of important issues before this subcommittee next Congress.

And one of those issues is ensuring that Americans have access to reliable broadband services. The expansion of these services to more rural areas has long been a priority of mine here in the U.S. Senate.

And since March 2020, Congress has allocated billions of dollars for broadband related services through COVID-19 pandemic relief packages, and most recently through passage of the infrastructure bill which has provided broadband funding at a price tag of over \$64 billion.

The nearly \$80 billion for broadband specific projects, on top of the billions of dollars the FCC disburses annually under its Universal Service Fund, is an unprecedented amount of money.

The good news is that for those areas where certain connectivity challenges remain unresolved, this funding, in addition to the sustained investments made by telecommunications providers across the country, should help close the digital divide.

The bad news is that this funding is spread out over 15 separate agencies and 133 programs, with the lion's share of the funding going through NTIA. This is deeply concerning. As I argued in Congress, was debating the infrastructure bill, NTIA has previously fumbled attempts to bring broadband access to more communities.

Back in 2009, the stimulus bill allocated \$4.7 billion to NTIA to expand broadband access in rural and underserved areas. It didn't go very well. The agency struggled with implementation. There

were serious issues with a number of the projects the agency approved. Other projects resulted in a significant amount of overbuilding, meaning that they resulted in the construction of additional broadband infrastructure in areas that already had access to reliable broadband at the taxpayers' expense.

More recently, last year, NTIA called for volunteers to help determine how to allocate the \$1.5 billion Congress provided NTIA for certain broadband programs. That is unacceptable, and I am afraid without stringent oversight, NTIA will make and has already made the same mistakes when managing the \$42.5 billion Broadband Equity Access and Deployment Program and Tribal Broadband Connectivity Program.

That is why last week I began an oversight effort to review the numerous Federal broadband programs. Oversight of how these dollars are being spent is necessary to avoid agencies misusing billions of taxpayer dollars, more importantly, to ensure the funding is actually going to areas that are truly unserved.

If there are changes that need to be made to the various programs Congress has established, we need to get to work to make sure they are as effective as possible and that they work as Congress intended.

One such program we have begun work to make necessary improvements to is USDA's Reconnect Program. I was pleased to partner with Chair Luján and Senators Klobuchar and Fischer in introducing the Rural Internet Improvement Act, legislation that will streamline USDA's broadband authorities and target funding to areas most in need.

We must also recognize the Federal Government will not solve the digital divide on its own. It is important we maintain a regulatory framework that promotes investment and allows telecommunications companies to make the kind of choices that have resulted in strong networks.

Unlike other countries, broadband providers in the United States were able to keep Americans connected when demands for fixed and mobile networks soared during the pandemic. This is largely because of the United States' light touch regulatory approach to broadband policy, which has incentivized the private sector to make network reliability, affordability, and resiliency a priority.

Finally, we must tackle permitting hurdles that delay the build-out of broadband infrastructure. My MOBILE NOW Act, which was signed into law in 2018, has been an effective tool in moving the Federal Government in the right direction. But I continue to hear concerns about unnecessary delays and costs associated with broadband permitting.

The agencies processing permitting requests need to be held accountable if they are not meeting deadlines, which is why today I am sending a request to several Federal agencies on the steps that they have taken to implement MOBILE NOW's broadband siting mandates.

For too long we have talked about bridgiting—bridging, I should say, the digital divide. It is time to actually do it. And the only way that happens is if this committee actually utilizes its important oversight responsibilities to ensure that agencies under its jurisdic-

tion make smart, targeted investments that use taxpayer dollars responsibly.

Anything short of that will result in Government waste leaving Americans still unconnected. I want to thank each of the witnesses for being here today, and I look forward to the discussion. Thank you, Mr. Chairman.

Senator LUJÁN. Thank you very much, Mr. Thune. I appreciate that. And we will now recognize our witnesses for 5 minutes each for their testimony. And we will begin with Kimball Sekaquaptewa of New Mexico. Kimball.

STATEMENT OF KIMBALL SEKAQUAPTEWA, CHAIR, CONNECT NEW MEXICO COUNCIL; CHIEF TECHNOLOGY DIRECTOR, SANTA FE INDIAN SCHOOL

Ms. SEKAQUAPTEWA. Thank you, Chair Luján. My name is Kimball Sekaquaptewa, you can call me Kimball, from the Hopi tribe, and a mother of three in the Pueblo of Cochiti. Please note that while our shared tribal experience is largely a rural experience, it is well known that New Mexico is one of the least connected states in the country, in large part due to the rugged and rocky terrain and sparse population density.

In my community, the wireline ISP offerings have not changed in 20 years. In short, there are none. Until I completed my first fiber optic network in 2018, the entire tribal government, a public library, shared a 3.0 mbps connection over a bonded TI.

As the Chief Technology Director for the Santa Fe Indian School, it was my duty to provide Internet connectivity to our 700 students who, during COVID-19, we sent home to 23 rural tribal communities, some of the least connected lands in the United States.

In fact, 89 percent of our students did not have Internet access that met the FCC performance benchmark of 25/3. Those that did lived in town. If there was a silver lining, it was that we could build on previous efforts. In 2016, I leveraged the FCC's Schools and Libraries E-rate Program to create a consortia of tribal schools and libraries to bring high speed Internet to six pueblos.

Our goal was to provide our pueblo students with the same college and career opportunities as their more affluent peers. Realizing that our work reached beyond education, the tribes self-invested in additional infrastructure for improved governance and focused efforts such as health care.

With their new fiber backhaul, it was these tribes who were able to pivot and deploy residential Internet access during the pandemic. Some now participate in the Affordable Connectivity Program as service providers.

Fast forward to 2022, the work continues. Thanks to the NTIA Tribal Broadband Connectivity Program, the Santa Fe Indian School is constructing a 324 mile route to three more pueblos and remote tribal lands. TBCP springboards tribal efforts to connect unserved homes and anchor institutions, and our experience has proven that we can be our own solution to the digital divide.

It is also true that until the iterative FCC broadband fabric matures, tribal self-certification of broadband availability is essential. In my rural community, the map currently shows three residences when it should show 275. In total, the Santa Fe Indian School will

have placed 500 miles of middle mile fiber, which is equally important for the state of New Mexico as it is for the tribes.

Given the NTIA open network requirement, private industry will not have to bear those expensive costs to build these routes and will have access to fiber backhaul to improve and extend their last mile networks. For too long, providers have built around sovereign lands when in fact we are the critical partners to achieve right-of-way and navigate permitting processes, along with the Federal agencies having oversight.

As Chair of the Connect New Mexico Council, and with my colleagues, we steward the deployment of scalable, reliable, affordable broadband to connect every New Mexican utilizing both State funds and the upcoming IIJA BEAD Program.

In addition, in New Mexico, we created a pilot grant with BEAD like NOFO requirements, and I can see formidable barriers to participation. While local government and tribes are eligible as BEAD grantees, functionally, the stringent requirements for matching funds, letters of credit, and professional engineering stamps discourage participation.

These requirements favor better resourced ISPs who will apply to serve their next best markets. As a nation, we run the risk of maintaining the status quo and missing the most underserved communities without local flexibility to administer federally funded programs. The rush to use the FCC fabric map compounds the issue.

We estimate that the fabric is missing tens of thousands of unserved homes and anchor institutions such as small schools, health care centers, houses of worship in New Mexico, potentially shortchanging our state by up to \$500 million in funding, an educated guess because the way the funding formula will work is still unknown.

We ask NTIA to extend the January 13, 2023, deadline to have more time to challenge the missing location to the FCC's preliminary broadband map. Last, I submit that the solution to bridge the digital divide in the United States does not lie in a methodology limited to a conventional ISP approach.

In that, I refer to a broader broadband ecosystem. For instance, only half of the states in the country have state education networks, an approach that is not currently incentivized. The development of State education networks has the ancillary benefit of installing middle mile infrastructure, enabling last mile deployments.

The way that the fabric currently counts anchor institutions minimizes the role that they can play to provide systemic solutions. Uplifting these corollary broadband efforts creates a holistic approach, one that is needed to solve the complexity of broadband access for all. Thank you.

[The prepared statement of Ms. Sekaquaptewa follows:]

PREPARED STATEMENT OF KIMBALL SEKAQUAPTEWA, CHAIR, CONNECT NEW MEXICO COUNCIL; CHIEF TECHNOLOGY DIRECTOR, SANTA FE INDIAN SCHOOL

My name is Kimball Sekaquaptewa, please call me Kimball, from the Hopi Tribe of Arizona and a mother to three children of the Pueblo de Cochiti. I am joining you here today from Santa Fe, New Mexico. Please note that while I share a tribal experience, it is largely a rural experience. It is well-known that New Mexico is one of the least connected states in the country in large part due to the rugged and

rocky terrain and sparse population density, resulting in extremely high construction costs with limited return on investment. In fact, in my home community, the wireline ISP offerings have not changed in 20 years, in short there are none. Until I built my first fiber optic backbone in 2018, the entire tribal government and public library shared a bonded T1 of 3.0 Mbps. As the Chief Technology Director for the Santa Fe Indian School it was my duty to provide Internet connectivity to our students who we sent home abruptly in March 2020 with the onset of COVID-19, to 23 rural/tribal communities who we know to be the least connected lands in the United States. In fact, in a survey of families, we learned that 89 percent of our students did *not* have Internet Access that met the FCC performance benchmark of 25/3. Those that did lived in town.

If there was a silver lining it was that we could build on previous efforts. Leveraging the FCC Schools and Libraries E-rate, I led a consortium of tribal schools and libraries to bring high speed affordable Internet into six Pueblo communities. Our goal was to provide our Pueblo students the same college and career opportunities as their more affluent urban peers. Our tribal leaders realized that our work reached beyond education and invested private funds to add broadband infrastructure for improved governance, healthcare, and environmental protection. With their existing fiber backhaul, it was these communities who were able to pivot and deploy residential Internet access during the pandemic.

Fast forward to 2022, the collaborations continue. Thanks to a NTIA Tribal Broadband Connectivity Program (TBCP) program, the Santa Fe Indian School is constructing a 324-mile route to three more Pueblos and remote tribal lands. I can't overstate the importance of this historic tribal broadband opportunity. The program springboards tribal efforts to connect the unserved homes and anchor institutions because our experience has proven that are our own solution to the digital divide. It is also true that until the iterative FCC Broadband Fabric map matures that tribal self-certification of broadband availability used to determine TBCP eligibility is essential. In my rural community, the map currently shows 3 residences when it should show 275.

In total, the TBCP supports us to place 500 miles of middle-mile fiber in New Mexico and these connections are equally as important for the State of New Mexico, as they are for the tribes themselves. Given the NTIA open network requirements, private industry will *not* have to bear expensive costs to build these routes and will have access to fiber backhaul to improve and extend their last-mile networks.

Thinking of tribes as partners and not just recipients of service, is a paradigm shift to solve rural connectivity in all states with tribal nations. For too long, providers have built around sovereign lands, when in fact, we are the critical partners and hold the skills to achieve right-of-way and navigate the permitting processes on tribal lands with the Federal agencies having oversight.

Looking ahead, the financial sustainability of emerging tribal networks is paramount. While the current grants provide the capital funding, operations and management require on-going support. Our Tribal ISPs are increasingly participating in the Affordable Connectivity Program as providers but the future of this program is uncertain. Alternatively, FCC could provide a pathway for emerging ISPs to access Lifeline through a modification of the ETC designation.

As Chair of the Connect New Mexico Council and together with my colleagues, we steward the broadband infrastructure deployment effort to connect every New Mexican to scalable, reliable, affordable broadband. With the passage of the Infrastructure Investment and Jobs Act (IIJA) and the Broadband Equity, Access, and Deployment (BEAD) Program we have a generational opportunity to create a connected nation. In New Mexico, we have implemented a pilot grant like the BEAD-like NOFO requirements, and I can see formidable barriers to participation. While local governments are eligible grantees, functionally, the stringent requirements for matching funds, letters of credit, and professional engineering stamps prohibit participation. These requirements favor better resourced ISPs, who will apply to serve their next best markets. As a nation, we run the risk of replicating the status quo and missing the most underserved communities without local flexibility to the federally-funded programs.

The rush to use the FCC Fabric map, compounds the issue. In New Mexico, we estimate that the Fabric is missing tens of thousands of unserved broadband serviceable locations, potentially shortchanging NM by up to \$500M in the funding allocation. Yet the number is a guesstimate because the way the formula funding will work is still unknown. In addition, the map does not include many small schools, libraries, health care providers, houses of worship and other community anchor institutions and we fear those institutions will not receive broadband because of being left off the map. We ask the NTIA to extend the January 13, 2023 deadline to allow

challenges for the missing locations to the FCC's preliminary broadband map, so they can be counted appropriately.

Lastly, I submit the solution to bridge the digital divide in the United States does not lie in a methodology limited to a conventional ISP approach. In that I refer to a broader broadband ecosystem. For instance, only half of the states in the country have state education networks—an approach that is not currently incentivized. Yet the development of state education networks has the ancillary benefit of installing middle-mile infrastructure for an entire state and enables last mile deployments. However, to encourage, or even allow these proven strategies, our methodology must match. The way that the Fabric currently counts anchor institutions, minimizes that role they can play to provide systemic solutions. Uplifting these corollary broadband efforts creates a holistic approach, one that is needed to solve the complexity of broadband access for all.

Thank you for allowing me to share the story of my last decade's contribution and work to ensure solutions to meet America's broadband needs for now and for the future.

Senator LUJÁN. Thank you very much for your testimony. Next, we will hear from the Honorable Michael Powell, the President and CEO of NCTA.

**STATEMENT OF HON. MICHAEL POWELL, PRESIDENT AND
CEO, NCTA, THE INTERNET & TELEVISION ASSOCIATION**

Mr. POWELL. Thank you very much, Chair Luján, Ranking Member Thune, members of the Committee. I am honored to be with you today. I am Michael Powell, President and CEO of NCTA, the Internet and Television Association, and our members have invested hundreds of billions of dollars over 20 years to bring high speed, high quality broadband to 90 percent of households.

And while we are proud of that achievement, we recognize that the work is undone. Many of our members would love to serve rural and unserved parts of the country but are unable to do so because they are cost prohibitive without public support.

For that reason, we are extremely excited, motivated, and committed to work with Congress and community organizations to make this last great opportunity a resounding success over the next couple of years. It is not an exaggeration to say this is a once in a generation opportunity for three reasons.

First is the amount of money appropriated is genuinely unprecedented. It is ten times the amount of money that was allocated and authorized during the BEAD Program in 2009, and it really addresses the core concern in many unserved areas.

Simply put, it is too costly to serve with too little revenue to continue to operate throughout the network without a loss. This scale of resources provides the first meaningful opportunity to genuinely close the digital divide and so we are very excited about that.

The second area that really represents true wisdom on the part of this committee in Congress is to insist that the FCC develop more granular broadband maps. For too long, we have used maps that are out of date, well understood to have overstated the number of areas that are served.

That is a serious problem in targeting resources in an efficient and significant way. We are very excited about that. The FCC has made a gallant effort at the first draft. I think it is commendable. It is a very difficult task. But there are many, many rounds of improving the data quality, ensure that those maps are accurate in the ways that Chair Luján was referencing.

Third, and I think less discussed, is that Congress took a fresh approach to addressing adoption and affordability. Fresh in that it focused on direct credits to consumers in order to afford high quality service.

Put simply, combined with the kinds of offerings ISPs have agreed to provide, eligible low income families will be able to access broadband essentially for free, and just as importantly, have the freedom to choose the plans that most suit their family needs. This is a great improvement. But we know from past experience it is going to take a lot more than money.

It is going to take excellent execution of the program. As Senator Thune mentioned, these are 130 programs with a lot of money being funneled through 15 different agencies. Gosh, what could go wrong? In our past experience, we have lessons that tell us what will go wrong, and I would like to highlight just a few.

The first is failing to maintain discipline in targeting the most unserved areas. I follow the family dinner rule. Nobody should get seconds till everybody's been served. Frequently in past programs, this is the biggest error that's repeatedly made. Money will always work hard to get to more economic communities if allowed to in areas where there is already broadband, where the economics are more sound.

It will require discipline on the part of regulators to ensure that that doesn't happen. The second important thing to do is remove obstacles the Federal Government and other Government agencies have within their power. Here I speak specifically of permitting, both on Federal lands and local communities, as well as access to poles. Put directly, poles are the lifeline to reach rural America.

If you do not have access to them at reasonable rates, you will not reach those communities, plain and simple. Next is the importance of maintaining discipline against regulatory creep. These kinds of programs always have a tendency to attract layered on regulatory requirements that are tangential to the mission of the program.

The consequence of that is it creates more complexity, additional burden, and raises the cost of an already fragile cost model. We should resist the temptation to do that as much as conceivably possible.

And finally, we have experienced all too often the presence of waste, fraud, and abuse. While we see a set of taxpayer resources to solve an important public policy problem, there will be people who see it as a honeypot and will endeavor to find every scheme possible to take as much of that money as they can.

We have seen that before. That requires real accountability, real transparency, clear criteria, a Government that explains its decisions in issuing grants clearly and make them publicly available. So thank you very much for having me today, and I look forward to answering your questions.

[The prepared statement of Mr. Powell follows:]

PREPARED STATEMENT OF MICHAEL K. POWELL, PRESIDENT AND CEO, NCTA—THE
INTERNET & TELEVISION ASSOCIATION

Good morning, Mr. Chairman and Members of the Committee. My name is Michael Powell, and I am the President and CEO of NCTA—The Internet & Television

Association. It is a privilege to appear before you to discuss our efforts to ensure that all Americans have access to reliable, high speed broadband services.

The cable industry is proud of its role in delivering high-speed broadband to America. We have invested hundreds of billions of dollars over the past three decades, but there are areas that remain economically hard to reach due to many factors, including their remoteness, challenging terrain, and low density. In the shadow of the COVID crisis, Congress attacked this problem by appropriating unprecedented levels of funding. These resources will be administered through a variety of federal, state, and local agencies, with the goal of closing deployment and adoption gaps, and getting all Americans connected. Working in private-public partnerships, this funding presents a once-in-a-generation opportunity to overcome the economic obstacles that have limited network expansion in rural, high-cost areas and to address the issues that slow broadband adoption.

These programs offer great promise, but there are substantial challenges in effectively administering this complex effort. Success will require sharp focus and resolve to direct resources where they are most needed. Past attempts have often failed because resources were mistargeted, or poorly administered by both government agencies and ineffective providers. We cannot allow that to happen this time. Congress's continued oversight of the programs that disburse this massive expenditure is essential if we hope to celebrate closing the digital divide in years to come. This hearing is a welcome start.

NCTA is deeply committed to this mission. Working cooperatively with the government, we will do everything in our power to achieve Congress's goal of reaching every community and citizen with robust, high-quality broadband service. Accomplishing this mission requires policies that address three critical objectives:

- (1) Encourage significant private investment in the construction of next generation networks, including government action to remove barriers that slow deployment such as permitting delays and pole access;
- (2) Target government funding to areas that are unserved. Experience shows that support is often siphoned to areas that are more economical to serve and already have broadband, leaving too many communities still waiting for Internet access. Public spending is essential to overcoming geographic and economic barriers that leave unserved communities on the wrong side of the gap; and
- (3) Promote broadband adoption. This challenge is two-fold: (1) we need to effectively offer financial support to low income communities, and (2) work with experienced community organizations to raise awareness of available support and teach digital skills to those who have access to broadband, but don't subscribe.

Let me now address each of the components in a bit more detail.

Cable's Private Investment Enabled the Widespread Deployment of Broadband Networks, But Obstacles to Reaching Some Communities Remain

NCTA members lead the Nation in building best in-class broadband networks in rural counties and urban cities throughout the United States. Fueled by private capital, cable broadband networks connect 82 million broadband households. More than 90 percent of American households have access to cable high-speed broadband—including 55 percent of rural homes—and NCTA's members are committed to reaching many more. This year, and every year, cable spends between \$17 and \$19 billion to deploy fiber-rich broadband networks in diverse areas across America. These networks are high-speed, high quality, and highly reliable connections that empower consumers to participate fully in the Internet ecosystem.

Networks are not static, and cable has continually pushed the leading edge. Gigabit networks were the exception in 2016 when only 4 percent of homes had access. Today, only 6 years later, our members offer 1-gigabit plans to 96 percent of homes where we offer broadband service. Already, the industry is opening the next frontier with its "10G" initiative—a plan to deploy ultra-high-speed multigigabit symmetrical connections to consumers in the near future.

These investments proved indispensable in meeting the unanticipated and unprecedented COVID 19 threat. No one ever anticipated a situation where virtually every citizen was at home relying on the Internet to work, to attend remote school, and to entertain and inform themselves. This was the greatest stress test imaginable and the network and the men and women who kept it working passed with flying colors. Without decades of broadband investment, COVID could have been a devastating economic catastrophe.

It is also noteworthy that as we deal with new economic challenges, broadband continues to connect new subscribers and offer great value. While speeds have continued to increase, prices remain stable and have even decreased. In an economy that is seeing inflation in the range of 8 percent, broadband prices have barely risen, with the cost of entry plans, most popular plans, and top tier plans all decreasing over 20 percent.

All is not rosy, however, in deploying broadband. Broadband builders face significant obstacles in reaching many unserved communities. For example, the categorical exemption of certain pole owners from the mandates of the Pole Attachment Act has outlived its usefulness and only serves to impede the extension of broadband networks into rural and unserved areas. All utility pole owners should be required to provide timely and non-discriminatory access to poles, ducts, conduits, and rights-of-way, at non-discriminatory rates. Without timely access to all poles, it will be incredibly difficult—if not impossible—to reach the Administration's stated goal of reaching 100 percent of currently unserved families and small businesses by 2030.

Similarly, broadband deployments that cross Federal lands are frequently stymied by slow permitting processes. Federal approvals are also required for many federally funded broadband projects and often delay deployment. These problems are significant in rural areas, particularly in western states which encompass a lot of Federal land. A recent letter from members of this Committee to the Secretaries of the Interior, Agriculture, and Commerce detailed this concern and called upon the Secretaries to streamline permitting on Federal land. In fact, streamlined permitting procedures for access to all public rights-of-way would help accelerate broadband deployment everywhere.

Cable is proud of its record building broadband throughout the country. Of particular pride is our commitment to offering equal access to our infrastructure throughout our service areas. Cable gigabit networks in urban areas are deployed as equally in low-income areas as in higher income ones. And importantly, there is virtually no difference in gigabit service availability based on race or ethnicity. The industry is committed to ensuring and improving equal access for all our citizens regardless of income, race, ethnicity, color, religion, or national origin.

Well-Managed Federal Programs Are Essential to Ubiquitous Deployment

Congress has taken the most important step to closing the digital divide by allocating enormous resources to the task, but money alone will not produce a successful outcome. Success will require disciplined execution. Holistically, this effort involves over 100 programs administered by a dizzying array of government agencies. A lot can go wrong. It is imperative to keep a number of known risks front of mind.

1. Resources fail to go to the neediest areas first

Unserved communities lack broadband for one reason above all others—they are prohibitively expensive to serve. The cost of deploying infrastructure over expansive, difficult terrain is exponentially higher than other areas. At the same time, the revenue to offset those expenses is inversely less where fewer people and businesses reside. Government funding is essential to offsetting these dynamics and incenting companies to build. Yet, there will be many forces that prefer to spend these limited resources in towns and communities with better economics, where broadband already exists. This is a fatal error that has been repeated many times in past programs, leaving the unserved still hungry for their first taste of broadband. In many of its programs, Congress has made clear that its focus is on unserved areas. To meet these goals, it is critical that implementing agencies distribute funding as intended with focus, rigor, and discipline.

Precise targeting will be important. The FCC's first draft of new broadband maps is an excellent start, but we will need to continually refine them and faithfully and consistently use them as an authoritative source across many programs if we want good results.

2. Inadequate Coordination

As mentioned, there is a lot of money being distributed by lots of different agencies with lots of different criteria and rules. Consequently, there is a serious risk that poor coordination and disharmony in the terms and conditions of these programs leads to confusion, delay, waste and poor results. Congress and the Administration should continually seek to harmonize the constellation of broadband programs to ensure efficiency in reaching our goals.

3. Policy Creep and Added Cost

The economic equation of unserved areas is fragile. Adding even a little additional cost or reducing available revenue can destroy a viable model for serving a new area, driving providers to drop plans to enter. There are a bottomless number of

contested policies and regulations that many would love to layer on to this program. Already, we see efforts to introduce forms of rate regulation, open-access requirements, buy American provisions, and labor rules. Whatever the merits, many of these efforts will prove distracting and worse add costs to serving areas that are already too costly. This is counterproductive to the bipartisan objective of opening the purse to solve the digital divide.

4. Failing to Measure Success and Inviting Waste, Fraud and Abuse

How successful the broadband funding programs are at building new networks will depend on which projects receive approval and the quality of provider selected to get the job done. It is imperative regulators use clear, measurable selection criteria and effective accountability and tracking processes. What you cannot measure you cannot manage well.

Ambiguous criteria, poor controls, and grants to inexperienced providers will, as it has in the past, lead to a great deal of waste, fraud, and abuse. Transparency is particularly critical, because we will need to enlist a large community to watch for and discover problems. The huge pot of money on the table will attract less than honorable efforts to get it, without advancing the goals for which it was intended. In addition, there will be countless new companies formed to enter these markets who will be well-intended but who lack the experience, long-term resources and staying power to successfully complete and maintain these expensive broadband builds. The grant programs need guardrails that ensure weak providers with low probabilities of long-term success are not excessively favored over companies with a proven track record of building and operating networks.

NTIA, Treasury, and USDA are working hard to distribute these funds in an effective and responsible fashion, and they have been open to our input on how to implement the programs most effectively under their stewardship. But we recognize that there is always room for continued improvement in the administration of complex government funding programs. To that end, NCTA supports efforts such as Senators Thune, Lujan, Klobuchar, and Fischer's introduction of the Rural Internet Improvement Act, which would reform the Department of Agriculture's Rural Development broadband programs, enhancing provider participation and helping broadband reach more Americans.

Broadband Adoption Requires Collaboration Across Sectors

While the prospect of improving access is exciting, ensuring all Americans are connected requires more than attention to infrastructure gaps. Broadband access without widespread adoption is like the proverbial falling tree in the forest that no one hears. Cable operators have long been leaders in offering special programs for low-income households so that they can fully participate in the economic, educational, and social life of our society.

Over the last 10 years, programs like Comcast's Internet Essentials, Charter's Spectrum Internet Assist Program and Cox's Connect2Compete have provided affordable and accessible Internet to more than 14 million consumers. More recently, in response to the pandemic, NCTA members restructured and expanded their programs to respond to increased need. Charter Communications, for instance, launched programs to provide free Internet and Wi-Fi access for 60 days to households with students or educators. Similarly, Cox participated in Nevada's Connecting Kids coalition which successfully reached and connected every K-12 student in the state by January 2021. Another NCTA member, Mediacom, partnered with Des Moines Public Schools to share the cost of Internet access for families in need.

NCTA members were also day one participants in both the Emergency Broadband Benefit and the Affordable Connectivity Programs, enabling eligible customers to use government subsidies to offset the price for broadband service. Indeed, many broadband providers including Comcast, Charter, Cox, Mediacom, and Midco have gone a step further by voluntarily offering a robust broadband service with at least 100 Mbps that is fully covered by the monthly \$30 ACP subsidy. In short, eligible subscribers will get high quality broadband for free.

Commercial providers, however, cannot make satisfactory progress on adoption alone. NCTA and its members embrace the critical role played by experienced community organizations and trusted digital navigators. They are best positioned to help identify non-adopters and to assist in overcoming adoption barriers. Our companies are working with nonprofits and other organizations to engage in community outreach, to build digital skills, and to highlight the value of broadband technology. Additionally, cable providers have recognized the importance of digital literacy—investing \$650 million since 2011 in digital literacy and training efforts.

NCTA recognizes that having a high-speed broadband connection at home opens up a world of opportunity. We are encouraged by the collaborative spirit that has

launched our renewed focus on getting all Americans connected to the internet. And further, we welcome the continued interest of this Committee and other policy-makers in keeping this effort on track toward a day when we can finally realize our national commitment to universal broadband service.

Thank you and I am happy to take your questions.

Senator LUJÁN. Next, we will hear from Mr. Jonathan Spalter, the President and CEO of USTelecom.

**STATEMENT OF JONATHAN SPALTER, PRESIDENT AND CEO,
USTELECOM**

Mr. SPALTER. Good morning, Chair Luján and Ranking Member Thune. I am so glad for the invitation to join this conversation today, and I would like to join you, Senator Luján, in extending thanks to Senator Wicker for his exceptional service to this committee, but also to the cause of broadband around the country.

My name is Jonathan Spalter. As you mentioned, I am the President and CEO of USTelecom, the Broadband Association. We are the National Trade Association representing network providers, innovators, and suppliers and manufacturers connecting the world through the power of broadband.

Our membership ranges from leading publicly traded companies, some of the largest investors and job creators in the country, to local and regional companies and cooperatives that have roots in their company, in their states, and in their service areas going back over a century.

What unites our diverse membership is a shared commitment to connecting communities, businesses and individuals to opportunity, to a better quality of life, and to each other via technology. U.S. broadband, I believe in my heart, has been a tremendous national success story, with massive investment in network expansions, prices that are actually trending lower, even in a time of inflation, and ever increasing speeds.

And as Senator Thune has mentioned, broadband providers' investments, along with smart, common sense, regulatory and legislative approaches, is why America's networks rose to the challenge of the pandemic, despite surges in demand due to the abrupt shift to work, school, health care, and everything else from the home.

The pandemic, however, also lays quite bare the unacceptable cost of being left on the wrong side of the digital divide. Universal connectivity is a matter of digital equity, and our collective work is not yet done. But working together, I believe in my core that it is in reach.

Between the tens of billions of dollars our members invest each year in connected infrastructure, and the Federal investments included in the Infrastructure Investment and Jobs Act, IIJA, we have the opportunity to finally, fully, and forever connect all parts of our nation, if we all work together to meet this historic moment.

So, I appreciate the opportunity to roll up our sleeves and explore the underlying causes of the remaining broadband gaps and some of the concrete steps that we collectively can take to close them. This includes maximizing the IIJA opportunity by ensuring that funding recipients have the technical, operational, and financial wherewithal to get these essential infrastructure projects over the finish line.

Removing or lowering hurdles to speedy deployment, clarifying that broadband grants should not be treated as taxable income. Making permanent the Affordable Connectivity Program to help low income families pay for Internet service.

Charting a sustainable future, a resilient future for universal service. And last but not least, ensuring that everyone has the digital skills that are necessary to harness all that broadband makes possible to all in our country.

We must not oversimplify the complexities of achieving affordable, reliable, high speed Internet for all, and you will find no more committed partner and ally to making this happen in America's broadband providers. Thank you very much.

[The prepared statement of Mr. Spalter follows:]

PREPARED STATEMENT OF JONATHAN SPALTER, PRESIDENT AND CEO, USTELECOM

Good morning and thank you, Chair Luján and Ranking Member Thune, for the invitation to join this important conversation. I hope this convening can help spark a renewed collaboration across the public and private sectors, alongside community partners, to work effectively together to connect every person, business and organization in this country to high-quality, affordable broadband internet.

My name is Jonathan Spalter. I am President and CEO of USTelecom—The Broadband Association. We are the national trade association representing network providers, innovators, suppliers and manufacturers connecting the world through the power of broadband. Our membership ranges from large publicly traded corporations, some of the largest investors and job creators in our country, to local and regional companies and cooperatives that have roots in their community going back a century or more.

What unites our diverse membership is a shared commitment to connecting communities, businesses and individuals to opportunity, to a better quality of life, to each other via technology. Universal connectivity has always been our north star, and today, with a concerted effort, it is within reach. Each year, broadband providers invest billions in our Nation's connected infrastructure. Our ongoing capital investments totaled \$86 billion in 2021 alone.¹ Together with recent Federal investments included in the Infrastructure Investment and Jobs Act (IIJA), they have the potential to finally, fully and forever connect our nation—if we work together to make the most of this historic moment.

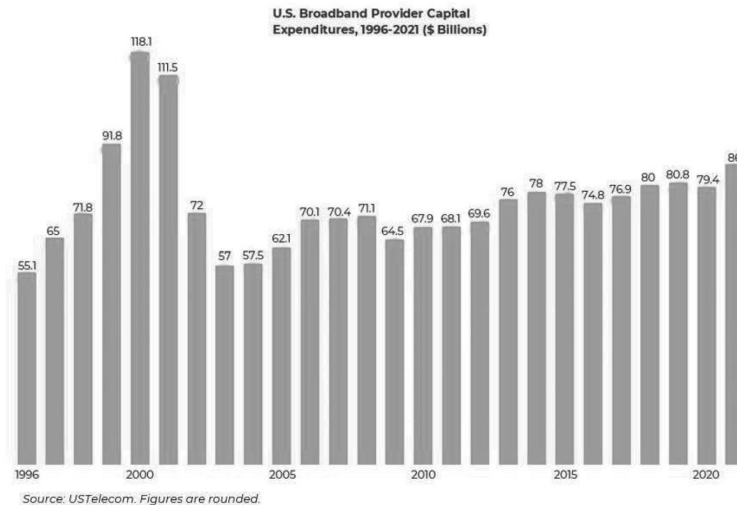
So, we appreciate the opportunity presented by this hearing to roll up our sleeves and explore together the underlying causes of existing broadband service gaps and how we can best get after the host of concrete solutions available to us to close the digital divide.

I. Overall, U.S. Broadband Deployment is an Extraordinary Success Story

From a macro perspective, U.S. broadband deployment represents a tremendous success story. America's broadband providers have invested more than \$2 trillion since 1996 to build and expand the Nation's high-speed infrastructure. Last year's investment of \$86 billion² represents more than twice the historic public commitment made in the IIJA, and these commitments are pressing forward despite the substantial economic headwinds posed by inflation, supply chain constraints and a tight labor market.

¹ USTelecom, Broadband Capex Report, July 18, 2022; available at: <https://ustelecom.org/wp-content/uploads/2022/07/2021-Broadband-Capex-Report.pdf>

² USTelecom, Broadband Capex Report, July 18, 2022; available at: <https://ustelecom.org/wp-content/uploads/2022/07/2021-Broadband-Capex-Report.pdf>



This vigorous investment is accelerating the transition from legacy copper to high-speed fiber networks throughout our Nation. In 2021, 43 percent of U.S. households had access to fiber, up 12 percent from 2020.³ And providers have already committed over \$45 billion of their own capital to connect 48 million households to fiber in the coming years.⁴ As a result, the number of households with fiber access is expected to double over the next five years to cover 83 percent of U.S. households.⁵ This forecast assumes effective use of IIJA funds, which is mission-critical work.

Broadband access also is expanded by favorable broadband pricing trends. While overall inflation has increased, the average price for broadband has bucked this trend. Consumers spend, on average, \$45 per month for broadband service, down 14 percent from 2021–2022.⁶ The average price for the fastest broadband speeds also is down more than 10 percent over this same period. In sharp contrast, consumer sticker shock grew for other essential goods and services, with grocery bills rising by 8.5 percent, health insurance by 6.1 percent and rent by 4.4 percent.⁷

In addition to broadband pricing that runs counter to inflationary pressures consumers face with most other essential goods and services, the IIJA established the Affordable Connectivity Program (ACP), which provides up to \$30 per month to assist low-income Americans with their broadband bills and up to \$75 per month in tribal areas. More than 1,300 broadband providers are participating in the program—connecting more than 15 million households so far to low-or no-cost broadband.⁸

II. Our Work Isn't Done Until True Universal Connectivity is Achieved

Broadband providers' investment is why U.S. networks, unlike those in other countries, rose to the challenges of the pandemic despite surges in demand due to the abrupt shift to work, school, health care and everything else from home. The pandemic, however, also laid bare the unacceptable cost of being left on the wrong

³ 2021 Fiber Provider Study, Fiber Broadband Association, January 5, 2022; available at: <https://www.fiberbroadband.org/blog/fiber-broadband-enters-largest-investment-cycle-ever>

⁴ New Street Research, Closing The Gap—An Open Letter To Secretary Raimondo, October 2021; available at: <https://ustelecom.org/wp-content/uploads/2021/10/New-Street-Research-presentation.pdf>

⁵ Independence Research, U.S. Broadband Blitz—Timeline and Impact, February 2022; available at: <https://www.fiberbroadband.org/page/fiber-research>

⁶ 2022 Broadband Pricing Index, USTelecom, June 29, 2022; available at: <https://www.ustelecom.org/research/2022-bpi/>

⁷ 2022 Broadband Pricing Index, USTelecom, June 29, 2022; available at: <https://www.ustelecom.org/research/2022-bpi/>

⁸ USAC, ACP Enrollment and Claims Tracker, December 5, 2022; available at: <https://www.usac.org/about/affordable-connectivity-program/acp-enrollment-and-claims-tracker/#total-enrolled>

side of the digital divide. It left little doubt that broadband is an essential service for everyone.

USTelecom member companies' commitment to connecting everyone—regardless of race, ethnicity or income—runs deep in our DNA. It advances both our business interests and the community values that have defined and united our industry for decades. No child should have to do their homework sitting in a fast food parking lot. Our parents and grandparents should be able to review their blood sugar levels with their endocrinologist from the comfort of home. Small businesses must be able to access a world of potential customers online.

Our member companies have long been committed to digital equity to ensure everyone in their service areas can take advantage of broadband-fueled opportunities—from health care to education to employment and reskilling. Together with community partners, our members have, for example, established learning centers to support remote education and provide tutoring and mentoring resources; STEM-based outreach programs to enable K–12 students in underserved communities build the critical skills they need to thrive in the digital economy; digital skills training programs for adults in rural communities in partnership with Historically Black Colleges and Universities; and telecom apprenticeship programs so tribal community members can gain the skills necessary for technology jobs on tribal lands.

Our collective work is not done until every person, business and community institution is connected to high-quality, affordable broadband. We agree wholeheartedly that universal connectivity fundamentally is a matter of digital equity. The question before all of us is how do we work collectively to get there? We begin with a shared understanding of the complex web of issues that have made a fully connected nation so elusive.

III. The Reality: Fiber is Costly and Complex to Deploy

Our member companies were founded, often a century or more ago, with the mission of connecting communities to opportunity. They paved the way for each generation of technological advancement in this country, from early revolutions driven by the availability of telegraphs and telephones, to universal copper-based telephone service, to DSL internet, and now IP-based fiber-optics and fixed wireless technologies.

As technology changes, so must our networks. Deploying next generation networks requires us to replace, not simply upgrade, our existing infrastructure. This is a time-consuming, resource-intensive process, and it cannot happen overnight or everywhere at once. It is a continuous endeavor. It involves navigating and overcoming a series of challenges complicated by factors ranging from supply shortages and limitations on the availability of skilled labor to legal barriers, such as state and local permitting processes.

Deployment is further impeded by outdated regulatory requirements that require our companies to maintain costly and inferior legacy copper networks, expending substantial resources that could instead be dedicated to accelerating the fiber transition. So as our members work to completely replace copper networks with fiber, they face the prospect of maintaining their legacy networks for lengthy and even indefinite periods of time as they seek regulatory approvals to migrate customers to next-generation networks. These obligations are unilaterally placed on our companies. Cable, wireless, satellite and other competitors face no similar demand on their capital, which distorts both competitive dynamics in the marketplace and financial decisions around deployment.

IV. Many Specific Opportunities Exist to Dismantle These Hurdles Together

We face serious barriers to universal connectivity—from outdated and uneven public policy to the sheer vast geography of our country. We can push past these barriers, but we need a genuine partnership to do so. There are numerous opportunities to join forces—across government, industry and community organizations—to do collective problem solving.

What follows is by no means a conclusive list. It is intended to illustrate the constellation of issues that present concrete opportunities to take action now to help clear a path for long-term success.

Maximize the IIJA opportunity. Congress is to be commended for including language in the IIJA to emphasize that fund recipients must be qualified and have the technical, operational and financial wherewithal to get these essential infrastructure projects completed.

- Conduct appropriate oversight to ensure grant recipients are properly vetted to ensure they have the proven ability to complete complex infrastructure projects.

- Ensure government agencies coordinate deployments based on FCC broadband maps, so funds prioritize unserved and underserved locations.
- Make sure the policy environment is flexible and supportive of provider efforts to navigate supply chain challenges to prevent equipment-related project delays.

Remove or lower hurdles to speedy deployment. From landlords who won't allow access to or through their apartment buildings to Federal agencies sitting on permits for years with no action, much can be done by policymakers at all levels of government to eliminate barriers that deny or delay affordable, reliable high-speed connectivity for all. This should include passing national permitting reform legislation like S. 1113—The Accelerating Rural Broadband Deployment Act authored by Senators Daines and Kelly which would create a shot clock for agencies to approve or deny an application within 60 days or the application is deemed granted.

Prevent IRS takebacks. Under current law, all broadband grants, including those in the IIJA's Broadband Equity, Access and Deployment program, the American Rescue Plan Act's Capital Projects Fund and USDA rural deployment funding, must be treated as taxable income. This means roughly \$1 in every \$5 flowing to communities for infrastructure must be returned to the IRS. Congress should act quickly to pass S. 5021—The Broadband Grant Tax Treatment Act, authored by Senators Warner and Moran, and cosponsored by Senate Commerce Committee Members Wicker, Warnock, Capito, Sinema, Cruz and Fischer to make clear these resources should remain in the communities they aim to serve—rather than be taxed back to Washington.

Chart a sustainable future for Universal Service. In passing the IIJA, Congress rightly asked the FCC to explore what the future of the Universal Service Fund (USF) might look like once these historic deployment outlays are made. The reality is that broadband infrastructure is not a 'set it and forget it' technology. Just like roads and bridges, these networks must be maintained, repaired and expanded over time. This will require ongoing resources in high-cost areas. This financial burden must be more equitably shared. The current outdated USF contributions mechanism is profoundly regressive—focused largely on the dwindling number of landline telephone service customers. To secure the future for universal service, the contributions base should be expanded to include those companies that benefit most from modern universal connectivity, namely the Nation's leading edge providers. I urge passage of the FAIR Contributions Act introduced by Senators Wicker and Lujan and cosponsored by Senators Young, Capito, Barrasso, Crapo and Peters. The legislation would require the FCC to go further in studying the feasibility of contributions from the edge providers. USTelecom proudly endorsed this legislation, and we hope that it will be passed by the Senate before the end of the year.

Commit to long-term assistance for low-income households. While most customers are enjoying faster speeds and lower broadband prices, those struggling financially need additional assistance. The Affordable Connectivity Program (ACP) was launched and funded by Congress to help low-income households pay for Internet service. More than 1,300 broadband providers participate in the program, with more than 15 million households to date receiving what amounts to low-or no-cost internet. While the ACP has proven successful, funding could run out sometime in 2024. Congress should make permanent this commitment to connecting low-income households.

Ensure everyone has the skills necessary to fully participate in the promise of broadband. Digital skilling initiatives are necessary to ensure all Americans are aware of and can harness the many opportunities broadband makes possible. Local community organizations are essential partners here. Congress recognized the importance of these efforts in establishing \$2.75 billion in Digital Equity Act funding as part of the IIJA. USTelecom members have been working to promote digital skills in the communities we serve for years and will continue to be committed partners in this work.

V. Long-Term Success Requires Strong, Constructive and Timely Teamwork

Across the many challenges facing our nation—from inflation to education, health care to social and economic divisions—meaningful solutions hinge on the ability of every home and business to connect to affordable, high-speed broadband.

Truly closing the digital divide means completing ubiquitous physical infrastructure, ensuring low-income consumers have access to this essential service and helping everyone attain the digital skills necessary to take full advantage of the many possibilities broadband brings into our lives.

We must not oversimplify the complexities of achieving universal connectivity. But we have to work together to overcome these challenges if we are to achieve our

shared goal of empowering everyone to take full advantage of affordable, reliable, high-speed internet. You will find no more committed partners to achieving this essential national goal than America's broadband providers.

Senator LUJÁN. Thank you, Mr. Spalter. Next, we are going to hear from Angela Siefer, the Executive Director of the National Digital Inclusion Alliance.

**STATEMENT OF ANGELA SIEFER, EXECUTIVE DIRECTOR,
NATIONAL DIGITAL INCLUSION ALLIANCE**

Ms. SIEFER. Thank you so much for having me here. It is a privilege and a joy to talk to you today. I am Angela Siefer. I am the Executive Director of the National Digital Inclusion Alliance. We are a nonprofit that advances digital equity by supporting community programs and equipping policymakers to act, which is what we did.

We envision a country where everyone has the opportunity to use technology to live, learn, work, and thrive. Digital inequities are not new, but the pandemic made them painfully clear. That clarity calls to action.

Communities came together, scaled up existing digital inclusion programs, set up new programs, took risks on innovative solutions. They are our country's digital equity heroes. They would not have made such progress without the swift actions of Congress during the pandemic. Representing the digital equity community, I thank you.

NDIA sits in a unique position. We facilitate the Nation's largest community of practice. We have over 1,000 organizations of local experts relaying their lessons learned and community needs to policymakers. These heroes need you, again. The historic investment in digital equity is amazing, but it will not fully bridge the digital divide.

As long as technology keeps changing, the work will keep changing, the divide will keep changing. There are many solutions, affordable, robust broadband, affordable devices to meet the needs of the user, access to ongoing skills training, and tech support in multiple languages.

What your historic investment should do, let's say will do, is change systems—so that we have strong digital inclusion ecosystems that allow us to continually adapt to technology changes. Let's call the investments a success when four things happen, Government agencies integrate broadband adoption programing and device ownership into their programs.

Industries who benefit from customers being online prioritize corporate giving and community partnerships. Philanthropy prioritizes digital equity in their giving because it strengthens their missions.

Fourth, local digital inclusion ecosystems are so robust that when people can't get going online for any reason, they readily find the support and resources they need. That would all be success. If all that happens, it is awesome. But we still need Federal support.

Long term solutions to bridging the digital divide require all hands on deck. As of December 15, 15 million households were enrolled in the Affordable Connectivity Program. Given that the rules for that were just created, this is a monumental feat. We are

thrilled that the FCC will soon have outreach funds going into trusted community based organizations who are already investing their own resources and raising awareness and deploying digital navigators to sit with their neighbors.

But unless Congress takes action, this vital program will go away in just a few short years. Internet service providers' low cost programs are helpful, but they have participation limitations. Representing the digital equity community today, I ask you for sustained funding for the Affordable Connectivity Program.

As we build networks and address broadband adoption through BEAD, we also need sustained Federal funding for the all the solutions, holistic solutions, digital navigators, digital skills training, devices, not just for students. Representing the digital equity community, I ask you to make the Digital Equity Foundation a reality.

Funded by spectrum auctions, this will provide long term support mechanism for digital inclusion programs. Another request, we certainly need a full FCC. They have a big job. Consider the new maps broadband, consumer labels, ACP, ECF, many other responsibilities. They cannot do this without Gigi Sohn.

Representing the digital equity community, I urge the Senate to confirm her nomination before the holiday recess. Finally, we need to increase the amount of digital equity funds dedicated to tribes and territories.

The needs in Indian Country and in the territories are great, and there are simply not enough funds in the Digital Equity Act to fully cover these needs. I know I am asking for a lot. It is bad form to say thank you and ask for more. But here it is. That is our needs.

Internet access and the skills to use it are not only essential to survive, but to thrive. And thriving is essential to America's promise, to the well-being of its people and the country's ability to compete globally.

Thank you for having me, and I welcome the Committee's comments and questions.

[The prepared statement of Ms. Siefer follows:]

PREPARED STATEMENT OF ANGELA SIEFER, EXECUTIVE DIRECTOR,
NATIONAL DIGITAL INCLUSION ALLIANCE

Chairman Luján, Ranking Member Thune and Members of the Subcommittee, it's an honor and privilege to join you today to talk about how critical digital equity is to our Nation's future. Thank you for having me.

I'm Angela Siefer, the executive director of NDIA—the National Digital Inclusion Alliance. We are a nonprofit that advances digital equity by supporting community programs and equipping policymakers to act. We envision a country where everyone has the opportunity to use technology to live, learn, work, and thrive.

Digital inequities are not new. But the pandemic made them painfully clear. That clarity caused action.

Communities came together, scaled up existing digital inclusion programs, set up new programs, and took risks on innovative solutions. They are our country's digital equity heroes. They would not have made such progress without the swift actions of Congress during the pandemic. Representing the digital equity community, I thank you.

Local digital equity efforts were strengthened with support from the CARES Act, ARPA, and the Consolidated Appropriations Act, particularly the Emergency Broadband Benefit Program and the Emergency Connectivity Fund. Then last year you passed the Bipartisan Infrastructure Investment and Jobs Act, which prioritizes digital equity in the BEAD Program and funds a historic \$2.75 billion for the Digital Equity Act, with an additional \$14.2 billion for the Affordable Connectivity Pro-

gram. It's an amazing step forward. NDIA and our community are working to make the most of these digital equity investments.

NDIA's community includes over 1,000 local organizations running digital inclusion programs, plus national advocates, researchers, and public servants. These are the folks guiding ACP sign-ups; providing appropriate devices; teaching digital skills; building digital equity coalitions; and offering digital equity advice to their states, territories, and the District of Columbia.

NDIA sits in a unique position—we facilitate the Nation's largest digital equity community of practice, learning from these local experts, and relaying their lessons learned and community needs to policymakers. I am here to tell you—these heroes need you. The historic investment in digital equity is amazing but will not fully bridge the digital divide. As long as technology keeps changing, the work of bridging the digital divide will keep changing. There are many digital divides—the availability of affordable, robust broadband; the availability of affordable devices that meet user needs; and access to ongoing digital skills training and tech support in multiple languages.

What your historic investment in digital equity SHOULD do, and WILL do, is create systems-level change and strong local digital inclusion ecosystems that allow us to continually adapt as technology changes. We should call the investments a success when:

1. Government agencies integrate broadband adoption programming and device ownership into their programs.
2. Industries who benefit from their customers being online prioritize digital equity in their corporate giving and community partnerships.
3. Philanthropy prioritizes digital equity in their giving because it strengthens their missions.
4. Local digital inclusion ecosystems are so robust that when people can't get online for any reason, they can readily find the support and resources they need.

If all of that happens, we will still need Federal support. Long-term solutions to bridge the digital divide require all hands on deck.

As of December 5, over 15 million households are enrolled in the Affordable Connectivity Program. Given that a year ago, rules for this program didn't exist, this is a monumental feat. We're thrilled that the FCC will soon fund outreach activities in trusted community-based organizations, who are already investing their own resources in raising awareness and deploying digital navigators to sit with their neighbors and guide them through ACP enrollment.

But unless Congress takes action, this vital program will go away in just a few short years. Internet service providers' low-cost programs are helpful, but they all have participation limitations. Representing the digital equity community today, I ask you for sustained funding for the Affordable Connectivity Program.

Most communities won't see affordable home Internet service anytime soon. Long-term solutions include increasing the availability of middle mile. So, I ask you for additional funding to expand middle mile networks.

We also need sustained Federal funding for digital navigator programs, digital skills training, broadband adoption, and devices (not just for students). Representing the digital equity community, I ask you to make the Digital Equity Foundation a reality. Funded by future spectrum auctions, this will provide a reliable long-term support mechanism with the ability to flex to new needs.

Another request—we sorely need a full FCC. They have a big job. Consider the new maps, the broadband consumer labels, ACP, ECF, and many other responsibilities. They cannot do this without Gigi Sohn. Representing the digital equity community, I urge the Senate to confirm her nomination before the holiday recess.

Finally, we need to increase the amount of digital equity funds dedicated to Tribes and territories. The needs in Indian Country and in the territories are great, and there are simply not enough funds in the Digital Equity Act to fully cover these needs.

As states, territories, DC, and Tribes embark on their BEAD and digital equity planning it will be important to tie the two plans together. We cannot work under the theory "build it and they will come." Our strategies must be holistic, addressing broadband adoption while building networks, not after.

I know I'm asking for a lot. Access to the Internet and the skills to use it are essential to not only survive but to thrive. And thriving is essential to America's promise, to the wellbeing of its people, and to the country's ability to compete globally.

Thank you for having me, and I welcome the Committee's comments and questions.

Senator LUJÁN. Thank you, Ms. Siefer. I will now recognize members for questions, and I will start with myself. The first question that I have is to all of the panel. And it is a simple yes or no question.

Does increased broadband adoption act as a multiplier for other sectors, including health care, education, employment, and commerce? Kimball.

Ms. SEKAQUAPTEWA. Absolutely. It has the ability to uplift community wellbeing across those sectors. And the internet, you know, has been in our tribal communities for a long time on our cell phones, but community use, Government using broadband to make our communities stronger with improved health care and education is what broadband is about for our work.

Senator LUJÁN. I appreciate that. That is a resounding yes. I appreciate that. Mr. Powell.

Mr. POWELL. Also resounding, yes. I Chair the Board of the Mayo Clinic and I can tell you the importance of telehealth in the case of a national emergency was essential.

Senator LUJÁN. Thank you. Mr. Spalter.

Mr. SPALTER. Well, absolutely, yes. And that is why we really do thank you for your leadership on moving forward on the IJA and working with our companies to ensure that all Americans can in fact be connected.

Senator LUJÁN. Appreciate it. Ms. Siefer.

Ms. SIEFER. Resounding yes.

Senator LUJÁN. Appreciate that. Another yes or no question, do Federal subsidies like the Affordable Connectivity Program, which provides \$30 a month stipend toward Internet service for eligible households and \$75 a month for households on tribal lands, lower barriers to broadband access? Kimball.

Ms. SEKAQUAPTEWA. Absolutely. It is a critical stop gap measure. It was a critical response during the pandemic, and it is a critical stopgap measure moving forward while we install affordable high speed networks to put in permanent solutions in our communities.

Senator LUJÁN. Appreciate that. Mr. Powell.

Mr. POWELL. Yes, I think so. Providing a free service removes price as any barrier to adoption. So it is critical.

Senator LUJÁN. Yes, I think so. Let me come back to that a little bit later. Mr. Spalter.

Mr. SPALTER. Absolutely, yes. While, in fact, in context, while overall inflation has increased, broadband prices have actually bucked this trend.

The average consumer spends \$45 a month on broadband, which is actually 14 percent less between 2021 and 2022. I would also say that it is incredibly important, and I agree with Ms. Siefer, that we have to sustain the Affordable Connectivity Program and make it permanent.

Senator LUJÁN. So the importance of sustaining the programs. I may follow up there as well. And then, Ms. Siefer, previous question?

Ms. SIEFER. A resounding yes.

Senator LUJÁN. Another yes or no, do digital equity initiatives like those funded by the Digital Equity Act for digital literacy lower barriers to broadband adoption? Ms. Kimball.

Ms. SEKAQUAPTEWA. Absolutely. We are not putting in broadband just for the sake of the broadband. We are trying to change human lives and have people utilize the technology. So digital—broadband adoption is the humanistic side of this technology infrastructure project.

Senator LUJÁN. Appreciate that. Mr. Powell.

Mr. POWELL. Yes. We have learned from past experiences that outreach, awareness, digital literacy, community groups are essential to success.

Senator LUJÁN. Appreciate that, sir. Mr. Spalter.

Mr. SPALTER. Yes.

Senator LUJÁN. Ms. Siefer.

Ms. SIEFER. Yes, of course.

Senator LUJÁN. Glad I could hear you, Mr. Spalter. Now, there should be little debate on this, deployment, affordability, and adoption, each one provides a piece of the puzzle. So I appreciate the explanation and the responses.

The Affordable Connectivity Program has made a real difference helping Americans afford broadband access, but the funding won't last forever. Hence the importance of this being a sustainable program.

And the Digital Equity Act will help fund initiatives that target other barriers to broadband adoption across the country. But it is not a permanent program, and we need to do more.

Ms. Siefer, in addition to encouraging build out, how can Congress work to provide permanent solutions to barriers to broadband adoption in the United States?

Ms. SIEFER. There are the individual things that Members of Congress can do, which is working with those industries that are impacted, right. If the industry benefits from having folks being online. This is all the industries, right, this isn't just Internet service providers.

But working with them to help them understand the benefits so that they are then part of the solution. Then it is also the Affordable Connectivity Program, it's the Digital Equity Foundation, it's all the things that you all know you have already done before, but because the digital divide is not going to be over, we have to keep doing those things.

Senator LUJÁN. And Mr. Spalter, yes or no, do you believe all broadband access technologies, whether it be fiber, cable, wireless satellite, provide equal access to learning tools?

Mr. SPALTER. Yes, I do. I would argue, however, that it is wired based infrastructure that is going to be actually able to allow us to achieve our goal of a fully and finally connected nation. And we should focus our resources and our funding programs accordingly.

Senator LUJÁN. And Mr. Spalter, yes or no, do some of your members maintain data caps or data throttling on their consumer broadband offerings?

Mr. SPALTER. These are—certain of our members actually do provide a range of different options to their consumers, including lower priced options that would include a data cap.

This is an option that is potentially very accessible to and important to certain of our consumers, and particularly, for example, seniors who might want to choose a lower price option.

Senator LUJÁN. I appreciate that. And my time is up. Mr. Powell, I have the same question for you, so if time allows later, I will come back and ask a similar question as well. I will now recognize Mr. Thune for his questions.

Senator THUNE. Thank you, Mr. Chairman. Let me start by saying I have concerns about, as I said earlier, NTIA and other agencies pursuing extraneous political goals in their respective broadband programs, which could ultimately lead to increased costs for providers deploying networks.

Mr. Powell, in your testimony, you talked about the need for, or of Government agencies, I should say, to avoid unnecessary added costs. Could you elaborate on this? How does direct and indirect forms of net neutrality, open access, burdensome labor requirements affect the deployment of broadband networks to truly unserved areas?

Mr. POWELL. I start with the premise that, remember, the problem we are trying to solve is really precarious economic environments that have disincentive providers from serving those areas, so we have to be highly sensitive to what additional costs we are adding.

So frequently these programs add levels of cost that compromise the model for whether to accept funds to enter a market or not. For example, if you don't have clarity on what rates you are allowed to charge and there are suggestions you will regulate the rates, that is a disincentive to knowing whether you can afford to offer the service because you are not clear on the amount of revenue you get.

Another example might be extensive workforce regulations, while well-intended, ultimately mean you have reduced the pool of skilled workers available to a provider in order to meet the buildout requirements in a market with tight labor. That is very, very complicating and actually could frustrate or defeat any number of initiatives.

Failure to be tech neutral could mean you have a limited amount of tools in your toolbox to solve complex problems in rural America, and thus, you know, you are again, might choose to pass on participation in the program. So you could go on and on in ways that these things manifest themselves in actual decisions on the ground.

Senator THUNE. Mr. Spalter and Mr. Powell, there are a number of barriers that slow down the deployment of networks. Could you discuss the barriers your members face today, and whether or not Congress should take additional action on Federal permitting reforms?

Mr. SPALTER. Certainly. Yes, Senator, there are a number of different barriers that slow down deployment, including, as you mentioned, a range of permitting challenges that our members face both federally and also State—with the State and local level.

We believe that there needs to be more coordinated and accountable efforts on the part of the various, or the 13 various agencies that are involved in deploying broadband around our country.

We believe that there should be much greater coordination as well with State and local authorities to ensure that permitting barriers can actually be leveled, that we can machete through a lot of these problems.

I have been hearing from some of our members, for example, in Western Montana, where the permitting challenges on BLM lands can add 3 years to a build out. These are incredibly challenging situations, and we have to collectively work together to address them.

Senator THUNE. You testified before the Commerce committee in May 2020 on the resiliency of our country's broadband network during the COVID pandemic. The United States, as has been pointed out, fared much better than European countries because of our light touch approach to regulating broadband networks.

Now that we are almost 2 years removed from the height of the COVID pandemic, what lessons should policymakers take away from future attempts to regulate broadband? And what policies could Congress pursue in the next Congress to encourage continued investment?

Mr. SPALTER. I think that the pandemic was instrumental in showing all Americans, and hopefully as well our policymakers and regulators, that the kinds of commonsense, smart policy frameworks that enabled innovation and investment to the levels that we have seen.

And I would like to point out at a high watermark just last year of \$86 billion in capital investment in our networks were made possible not because we were trying to slow down the incentives for investment in innovation, but because we were trying to actually accelerate them.

I think going forward, if we can actually collectively as a nation, make sure that, and especially on the precipice of this historic moment where we actually will be able to deliver the \$42.5 billion of BEAD Program money, that we not encumber this new tranche of investment in unnecessary regulatory overhang, and that the NTIA and the states scrupulously listen to the intent of Congress as it was expressed in the IIJA.

Let's focus on getting the monies out to the underserved and unserved first.

Senator THUNE. As I mentioned in my opening statement, there are 130 programs, stunning really, supporting broadband across 15 different agencies. Could you speak to your—the frustrations that your members have when they are notified after the fact that another Federal agency is providing funding to another entity to provide broadband in an area that is already served. And I would start with Mr. Powell, Mr. Spalter, and then open it up to the panel.

Mr. POWELL. To quote one of my CEOs, it is a lot of money going to too many places through too many programs under different criteria. This is very, very complex to manage.

I think that, you know, another thing that our members are quite frustrated by is areas that are possibly unserved but there has already been Federal commitments to serve those areas that have been provided through other programs.

For example, you could have won money in RDOF to serve an area, yet it shows up as unserved in FCC maps or programs don't fully recognize existing commitments to serve areas. That can lead to a lot of confusion and complexity, and stranded investment because they bid on those projects on the assumption that they would build in those spaces under these terms and criteria, only to have another program parachute in on the same thing.

So one of the challenges for regulators is to ruthlessly attempt to harmonize criteria, conditions across these programs and make sure all take cognizance of the other as they make their decisions.

Mr. SPALTER. Frustrated is one word I would use. I think that there are some others in my thesaurus that I could also throw out. But clearly our members who know the implicit and high fixed costs of deploying networks are alarmed when they are potentially overbuilt by Federal dollars from one agency or coming in and actually making it more challenging for them to deploy.

Which is one of the reasons why we believe firmly, Senator, that there should be—that Congress should require a certification process by which agencies certify that their use of Federal funds would not be actually deployed in areas where Federal funds are already being spent.

Senator THUNE. For all the panelists, yes or no questions, Congress need to consider creating new broadband programs, yes or no?

Mr. POWELL. Should they consider new broadband programs? I think we have a lot of broadband programs. I think they should focus on refining and get the most out of the ones that we have at the moment.

Mr. SPALTER. I agree. I think that let's see how the BEAD Program progresses. Let's see what we can do about reforming USF, and then we consider whether or not additional programs need to be come on—come online.

Senator THUNE. Ms. Siefer.

Ms. SIEFER. So I would focus on the broadband adoption side of it, and further invest in what we have.

Senator THUNE. Ms. Kimball.

Ms. SEKAQUAPTEWA. I would allow for continued funding to focus on on-time, on budget implementations with adequate support to realize those goals.

Senator THUNE. Yes. And I will just close, Mr. Chairman, by saying I for one am concerned that any new programs are going to lead to duplication of services and wasteful spending.

And I hope that this vast array of programs that we have and the funding that is associated with that can be put on the target, and that we don't end up with a lot of overbuilding and wasteful funding that doesn't achieve the desired goal.

And it seems to me there is a ton of funding in the pipeline right now. And you add that to the normal, as I said earlier, USF funding. We are in a unique position and hopefully it can be utilized in a way that—utilized wisely and well on behalf of the taxpayers. Thank you.

Senator LUJÁN. Thank you, Mr. Thune. Mr. Peters, you are recognized for your questions.

STATEMENT OF HON. GARY PETERS, U.S. SENATOR FROM MICHIGAN

Senator PETERS. Thank you, Mr. Chairman. Mr. Spalter, thank you for being here today. As you know, in 2020, Congress passed the Secure and Trusted Communications Act to ensure that American broadband networks were free from the influence of Chinese State connected companies like Huawei.

In the bill, we promised the broadband providers that we would help pay “to rip and replace” this equipment. But so far, Congress hasn’t kept up with that promise, and there is roughly a \$3 billion shortfall in the program. And what some people I think don’t realize is that this funding shortfall isn’t just a national security issue, it is also a broadband equity issue as well.

For example, in the upper peninsula of Michigan, where 25 percent of households cannot access broadband currently, Northern Michigan University operates a network that provides connectivity to its student body and over 16,000 households in roughly 120 rural Michigan communities.

And without funding from Congress to replace its Huawei equipment with trusted technology, the university’s ability to provide this service is without question in danger right now.

So my question for you is, can you explain the potential consequences that rural broadband providers, and rural users that rely on that service, are going to face if Congress does not act soon to fully fund, Rip and Replace?

Mr. SPALTER. Let me start by thanking you, Senator, for your consistent and forceful stewardship of our Nation’s security and resiliency of our cyber infrastructure. That is very, very appreciated by all in our sector.

If rural and local providers, particularly like those in Northern Michigan, are unable to access Rip and Replace funds, they will not be eligible to access Universal Service Fund, and that can have a devastating consequence on the lives of our rural communities, our families, and the enterprises that populate them.

This is an absolutely challenging issue that we have to make sure that those \$3 billion can actually be deployed and make sure that no—none of our rural and local providers will be denied access to the types of support that they need, either in terms of CapEx or OpEx, to deploy and maintain and manage their networks.

Senator PETERS. Well, thank you. Thank you for the answer. I think it is important for people to realize the implication of this.

And Mr. Chair, I would also like to enter into the hearing record a letter from seven broadband trade associations in support of funding Rip and Replace. Thank you.

[The information referred to follows:]



December 8, 2022

The Honorable Charles Schumer
Majority Leader
United States Senate
322 Hart Senate Office Building
Washington, DC 20510

The Honorable Mitch McConnell
Minority Leader
United States Senate
S-230, The Capitol
Washington, DC 20510

The Honorable Nancy Pelosi
Speaker
United States House of Representatives
H-232 The Capitol
Washington, DC 20515

The Honorable Kevin McCarthy
Minority Leader
United States House of Representatives
H-204, The Capitol
Washington, DC 20515

Dear Majority Leader Schumer, Speaker Pelosi, Leader McConnell, and Leader McCarthy:

On behalf of the undersigned organizations representing the U.S. information and communications industry, we write to urge Congress to fully fund the Federal Communication Commission's (FCC) Secure and Trusted Communications Networks Reimbursement Program (Program). The Program, known as "Rip & Replace," was mandated by the Secure and Trusted Communications Networks Act of 2019 to remove from U.S. networks Chinese equipment deemed to pose a national security risk and replace it with equipment from trusted vendors. In July, the FCC identified a funding shortfall of \$3.08 billion to fully fund the Program's approved application cost estimates. Absent the funding of this shortfall, carriers could only be reimbursed for approximately 40% of their costs, which would preclude them from completing the process. The successful implementation of this Congressionally mandated national security imperative depends on fully and immediately funding the Program.

This Program is a critical, and essentially the only, mechanism for wireless carriers and communications providers in rural America to remove, replace, and destroy communications equipment and services in their networks that pose a national security risk. Because of the funding shortfall, untrusted equipment is still in service today, including some near military bases, airports, and other areas of strategic importance. Timing is critical – the FCC's July announcement started the clock for completion of this critical work. The window is closing on this high-priority and accelerated Program, and carriers cannot implement the plans needed to complete the job without full funding.

Failure to fund the Program will mean that carriers cannot complete the job of removing and replacing vital equipment in their networks, and the result will be partial or complete shutdowns of service in many areas where no other carrier provides service. This will affect not only the rural carriers' direct

subscribers, but also the only connectivity available to millions of other consumers when travelling through their networks' signals, including the ability to make emergency and 9-1-1 calls.

Affected carriers have already begun the "rip and replace" process at the direction of both Congress and the FCC, committing and expending significant resources in good faith reliance that the Program would be fully funded. Beyond planning, some carriers cannot begin implementation until more funding is available or they risk being stuck mid-stream with no path forward and no path back. All of these carriers urgently want to complete the transition to secure and trusted networks, as they have been largely prohibited from servicing or upgrading their networks for years, increasing chances for network degradation or even failure and leaving their communities behind as technology evolves to 5G and beyond. While the United States has taken a leadership position internationally about the risks of untrusted communications networks, work remains to eliminate that risk in our own heartland.

The FCC does not have the ability to provide additional resources for this Program – only Congress can provide funding to resolve the shortfall. We urge you to prioritize this national security emergency by fully and immediately funding the Program before the 117th Congress adjourns.

Sincerely,

Competitive Carriers Association
 Information Technology Industry Council (ITI)
 NATE: The Communications Infrastructure Contractors Association
 NTCA – The Rural Broadband Association
 Rural Wireless Association
 Telecommunications Industry Association
 Wireless Infrastructure Association
 WTA – Advocates for Rural Broadband

cc:

The Honorable Maria Cantwell, Chair, Senate Committee on Commerce, Science, and Transportation
 The Honorable Roger Wicker, Ranking Member, Senate Committee on Commerce, Science, and Transportation
 The Honorable Frank Pallone, Jr., Chair, House Committee on Energy & Commerce
 The Honorable Cathy McMorris Rodgers, Ranking Member, House Committee on Energy & Commerce

CONGRESS MUST FULLY FUND REMOVAL AND REPLACEMENT OF CHINESE EQUIPMENT
IN U.S. WIRELESS NETWORKS

(“RIP & REPLACE”)

The Federal Communications Commission (FCC) has identified a funding shortfall of \$3.08 billion to fully fund the approved application cost estimates for the Secure and Trusted Communications Network Reimbursement Program (STCNRP), known as “Rip & Replace”.

Without immediate additional funding of \$3.08 billion from Congress, the national security goals of the Rip and Replace program are threatened and affected carriers risk partial or even total shut down of rural networks, jeopardizing connectivity for millions across the United States.

- The ability to remove all untrusted equipment (some of it near military bases or other areas of strategic importance) will be directly and severely limited, posing a national security risk to American networks;
- Any delay of this funding will have a chilling effect on connectivity throughout America—including roaming in rural areas and the ability to access emergency services.

Affected carriers have already begun the “rip and replace” process at the direction of both Congress and the FCC, committing and expending significant resources in good faith based on the assurance that full reimbursements would be available. The FCC does not have the ability to provide additional resources for this program—Congress must provide funding.

Failure to fully and immediately fund the Rip & Replace Reimbursement Program will mean providers cannot entirely remove and replace offending equipment. The consequence could be completely shuttering their networks, threatening the availability and security of advanced communications across the country, *particularly in rural America*, where ubiquitous connectivity challenges already abound. Many of the Reimbursement Program participants are small businesses that serve a vital role in their communities in terms of competition and service.

Time is of the essence, as carriers have been largely unable to service or upgrade their networks for years, increasing chances for network failure, cutting off communications services for the carriers’ retail customers and roaming coverage for millions of Americans as they travel in rural areas.

Background Timeline:

March 12, 2020: The *Secure and Trusted Communications Networks Act* of 2019 is signed into law after passing Congress with broad bipartisan support.

June 30, 2020: Mobile carriers could no longer use FCC Universal Service Fund (USF) money on equipment deemed untrusted.

December 27, 2020: Congress appropriates \$1.9 billion to the FCC for the Secure and Trusted Communications Networks Reimbursement Program in the FY 2021 *Consolidated Appropriations Act*.

- The Consolidated Appropriations Act also expands eligibility for the Reimbursement Program to other entities affected not originally included in the 2019 law but prioritizes companies with under 2 million subscribers.

October 29, 2021–January 28, 2022: FCC opens filing window for applicants seeking support from the Reimbursement Program.

February 4, 2022: FCC notifies Congress that they have received 181 original applications from 96 applicants requesting \$5.6 billion, and that current appropriations would not be sufficient to fully fund all approved applications.

STCNA requires the FCC to approve or deny applications within 90 days of submission but allows the FCC to extend that deadline by up to 45 days if additional time is needed to review. Exercising that option, the FCC extended the review deadline to *June 15, 2022*.

June 1, 2022: FCC Chairwoman Rosenworcel informs Congress the FCC determined the gross cost estimate demand for the program was reduced to \$5.3 billion and anticipated further reduction, but that appropriated funds will remain less than the demand from applicants. She notes three contributing factors:

- The expansion of entities eligible for participation in the Program by the FY 2021 Consolidated Appropriations Act;
- Preliminary cost estimates of the Program did not consider the full range of costs that were ultimately reimbursable under law;

- Providers reported increased costs since the program was funded due to supply chain issues, inflation, and project completion requirements by law.

June 15, 2022: FCC Chairwoman Rosenworcel *updates* Congress on the FCC's progress reviewing "materially deficient" applications and allowing applicants to cure their submissions. She also announces that absent additional appropriations, the FCC will apply the prioritization scheme specified by Congress for allocation funding on a pro-rata basis:

- Funding is first allocated to approved applicants with 2 million customers or less;
- Then to approved applications from accredited public or private non-commercial educational institutions with their own facilities-based broadband services, health care providers, and libraries;
- Finally, to any remaining approved applicants.

July 15, 2022: FCC Chairwoman Rosenworcel *informs* Congress that the FCC has completed its review of applications to the Reimbursement Program, and announces in a *Public Notice* the granted applications for reimbursement, the approved cost estimates, and the approved prorated allocations.

- FCC Chairwoman Rosenworcel notes a shortfall of \$3.08 billion to fully fund approved cost estimates.
- Chairwoman Rosenworcel announces the Commission will prorate reimbursement funds equally to each eligible applicant that have 2 million customers or less. The pro-rata factor is approximately 39.5 percent.

Approved applicants must submit at least one reimbursement request within one year of the allocation announcement (7/15/22), and have one year from receiving approval to submit a reimbursement to complete the removal, replacement, and destruction of covered equipment and services. The FCC can grant an extension for 6 months to all applicants or to individual applicants.

July 27, 2022: The House of Representatives passes *H.R. 7624*, The Spectrum Innovation Act which also provides funding for the Secure and Trusted Communications Networks Reimbursement Fund utilizing funds from the 2.5 GHz auction (Auction 108) and if necessary, proceeds from a future auction in the 3.1–3.45 GHz band.

September 7, 2022: Thirty-four senators sign a *bipartisan letter* to Senate Leaders Schumer and McConnell stressing their support for promptly funding the Rip & Replace Program in its entirety.

Senator PETERS. Ms. Siefer, I want to first thank you for highlighting the great work of digital navigators such as Detroit's Connect 313 that are able to help guide communities through the Affordable Connectivity Program.

Connect 313 is part of the reason that Detroit has the highest rate of enrollment in the Affordable Connectivity Program of any other metro area in the Nation with 61 percent of eligible households.

And overall, Michigan's enrollment rate in ACP is almost 44 percent. These high rates of enrollment are due to the tireless efforts of our State agencies and local organizations, like Connect 313, to help eligible households navigate the process. But there is certainly much more that we need to do.

And so my question for you is, can you expand on some of the things organizations like Connect 313 are doing right to increase enrollment in ACP? And how can Congress better help their efforts to continue this very important work?

Ms. SIEFER. Yes, that is a fabulous question. So organizations like Connect 313, they work with those who are in the community who are already trusted for some other reason. So it could be food banks, it could be community action agencies, libraries, schools, but those who already have relationships with those who are in need of that subsidy.

And because they have those relationships, that is how they get those high numbers. We need more of that across the country, right. We shouldn't just be in Detroit where we are seeing such high numbers. But that requires investment in those digital navigation services. We also need education of Internet service providers, customer service agents.

Sometimes there is confusion because this is all confusing ACP low cost offers. It is all awesome and it is all new and it is confusing, so we need increased education of those folks. And we need more database connections so that when folks are signing up, it is more automatic. Right now, sometimes folks have to go through a long process.

Senator PETERS. All right, thank you. And Mr. Powell, quickly, I am running out of time, but NCTA represents Charter and Comcast, which are two major providers in Michigan. Can you speak to the extent that they and other providers have and will take steps to improve outreach and implementation of the Affordable Connectivity Program?

Mr. POWELL. Yes, sir. The good benefit of those two programs and many others of our members is they have been doing low cost programs, private programs for over a decade, and they have an enormous amount of experience with what works.

They know that outreach is essential. Having digital navigators that help people through the process is essential. Making sure people understand the terms of the program is essential.

So they have deep rooted expertise and teams dedicated to those extra efforts, and they work with groups like those represented today to try to make that effective.

Senator PETERS. All right, thank you. Thank you, Mr. Chairman.

Senator LUJÁN. Thank you, Senator Peters. Senator Blackburn, you are recognized for your questions. One second, Senator Blackburn. We can't hear her and on her end it is unmuted. Would you try speaking again, Senator Blackburn, and see if we can fix that audio?

**STATEMENT OF HON. MARSHA BLACKBURN,
U.S. SENATOR FROM TENNESSEE**

Senator BLACKBURN. Yes, absolutely. Are you hearing me now?

Senator LUJÁN. We can hear you, Senator. Thank you.

Senator BLACKBURN. OK. Excellent. And I do thank you for the hearing. As you all know, and with our witness witnesses, you all have heard from us for years, on this issue of deployment.

And Mr. Powell, I want to come to you first. When you look at all the money that has gone out through the infrastructure bill, through CARES, through the American Rescue Plan, all of this money that is out there for broadband and you are talking hundreds of millions of dollars.

And then in Tennessee, our State general assembly put another \$100 million in behind grants for broadband. So it seems like the funds are there, but yet we continue to hear these low population areas, they are having trouble getting people to come in and do that last mile to reach these homes where there is less population per mile.

So I would like for you to just help me to look at this. What else do you need when it comes to connecting these areas, and why is the hesitation there when there seems to be so much money there? What are we missing on this?

Mr. POWELL. Yes, Senator, thank you for the question. Obviously, money is critical because these are very cost prohibitive areas, but it is not in and of itself enough. One of the problems we ran into, we discussed with others today, is the complexity of permitting in these parts of the country.

A lot of these examples include crossing Federal lands. Very often, more than one Federal agency will claim the authority for issuing those permits. There is no lead entity that a carrier can go to resolve those conflicts.

Those fees—those permits often require very exorbitant access fees that vary from one Federal program to the other. Not that we don't hack our way through this process, but it literally can add years and years to a commitment to build. And I—

Senator BLACKBURN. Yes—no, it is a frustration to many of our County Mayors who are trying to get this done. And I visit with all 95 of our County Mayors in Tennessee every year. Mr. Spalter, weigh in on the same question, if you will, please.

Mr. SPALTER. Thank you very much for the opportunity to answer that question, Senator. I agree with Mr. Powell that the challenges that are—that come with onerous, slow, and absolutely cumbersome permitting challenges are manifold, and we need to address them square on if we are going to be able to access, provide access often to our hardest to reach rural and unserved and under-served communities.

It is incumbent on us as an industry to continue to put our shoulder toward this problem, but we are not going to be able to solve it alone. We have to be able to work with this body, with Federal Government, and also with State and localities to ensure that there is going to be a greater consensus of making broadband service more accessible and more efficiently, more quickly, by lowering the barriers that come with permitting challenges.

Senator BLACKBURN. All right, let me ask you this. Talking about barriers, when Alan Davidson was before us, I had asked him about some of the labor laws and practices and if they were going to require areas to implement those when it is a state like Tennessee that is a right-to-work state. That is one of those barriers. So how do you see that playing out?

Mr. SPALTER. Let me take a stab at that if I can, Senator. It is a very important question. I will start by saying that some of our providers are among the largest employers of labor in the United States of America.

That said, the IIJA recognizes that broadband funding programs should not be subject to Davis-Bacon regulations. We believe that NTIA should scrupulously follow the intent and spirit of the law without any hesitation.

And this applies not only to Davis-Bacon, but also to the middle class subsidy requirement that has been advanced by NTIA, I think outside of the spirit of the IIJA.

Senator BLACKBURN. Mr. Powell, anything to add to that?

Mr. POWELL. I think Mr. Spalter category is right. It isn't a war between whether, you know, good employee protections or not are valuable. It is the amount of skilled labor available. By our measures, even before this program, there was a need for some 850,000 new skilled workers in this space. These additional requirements only complicate that pool.

Senator BLACKBURN. OK. And I know Senator Thune asked you all about the 100 programs over 15 agencies, which is an area of concern for us. You kind of batted around a little bit on that.

So I would like a written response from you all, Mr. Spalter and Mr. Powell, to talk a little bit about what you see as a way to do some streamlining to speed up this broadband deployment and get to the heart of connectivity.

So if you would do that and submit it for the record, that would be excellent. Thank you, Mr. Chairman.

Mr. POWELL. Certainly.

Senator LUJÁN. Thank you, Senator Blackburn. Next, we will hear from Senator Klobuchar.

**STATEMENT OF HON. AMY KLOBUCHAR,
U.S. SENATOR FROM MINNESOTA**

Senator KLOBUCHAR. Thank you very much, Mr. Chair, and thank you to the witnesses. Just yesterday, the Minnesota Department of Employment Economic Development received nearly \$6 million in Federal funds for broadband. We are very excited about this. We have about 144,000 Minnesotans that don't have high speed. And we will personally thank the Chair for that money.

Thank you, Mr. Chair, as well as all the people that have worked on this. And it has been a high priority of mine since I have gotten here, because I just view it as the way that we are going to make it, especially in rural America, easier for people to continue to live there. And that was very clear through the pandemic.

We do have workforce issues. My state has the lowest unemployment rate in the country. About 2 months ago, we had the lowest unemployment rate in the country in the history of America, true story. And now we are at like 2 percent or something.

So, Mr. Spalter, you mentioned in your written testimony the availability of skilled labor is one of the challenges in deploying next generation networks. Can you tell us about what you are seeing on the ground?

I am a big believer in immigration reform, as are many in this committee, and I think it would be a game changer for us for deploying some of the technology we need to deploy. Go ahead.

Mr. POWELL. Sure. Thanks for the question, Senator. It is true that many of our providers are facing real shortfalls in accessing skilled labor to do the important work of broadband deployment, be it digging trenches, pulling fiber, managing the various technical and service requirements that are part of the process of delivering broadband, which is why we have been working hand in glove with community colleges, high schools, a variety of community organizations to develop apprentice programs, training programs.

I think of, for example, one of our members, Hunter Communications in Northern California, has engaged a partnership with the Hoopa Valley Reservation to do apprentice training. This is just

one of hundreds of examples of where we have been trying to support the workforce pipeline.

Senator KLOBUCHAR. Thank you. Appreciate it. Ms. Siefer, I am Chair of the Antitrust Subcommittee and I am always interested in the role competition can play in making high speed broadband more affordable.

One of the issues in certain areas of our state, there is only one provider, and I know one of the things we did with this bill was to direct the FCC to require providers to show us central pricing and speed information in a simple format so consumers can make more informed decisions.

But even that doesn't help the 87 million Americans that have only one choice. I have got a bunch of rural electric co-ops that have gotten in the game and have been very responsive when they have. Also, smaller phone companies have tended to build out more.

And I love the fact that we have a clawback in the law. And I have talked to Secretary Raimondo, if the money goes out and the broadband isn't built. So could you talk about what could be done to increase competition in our broadband markets?

Ms. SIEFER. The competition piece is important in terms of lowering the cost for consumers, but it will only lower it to where it is affordable for middle class. The lower income folks are still going to need that subsidy. So we still have to go—it is a two part—

Senator KLOBUCHAR. I understand—

Ms. SIEFER. Yes, increase subsidies.

Senator KLOBUCHAR. That doesn't change that, right?

Ms. SIEFER. Yes, exactly. So—

Senator KLOBUCHAR. I am more interested in the providers and how we can do that.

Ms. SIEFER. So we need as many options on the table as possible. So don't restrict local folks' ability to create solutions.

Senator KLOBUCHAR. Very good. Mr. Powell, can you tell us of ways we can improve coordination and administration of the funding programs for broadband across Government agencies, given your experience from the past?

Mr. POWELL. Well, I think Congress was smart to require the FCC and the NTIA and others to go through a process of developing an MOU for greater coordination. But, you know, having a meeting is not the same as coordination.

I think one way that would improve that is really create a set of external criteria that would allow you to measure whether that coordination and harmonization is effective, as opposed to just being able to meet the requirement by saying, yes, we talked three or four times. It is going to take a lot more than that.

Senator KLOBUCHAR. Very good. Yes, I think that is going to be very important. I think also the people involved in it, the agency heads, who I have respect for, is key as well. Ms. Sekaquaptewa, thank you so much for being here.

Could you talk about how communities are using Federal funding to provide devices, which is part of getting at low income households? And are there ways we can ensure these funds are used more efficiently?

Ms. SEKAQUAPTEWA. Sure. The tribal libraries in our communities play a critical role for Internet access historically, but also access to devices.

So the participation of these entities in the digital equity planning, as well as the schools with the emergency connectivity fund, are critical to providing devices for the students and community members.

Senator KLOBUCHAR. OK. Thank you. Thank you all very much.

Senator LUJÁN. Thank you, Senator Klobuchar. Next, we will hear from Senator Sinema, and this will be audio.

**STATEMENT OF HON. KYRSTEN SINEMA,
U.S. SENATOR FROM ARIZONA**

Senator SINEMA. Thank you, Chairman Luján and thank you to our witnesses for joining us today. Passing last year's bipartisan infrastructure law was a watershed moment for broadband connectivity across the United States. I was proud to help lead the effort to bring the infrastructure law together, building on and incorporating ideas from many of my colleagues on this committee from both sides of the aisle.

The bipartisan infrastructure law's historic investments in deployment, affordability, tribal access, and digital inclusion are the first steps toward ensuring all Arizonans will have high speed broadband. But passing a law isn't enough.

Congress and stakeholders across the country, like our witnesses today, must ensure the programs are implemented effectively, funding is distributed quickly, and approvals are processed appropriately to ensure that we close the digital divide.

My first question today is for Mr. Spalter. One area of improvement is with permit approvals by Federal agencies. This is an area of particular interest for large Western States like Arizona, where the Federal Government owns 42 percent of the land in our state.

I recognize Chair Luján's interest in this as well as he represents our neighbor, New Mexico. Currently, permit approvals by the Federal Government, such as the Bureau of Land Management or the U.S. Forest Service, can take years.

This needs to be improved. Mr. Spalter, have your members experienced challenges with securing Federal Government approvals, and do you have any recommendations to streamline the process?

Mr. SPALTER. Thank you for the question, Senator. We are frequently experiencing sometimes very severe permitting challenges and delays in deploying. These are expressed not only for our largest providers, but also and critically for our regional and local providers as well.

The good news is that there have been steps that have been advanced to actually address some of these issues. And I just point to one, for example, under BEAD, states must share their plans to streamline their permitting and rights of way processes.

This is going to be at least one way to standardize permitting approaches on a national and harmonized basis, and we hope that this will take root and also just raise the visibility on the need to actually address permitting challenges fully and finally.

Senator SINEMA. Thank you. My next question is for Ms. Kimball Sekaquaptewa. I hope I said that right. Sekaquaptewa.

Ms. SEKAQUAPTEWA. Excellent.

Senator SINEMA. Was it really?

[Laughter.]

Ms. SEKAQUAPTEWA. It worked. Very brave as well.

Senator SINEMA. In the bipartisan infrastructure law, Congress allocated \$2 billion specifically for the Tribal Broadband Connectivity Program, in addition to tribal broadband funding from previous laws.

Now, some of this funding has already gone out to tribes. For example, the Gila River Indian community will use a \$4.4 million grant to assist in telehealth expansion, distance learning opportunities, affordable broadband service, and economic growth.

The Hopi tribe will use a \$13.8 million grant to install fiber, connecting over 1,000 unserved Native American households plus 18 businesses and 6 community anchor institutions.

My question for you is, based on your experience at the Santa Fe Indian School and as Chair of the Connect New Mexico Council, could you discuss the importance of the Tribal Broadband Connectivity Program for tribes in the Southwest and could you recommend any additional steps Congress should take to help ensure more tribal communities have fast, affordable broadband access?

Ms. SEKAQUAPTEWA. Yes, thank you for that question. I believe that this Tribal Broadband Connectivity Program is historic. It is monumental. And it is allowing us tribes to work toward building our own community solutions.

While \$2 billion is a lot of funding, it is not going to meet all of the needs in our rural tribal communities. In the Southwest, there has been a number of middle mile projects, as well as last mile projects that work together in unison.

For instance, my project at the Santa Fe Indian School is putting in the middle mile, but we work closely with our sovereign nation consortia partners who have just been applicants as well for fiber to the home or fixed wireless solutions.

Together, as we built a cohort and share expertise, navigate the permitting processes, share technical expertise, and centralize services for improved gateway services such as cybersecurity, we are able to build an ecosystem that serves not just our last mile tribal needs, but our regional needs as well.

Senator SINEMA. Thank you. My last question is for Mr. Powell. Mr. Powell, with the FCC publication of its preproduction draft of new nationwide broadband maps, these draft maps will enable the State of Arizona, as well as our tribal and local governments and other stakeholders, to provide feedback on the FCC's analysis.

These maps will enable the FCC to work with the NTIA to begin the process of distributing broadband funding appropriated in the bipartisan infrastructure law to State governments.

Mr. Powell, these FCC maps are just the first draft. As these maps continue to be improved, do you have any recommendations for how to best ensure the maps are used to direct Federal money to unserved and underserved locations, consistent with the requirements of the law?

Mr. POWELL. Yes. Suggestion one is we have to make sure we have a very robust amount of feedback to the quality of the maps

to get them improved, particularly the January 13th deadline, which is what NTIA has said is necessary as a predicate to distributing the funding in June.

I think the second problem I see is, you know, the map is not universally applicable. We have other large Federal programs that are not required to use the map. I think that is potentially problematic.

And I think we have a lot of states that will have different versions of the map. We would hope that those get fed into the FCC process, and the FCC process continues to develop a genuinely authoritative map that all of the communities can rely on equally.

Senator SINEMA. Thank you. Mr. Chairman, I yield back.

Senator LUJÁN. Thank you, Senator Sinema. Next, we will hear from Senator Baldwin for her questions, and then we will go to Senator Young. Senator Baldwin.

**STATEMENT OF HON. TAMMY BALDWIN,
U.S. SENATOR FROM WISCONSIN**

Senator BALDWIN. Thank you, Mr. Chairman. Let me start with you, mister—not mister, Ms. Siefer. The Affordable Connectivity Program is responsible for connecting almost a quarter million Wisconsin households to affordable, high speed broadband.

And I am proud to have voted for the Infrastructure Investment and Jobs Act, which made that possible. Governor Evers and the Wisconsin Public Service Commission have done a laudable job of encouraging Wisconsinites to apply for this benefit.

But I was really concerned to learn of a recent study finding that 45 percent of affordable connectivity program applications to the program are rejected. That is a very staggering figure.

And so I am asking you, what more can be done at the Federal, State, and local levels to make applying easier for eligible families and to encourage more seamless eligibility verification?

Ms. SIEFER. It is a really great question. The computer matching agreements that State programs have with USAC, we don't have it for all the programs. We don't have it with all the states.

So that would speed things up quite a bit because then there wouldn't be this paperwork. Oh, you didn't give us the right PDF or whatever, right, that happens. But also the human aspect of this, having more funding for digital navigators so there is someone sitting next to the person signing up and saying, oh, I am sorry, because of your situation, we need you to submit this instead of this.

Because it is confusing, and so if you don't have that human helping you, you can think you have submitted everything and you didn't.

Senator BALDWIN. OK. Mr. Spalter, Wisconsin residents depend on services made possible by the Universal Service Fund, including rural broadband through the Connect America Fund, lifeline phone services, and E-Rate funding for school and library connectivity.

The Fifth Circuit recently heard arguments on whether this fund, which has been supported on a bipartisan basis for decades, is unconstitutional. What would be the impact to the telecommunications ecosystem if the Universal Service Fund was ruled unconstitutional?

Mr. POWELL. Senator, it would be nothing less than a force majeure that would impact our Nation's commitment to the future of universal connectivity. We believe in the constitutionality of the program.

We believe that it is on sound legal footing, and we expect that the court will agree with us in this regard. But we have to be very clear eyed about the need to make sure that universal service can be sustainable. In the long haul, we believe that we have to expand actually the base of contributors that are providing support for USF beyond the very small slice of telephone and voice providers via the Internet in order to do so.

And we are really looking forward to working with you and this committee in ensuring the FCC has the authority to be able to expand that base.

Senator BALDWIN. Thank you. Mr. Powell, I had a very interesting discussion with some of your coworkers. I am going to ask you to be a futurist for a quick second. I think about the global race to develop quantum computing.

And I don't know how far off we are. I don't know whether the U.S. is going to win it. I certainly hope we do because it has such important consequences. But that said, what does the telecom industry do to sort of prepare for that day, for emerging technologies?

And what should we be thinking of as Members of Congress to pave the way for safe implementation in the future?

Mr. POWELL. Fascinating question. I think there are two dimensions that I would focus on. First of all, it is literally a quantum leap in capability. It is hard to foresee conceivably what it could mean. The first thing from my familiarity with it is the ability to hack encryption, which is potentially dangerous.

A lot of encryption is built on the premise that a computer would take decades and decades to crack it so that it is safe. If you have a quantum computer that can do those calculations at an exponentially faster rate, you can have a lot of vulnerable systems in America to that kind of hacking.

So our members are focused on what will be encryption for the future, and that is going to be a really, really critical area. I think the other thing, you know, managing communications, essentially a mathematical formula. There is all kinds of algorithms that determine congestion, routing patterns.

You know, to the extent that quantum computing can improve the efficacy and effectiveness, it probably means we could have ultimately much, much, much faster network with much higher capacity and much lower latency, which should be the holy grail for all infrastructure providers.

Senator LUJÁN. Thank you, Senator Baldwin. Senator Young, you are recognized.

**STATEMENT OF HON. TODD YOUNG,
U.S. SENATOR FROM INDIANA**

Senator YOUNG. Thank you, Chairman. I want to thank our panelists for being here today. We have spent tens of billions of dollars on important infrastructure investments, particularly broadband funding in recent years, spanning various Federal agencies.

And this committee has a really important oversight role, and I commend the Chairman for his leadership in this effort. The infrastructure bill alone made a \$65 billion investment in broadband deployment and adoption, and established, as has been noted, a roughly \$42.5 billion broadband grant program at the NTIA.

I want to ask a couple of questions of Mr. Powell and Mr. Spalter, please. You represent many member companies who would likely consider participating in the BEAD Program, this grant program to states.

Do your members want to participate in the BEAD Program, and how is your industry prepared for this new funding? And perhaps you could touch on any regulations associated with the requirements of the BEAD Program or other Government programs that are of particular focus to your members.

Mr. SPALTER. Let me begin, Senator, and thank you for the question. Our members are, if I could use this phrase, "loaded for bear" to be able to actually deploy these BEAD dollars responsibly, accountably, quickly, and effectively.

It is our members who have the financial, technical, operational, and experiential wherewithal to be able to best apply these funds and put them to their best and highest uses. We are anticipating broad participation in the BEAD Program.

We are concerned, however, that there are unintended consequences of the IIJA that need to be dealt with squarely, including provisions that I don't believe Congress had intended to be included in the BEAD Program nor its implementation.

Such things as Davis-Bacon, the middle class subsidy that has been suggested. We need to together collectively deal with these issues if we are going to foster the kinds of deep participation that we want, and our members would very much like to be able to achieve.

Senator YOUNG. Thank you. Mr. Powell.

Mr. POWELL. I would just add the tenor of your question gets at something I think is not fully appreciated. This is a massive complex undertaking for an ISP. You have teams dedicated, first of all, just digesting the rules, the conditions, the parameters, the markets that are going to be available, which ones are not going to be available.

You know, how is it going to be funded, where the matching fund is coming from? How do we do this in an inflationary environment that might lead to recession? How do we do this in a supply chain constrained environment?

How do you do this in a skilled labor shortage environment? What are the ways to migrate around those things? So, you know, this is why the delicacy of unnecessary regulatory mandates could really derail the incentive to participate.

Senator YOUNG. Yes. Yes, absolutely. So we will note whatever regulations or provisions you think are already perhaps unintentional or are not reflective of the intent of Congress as a whole on an ongoing basis, we will want to be attentive to some friction that will be associated with implementation, and I am sure at various points.

One question to again each of you, Mr. Powell and Mr. Spalter, pertaining to the digital divide, something we in Congress have in-

licated that we want to close for some period of time. But what is closing the digital divide mean to you?

And do you believe that we will officially, through this spending and implementation initiative, be able to close the digital divide after, you know, tens of billions of dollars? Because, frankly, this was the promise of the broadband investments, which was we would make sure there are no unserved, and we would significantly narrow the number of underserved households across the country.

And I expect inflation, which Mr. Powell mentioned, could have an adverse role on meeting that objective. But what say you, Mr. Spalter?

Mr. SPALTER. To the question of how do we close the digital divide and what is closure of the digital divide, I think it has been well expressed by the intent of the IIJA itself, which is that when all in America who seek—who want access to broadband can have that access at speeds of 120 throughput at least, to get to that promised land, I think, you know, it is tantalizingly close, but it is going to take an all hands on deck effort to make sure that we can, in partnership with our Government partners, really machete through a lot of these encumbrances that make our willingness to participate in question because of the various regulatory permitting and other challenges that we know are part and parcel, unfortunately, right now of broadband deployment.

Senator YOUNG. OK, so your answer is basically we hope we can close the digital divide. We all need to be working together and toward that end. But you certainly haven't given me a confident assertion that it is going to happen, which is fair. Mr. Powell.

Mr. POWELL. Yes. I think closing the digital divide is every American, regardless of where they live, whatever their community, has the ability to access broad—high quality broadband infrastructure at a reasonable rate.

That is the historic commitment of the Nation to universal service, and we fully realize that dream, that will be the result. I am more excited and bullish than I have ever been that we have the opportunity to generally close the divide. I have also learned that declaring mission accomplished prematurely is a huge mistake.

A lot of this money could be misdirected, inefficiently managed. We have seen that before. I think that the history of that anxiety should produce a much sharper, more vigilant, more better over-seeing program.

If we do that, I think we will be able to celebrate the closing of the digital divide. If not, we will be wondering 5 years from now what happened.

Senator YOUNG. You have your game face on.

Mr. POWELL. Yes.

Senator YOUNG. All right. Thank you.

Senator LUJÁN. Thank you, Senator Young. Next, we will hear from Senator Rosen.

**STATEMENT OF HON. JACKY ROSEN,
U.S. SENATOR FROM NEVADA**

Senator ROSEN. Well, thank you, Chairman Luján. I really appreciate you for holding this important hearing today. You know, I am one of the authors of the broadband section of the bipartisan

infrastructure law, including the Middle Mile Broadband Deployment Act. So I want to ensure that we meet the law's goals.

Nevada is home to vibrant rural communities like Ely, Lovelock, and Pahrump, but residents are really counting on the new infrastructure law to bring long awaited high speed broadband to our state.

Broadband access is not just a communications issue, it is an economic issue, it is a workforce issue, it is a public safety issue, and it is a health care issue. And that is why I am so severely disappointed by the recent broadband maps released by the FCC, which vastly overstate current coverage in rural Nevada.

Broadband funding is directly tied to these maps, so we need to get this process right. That means ISPs must be forthcoming about where they actually serve. But it also means that the FCC challenge process must accept challenges based on actual engineering and the facts on the ground, not whether merely an ISP can theoretically serve a particular community.

Actual facts, not theoretical, because our constituents are counting on us, all of us, to get this right, and I am going to continue to work with the FCC Chairwoman until we do so. So, thank you. I am going to turn now for my question to the witnesses. So, we do want to ensure success in digital equity programs.

And so to fully participate in our modern world, our constituents need not just access to affordable, high speed internet, but also to those connected devices and digital skillsets to navigate diverse technologies and online services.

Again, as one of the 22 Senators who worked on the bipartisan infrastructure law, we understood the importance of taking that tailored approach to digital equity, ensuring that there are programs for every local communities' unique needs. Means addressing affordability, digital literacy, digital hygiene, upskilling all of the above.

So, Ms. Siefer, one of the challenges I have heard from stakeholders in Nevada is finding community partners in rural areas. Even communities that receive Federal funding through the Digital Equity Act State capacity grant we created, they still need help finding partners with the capacity to implement digital inclusion programming.

So Ms. Siefer, how do you approach working with these communities to meet their needs? We want to be sure everybody gets what they need to thrive.

Ms. SIEFER. First, Senator Rosen, I have to thank you on behalf of the digital equity community for your work on the bipartisan infrastructure law.

We really appreciate everything you did. In rural communities, it is more difficult because those resources of those who are already providing digital inclusion programming may not be there. So the stakeholder engagement process that has to occur, that process is a way to find those who can do the programming.

Some of them may already exist, they may already be doing digital inclusion work, but you may not know, or we may not know that they are doing digital inclusion work because they don't call it digital inclusion. They call it something else.

But also that stakeholder engagement process is a way to educate those who are already serving the populations, the covered populations that are supposed to be part of all of this, and then they can become part of the solution. They can integrate it into their other programming.

And the reason that that is going to be so valuable is because of the trust that they already have with those covered populations. And part of what NDIA does is that training. So we offer ourselves to your community members.

Senator ROSEN. Well, I want to continue on the stakeholder engagement process, because we want to ensure a success in digital affordability programs as well, because despite areas where broadband affordability support is needed most, it could have the greatest benefit.

Our rural areas sometimes have the lowest participation in the Affordable Connectivity Program, those enrollment rates. And so it is available. People aren't enrolling. So how again do we reach out to everyone, let them know that these programs are there? What are the strategies you can use to be sure that we increase enrollment in our rural areas?

Ms. SIEFER. It really goes back to those trusted intermediaries. So the ones that are already talking to the covered populations. There are those who aren't always trusted, right. No offense to my colleagues.

Maybe the Internet service provider saying that this is something available, may not be the right way to go. Because free doesn't—it sounds like a scam, right. But if your librarian is telling you about it or your teacher is telling you about it, or the individual over at the extension center is telling you about it, that you might trust.

Senator ROSEN. Well, thank you. I think we really—I am going to submit the rest of my questions for the record. But I really think getting this information out through a trusted source is up and down our states, urban and rural, it is so important that everybody gets the digital access that they need. Thank you so much. Thank you, Mr. Chairman.

Senator LUJÁN. Thank you very much, Senator Rosen. Next, we will hear from Senator Tester.

**STATEMENT OF HON. JON TESTER,
U.S. SENATOR FROM MONTANA**

Senator TESTER. Well, thank you, Chairman Luján and Ranking Member Thune, for having this hearing. And I want to express my appreciation to the panelists for their testimony. I am going to start with you, Mr. Powell. You already pointed out that there is a lot of money, a record amount of money going in to lay down broadband to get everybody connected up. From your seat, what is the biggest barrier for Internet service providers?

Mr. POWELL. I think the biggest barriers is you need critical inputs to actually operate in these parts of the country. Those critical inputs are permitting, which we have talked a lot about today.

I would offer some additional suggestions for improving that, not only trying to create much deeper coordination among Federal agencies for Federal lands, a harmonized set of access fees, but I

would also add making sure those agencies are staffed with the people.

We often call these agencies, and we are told we don't have enough people to work on that, we will do your permit next year. And that is just kind of unacceptable with the urgency of this program.

The second area that we have touched on, which I think is critical, is access to poles at reasonable rates. We do have a Federal regulatory regime that regulates reasonable rates for poles, but there are exemptions in that law.

And many of those exempted entities have conflicts of interest in allowing new entering providers from accessing those poles. That becomes a very, very, very serious problem for anybody hoping to reach these areas.

So continued focus by the FCC, the Congress on permitting and poles, we think is the principal and primary obstacle to utilizing the money effectively.

Senator TESTER. So, we—I think this is a fair statement, like in a lot of laws and oversight, there are a few folks out there that create problems for everybody else. And one of the problems that we are concerned about the, that you are concerned about and so am I, is building on top of a broadband that is already there.

My question to you is—and I think because of that, I mean, we are seeing you have to dot the I's twice and cross the T's three times, because there are some folks out there that are going to take Federal dollars and they are going to overbuild on top of other existing lines.

Well, if testimony was being given today, it occurred to me that it isn't some of the responsibility on the folks that are requesting the money, or do you just not know where the service is, so you are just going to build it out? Answer me which one of those statements is true?

Do we have companies in—and this is for you, Mr. Powell—do we have companies out there that are getting the money, knowing damn well that the services is already there, but they can get the money and, you know, pocket a little administration fees and make some money? Or is it a situation where the maps are so bad that even the companies don't know which areas are served?

Mr. POWELL. I think both can be true. I think the efforts to make the maps more sophisticated, precise, and granular is going to significantly diminish or mitigate that consequence. Look, I have been involved in these programs for 30 years.

I guarantee you there are companies out there who believe that they can acquire resources and subsidies, find a way to build in economically sustainable efforts, areas which often include areas where broadband already exists, pocket that profit and get away with it successfully.

They have done it in the past, in past programs, without sufficient rigor and accountability for those kinds of things. And shame on us if they are able to do it a third time, despite Congress, at least in the BEAD Program, expressing quite clearly and intentionally the desire to take care of the neediest first, and only when that job is done to move to underserved areas, and only when that job is done, consider other possible uses of the money.

The question is, will we rigorously adhere to that scheme, or will it be eroded through the implementation across multiple jurisdictions over time?

Senator TESTER. Right. And look, I think the dollars are there to get everybody connected up with good service. But if it is not used correctly, then that is a problem. And I think—I don't, I can't speak for the agencies because I do oversight, I don't do their work.

But I think that is probably part of the reason why permitting is onerous, because they want to try to make sure that people aren't doing this. I want to move on to something else. And this is for Ms. Siefer.

The bipartisan infrastructure bill that quite frankly I helped write and got passed, requires some broadband labels. I looked at the label. I think it is great if you know what you are looking at.

But quite frankly, it tells you about download speeds and upload speeds and all those kind of things, but to a regular person, that doesn't mean much. Do you think these broadband labels are going to be effective, or do you think we need to take another run at it?

Ms. SEIFER. I think the broadband labels have an opportunity, a potential to be effective. But we also need to be educating all of our community members as to what these things mean. As this technology keeps changing, we are going to have to figure out how to keep educating each other. And it is really complicated, but we can't just be like, well, somebody else knows all the answers.

Senator TESTER. Right on. I just want to thank you guys very, very much. This is a big, big issue. We have an opportunity to do a lot of good stuff and create a lot of jobs in the economy in the process if it is done right. I appreciate all your input. Thank you.

Senator LUJÁN. Thank you, Senator Tester. Next, we will hear from Senator Capito.

**STATEMENT OF HON. SHELLEY MOORE CAPITO,
U.S. SENATOR FROM WEST VIRGINIA**

Senator CAPITO. Thank you, Mr. Chairman. And thank you all for being here today. I am sure you can tell from the hearings this is an issue that hits home all the time. And certainly that is no different for me in a rural area of West Virginia who has some of the lowest broadband deployment, unfortunately.

So I am going to start with Mr. Spalter. Senator Klobuchar and I introduced the Rural Broadband Protection Act earlier this year. This legislation will require a more vigorous vetting and verification process for Internet service providers seeking to participate in the FCC high cost programs.

And I think you all are in support of this. The issue is, for years we have had money go out to certain providers that in the end can't either, a, provide the service or it gets too expensive, or for whatever reason, it doesn't get deployed there. That is what I am trying to get with this bill. Let's pre-vet before we go ahead. So could you speak to that issue for me, please?

Mr. SPALTER. I think that the Rural Digital Opportunity Fund in its first iteration is proof positive that we have to do better and be more aggressive in ensuring that we are properly vetting providers for their financial, technical, operational, and even experiential wherewithal.

Which is why we support your legislation that would do more to pre-vet providers. This is, as we all have expressed, a once in a generation opportunity to get the work done and we cannot be doing science experiments with these dollars.

Senator CAPITO. No. No, we really can't. Mr. Powell, do you have a comment on that? What you see from your perspective?

Mr. POWELL. I would say I really endorse your instincts here. I mean, I think broadband is way more hard—way more difficult and complicated to provision than people realize. It requires deep levels of engineering, technical expertise, and more importantly, a commitment to the long term.

I think there is a tendency to believe that you dig a hole, you build a line once, and you are done with this. We spend \$19 billion every single year just on upgrades, changes, and innovations. You have to make sure someone who is entering the program is able to sustain that for a meaningful amount of time.

What we often see is they come in and get the money to build. Constructing it once is one thing and then cannot keep going for the long—

Senator CAPITO. Right. And that is one of the concerns I have. I am not saying every municipality might have an issue for this, but this could be an issue in certain—we don't have a whole growth industry in our State or municipalities wanting to do this because they realize it has to be a regional approach.

You have to have not just the expertise but the money to maintain it. It doesn't just stop once you get the delivery. So I think that is a sort of a side issue to this. If I could talk about the mapping again, I had a joint meeting, and the Western New Broadband Enhancement Council has done a great job on trying to pre-map our state.

But when the maps came out, it looked as though 138,000—we have 1.8 million, so 900,000 residents or something around that that, and so 138,000 locations look to have been left out. And I think this is a national problem.

So when do we expect these to actually be finalized? Because the money really can't go out by our desire until these are complete. Is that correct, Mr. Powell, or Mr. Spalter?

Mr. POWELL. Yes, that is correct. I mean, the general expectation is the final maps will come out in the spring. Some people say March, some people say April. The distribution of funds, NTIA has said at the end of June.

So we really are in a crunch period beginning now, particularly submissions that are due on January 13th, in order to give the FCC a genuine opportunity to produce a next round of maps that is more accurate and reflects the concerns that you are raising.

I would want to highlight one thing to clarify. The FCC is the one determining the locations of the fabric—

Senator CAPITO. Right.

Mr. POWELL. You know, that is not being provided by the ISP. So a lot of these problems are in this complex process of the fabric that we can help with, but that data is being collected separately from the data we provide.

Senator CAPITO. Right. And go ahead, Mr. Spalter.

Mr. SPALTER. Well, I would just add to that that the review and challenge process absolutely plays a critical role in ensuring that we are going to be actually able to have maps that will be fully functional.

And it would be a complete undermining of the law if the NTIA were to move forward with maps that have not been subject to that rigorous review process. Which is why I think that this kind of oversight is extremely important in ensuring that we can actually have maps that are viable, scalable, universal, and harmonized across the country.

Senator CAPITO. Right. Yes, we have been really pushing through our office the website on the FCC where you can actually put your home address in, and I would encourage people to do that, especially when you have got—well, in any case but in the more rural areas it is easy to miss.

Addresses are different, and but we need to get that granular data. And I am really appreciative that the State data that is coming forward, with what the ISPs are delivering and others, is really I think enhances this, but we are still—some of ours are getting missed.

So I appreciate everything you are doing and thanks for the answers. Thank you.

Senator LUJÁN. Thank you, Senator Capito. Next, we will hear from Senator Lummis for her questions.

**STATEMENT OF HON. CYNTHIA LUMMIS,
U.S. SENATOR FROM WYOMING**

Senator LUMMIS. Thank you, Mr. Chairman. And welcome, panel. My first question is for Mr. Powell and Ms. Sekaquaptewa. Did I get it right? I am so sorry.

Ms. SEKAQUAPTEWA. Yes you did. Sekaquaptewa.

Senator LUMMIS. OK. Well, I am from Wyoming. And as you know, Wyoming and the West face unique challenges that can impact the availability of broadband services and probably create additional costs.

You know, sometimes our equipment is in remote areas when it needs to be repaired, hard to get maintenance to that kind of equipment in some of our areas, and that can cause additional costs, so our service goes down.

So what costs disproportionately impact rural and tribal areas when it comes to deploying broadband services? What are you seeing out there?

Ms. SEKAQUAPTEWA. For the tribal areas, you are absolutely correct with the rugged nature. If you look at the state of New Mexico on Highway 40, goes into Arizona in about 60, maybe even maybe 90 miles. From that border, it is lava.

So constructing in that requires advanced equipment that is more expensive. And I think that is probably one of the biggest elements that, you know, we battle when we put in our—when we design our projects.

The permitting is also a challenge. I will say, though, that, you know, with the recent Federal efforts with the permitting council, there is more of a mechanism to coordinate the Federal agency per-

mits. And that is going to be a huge time savings, which also can have cost components as well.

But we look forward to working with these new initiatives that have made broadband projects eligible for this project or for their permitting council's process and are optimistic that we can reach our delivery goals for our Tribal Broadband Connectivity project, whose time-frame had to be extended by four—was allowed to be extended up to 4 years as opposed to the initial NOFO which had a 1-year project.

Now for our project cost there, we are going to look at some administrative costs that were unexpected for that longer time-frame and that has a lot to do with the supply chain issues. We are in, I just ordered, you know, a couple of million feet of fiber with a 2-year delivery date.

Senator LUMMIS. Is permitting more difficult on—in Indian Country?

Ms. SEKAQUAPTEWA. It is. We also have the Bureau of Indian Affairs that we need to work with. So that can be—that is another process that we just have to factor in. So when we look at, you know, reforms and coordination, the BIA did sign an MOU work on these on these projects.

But it is time and educational. So within the agencies, you might have that conversation at the Federal level, and we have heard some of the witnesses speak to that, but then once the management down to the people processing or receiving paperwork, until they are trained and they are meeting their timeframes, we are going to continue to see barriers.

Senator LUMMIS. Is BIA—is it necessary to have BIA involved in this? Is this an area where BIA could be more of an impediment than help?

Ms. SEKAQUAPTEWA. Yes and no. I think that BIA does play an important role here. They—not all tribes are the same. You know, we are sovereign nations. Some of us have more resources and more internal capabilities and capacity. And for those tribes that can move forward, a lighter touch with the BIA is absolutely fair.

Senator LUMMIS. And does the BIA adapt itself to the differences among tribes and their self-governance capabilities?

Ms. SEKAQUAPTEWA. Yes, they do. They try to do that. What—the BIA also has a role, though, I think, for the least resourced tribes. For instance, with spectrum acquisition. This is something where tribes have not had access to sovereign rights over what could be considered a natural resource like water.

So now as we move forward into the telecommunications space and we are trying to negotiate in the secondary markets, perhaps there is a band of spectrum that we would like to utilize, and we know that it is not being utilized by the license holder.

There was an order to the effect to allow tribes the opportunity to utilize that underused spectrum. But where does a tribe begin, especially if it is a low resourced tribe? How do we engage in those processes?

We are not going to be able to without additional structures of support, and BIA has the opportunity to grow and help us with that process.

Senator LUMMIS. OK. Well, I hope you will reach out to the Committee, because you are knowledgeable in this area, and let us know if there are areas where we should require a lighter touch of the BIA with regard to regulation and layers of bureaucracy in this area that might prevent a company from accessing a broadband project in Indian Country.

Mr. Powell, same question for you. Maybe, maybe a little less focused on tribal lands.

Mr. POWELL. Yes. I think states like yours are the most challenging. Number one, for geography. These are complex terrains to wire and connect, and those are unique challenges. Permitting, as you mentioned. Pole access as we have discussed.

All our significant problems running into those communities. The availability of skilled labor to work often in remote regions is challenging as well.

And then I think an area we haven't talked enough about across the whole country is this continuing backup in the supply chain, which is really becoming quite problematic, I think, for all of us.

Senator LUMMIS. Thank you. I have. I have run over, so I might submit additional questions in writing. Hey, thank you all for being here.

Senator LUJÁN. Senator Lummis, thank you very much. Mr. Powell, I had asked Mr. Spalter a question about data caps, and I have the same question for you as well. Yes or no, do some of your members maintain data caps or data throttling on their consumer broadband offerings?

Mr. POWELL. Not data throttling. Some of our members do employ data caps. One of the reasons is our networks are shared. Meaning, in a neighborhood everyone is drinking from the same broadband network.

If one user were to overuse that broadband, it would diminish the experience of others in the community, so some of our carriers use caps to manage and prevent that situation.

Senator LUJÁN. But if a network is properly built, there is plenty of data for everybody. To me—just so, you know, data caps to me are like long distance calling. When my mom is going to make a long distance call, I encourage her to use her mobile device so she doesn't have to pay for that long distance call like she would if she had to use her landline.

There shouldn't be long distance calling in America, and that is a fundamental flaw with USF. I don't want to get into all of those problems. But everything that I am aware of from network build-out and construction, given technological advances, is there is plenty out there if it is constructed correctly. Is that an incorrect assumption I am making?

Mr. POWELL. I don't want to call it incorrect. Some networks are fixed connections to a home, and they are not affected by the use of homes next door.

Cable networks are largely shared, which means the way they are constructed and designed, one home can affect the quality of what is available in another home. This also happens in multi-dwelling units.

So for example, in the days when you had someone running a BitTorrent server in their basement and were downloading tons of

illegal music, could that degrade the experience of people sharing that backbone connection? Absolutely, that is true.

That is why those that do have caps, the caps are extraordinarily high. Very few people ever reach them or ever will reach them, and they are done for network management reasons. Now, to be fair, many of our companies don't do them.

It is an individual business decision, so we don't have some opinion that they are all necessarily or not necessary. These are decisions companies make to manage their networks in the communities they serve.

Senator LUJÁN. I appreciate that. I appreciate the response that says that, well, if they have them, they are high, so people may not hit them.

The reason that I am asking this question to you, Mr. Spalter, and to you, Mr. Powell, is during the last couple of years with what children were faced with distance education, educators who were conducting their classrooms from their homes, especially in the most rural parts of the country where their technology may have been a line of sight shot from some, you know, some provider that couldn't get to them maybe because of easements, things of that nature, but nonetheless, they were constrained with caps.

I have spoken to a number of teachers and a number of students whose parents or household thought that they had purchased a good enough plan so that they would not be hit with additional fees, things of that nature, and were hit with data caps.

I was really surprised with the number of educators in New Mexico, a number of kids, that did hit those caps and then they could not afford to go higher. And the reason I am asking that is with the work that we are doing here, it is about equitable access.

Mr. POWELL. Yes.

Senator LUJÁN. And to me, if a household with students hit that cap and they can't participate in school, that does not feel to me like equitable access. And so I introduced a piece of legislation called the Uncap America Act, looking at this specifically.

I mean, I think even your largest member did not deploy data cap plans in all of their states, although there is a question of, you know, 2021 or 2022, or if in the future if that may happen. But it was a recognition that it was not needed everywhere.

And to your point, Mr. Powell, that not all of your members use that as well. And that is the same with you, Mr. Spalter. Not all of your members have data cap plans available to customers as well. But nonetheless, I hope that that is something that we can look at going forward, given network buildouts, what we are now seeing with further reaches.

And if data caps continue at the rate that we saw them during COVID, there is going to be a lot of folks still left out. And I am hoping that that may be something we can work toward.

Ms. Sekaquaptewa, how do we best ensure students across New Mexico and around the Nation have equal access to education, especially as—and specifically as it pertains to access to broadband, distance education, responsibilities, things of that nature?

Ms. SEKAQUAPTEWA. Well, I think that we learned—and thank you for that question. I think we have learned through the pandemic that it is all about residential Internet access. During the

pandemic, when and I am not sure how it is in other states, but in our tribal lands in New Mexico, we were—physical barricades were put up at the entrance to our tribal lands.

This was to prevent traffic for people coming in, you know, and possibly with the sickness, but it was also to protect us from going out. And the problem with that was that our students who were going to the McDonald's and the Starbucks, they could no longer have that access.

Once the tribal library shut down, we were told to stay, you know, in our homes, in our bubble, and not even with our extended families to also protect ourselves. So the Internet that we had in our homes was the only lifeline we had for remote learning. And as I mentioned earlier, 89 percent of our students did not have it.

We cobbled together what we could with the mobile hotspots once their prices went down. But really, we need affordable, permanent residential services in our communities. That is the only way that we are going to be able to ensure adequate participation for our students in K–12.

Recent leading research is connecting broadband availability to student attainment and post-secondary pursuits. With—after the pandemic, we are not going backward. Remote learning is here to stay. The expectation that students will be carrying devices and will be completing homework, you know, at home and collaborating with their peers at night is just the new normal.

So as we want to prepare students for success, it is to have their availability to the Internet as a universal service in their homes. And just real quickly, what we do—how we use the Internet is also changing in education.

You know, I mentioned the State education networks. We now have our tribal libraries connected over gigabit connections to institutions of higher education in New Mexico, to the research and education networks.

Ours in New Mexico is called the Albuquerque Gigapop, where they peer with all the higher-ed institutions. So when we have these residential Internet connections and these high speed connected anchor institutions, we are now connecting our educational spaces to international high speed education and research networks.

So when we talk about workforce training and we talk about building the next generation of IT professionals, it is all part of that greater conversation.

Senator LUJÁN. I appreciate that. And in my familiarity with those networks, and that is part of the brilliance is you made a decision based on the lack of connectivity when you were initially working on the tribal library, I believe, at Santa—which pueblo was it? The first tribal library that you worked on?

Ms. SEKAQUAPTEWA. Santo Domingo.

Senator LUJÁN. Santo Domingo, which I believe we had a chance to visit. And then you saw how you could continue to expand that opportunity, pueblo to pueblo. But by building your own network, you could get to that Gigapop, if you will, and you could get to that access point and have the fastest speeds available to people in the community. So I just want to thank you and your continued success with your expansion in that area.

Ms. SEKAQUAPTEWA. Thank you.

Senator LUJÁN. There has been some specific questions around the mapping. And while I agree with Chairman Powell that I applaud that the FCC has moved forward and we have some data now, we have clearly seen where aspects of the country are missing from what that was able to capture.

And as I pointed out in my opening, Cochiti Pueblo, Shiprock, New Mexico, completely left out. And in New Mexico, the office has said that as many as 37,000 locations in New Mexico are unaccounted for.

So how best can we enable our local communities to engage the FCC and take advantage of the challenge process as intended?

Ms. SEKAQUAPTEWA. Thank you for pointing out the—some of our challenges in New Mexico. You know, one of the—when we moved to the residential based reporting, the granular reporting, you know, that is good. That is an opportunity. But it ties into other nuances that also have to be solved for.

In our tribal lands, we don't necessarily have street addresses, you know, so how are we going to match that that P.O. Box to that underserved home. So we are having to look at the systems that we use to build the maps and look at the methodologies and the challenges that lie therein.

As Chair of the Connect New Mexico Council, we have been looking at tribal engagement very seriously, and we need to put together, you know, different teams. It is not just inviting tribal leadership.

It is also a conversation of GIS specialists. Do the tribes even have GIS specialists? You know, how are we going to work then—or with the IT departments, who plays a role to do what? So it has to be a multi-pronged approach.

And in particular with respect to mapping, we have solutions. Let's create a helpdesk. You know, people can call the FCC for help. People can call the State for help. But, you know, what we need to do is we need to go to each one of the communities and we need to use our local networks and our trusted partners to invite them to workshops.

We are planning two in the fall—I mean, one next week and then one right after Christmas, but we are going to bring together our tribal teams. We built an offline map that we are going to have that is interactive, and we are going to zoom in on our neighborhoods by having the people in those neighborhoods in the room, and we are going to identify those missing locations.

Senator LUJÁN. Well, let me ask you a follow up to everything you just put on the table. Is the January 13th date established by the NTIA enough time?

Ms. SEKAQUAPTEWA. Oh, absolutely not. I mean, we are going to work like crazy until we hear that there is an extension, but we need more time to do it right. I know we desperately need broadband.

I know that people are hurting, and basic human services are being compromised until we can get broadband deployed as fast as possible, but also rushing into decisionmaking and creating funding allocations that might not be in the best interests of those same

communities would be a miss, I think, for this generational opportunity we have with this funding.

Senator LUJÁN. I appreciate that very much. Now, providers looking to serve rural markets must typically pay more to connect each subsequent customer, right, as distances increase, as there are other challenges surrounding that.

The FCC has interpreted its universal service mandate to include support for this high cost buildout, as well as provide a lifeline to low income subscribers. NTIA's BEAD Program and the Affordable Connectivity Program take these policies to the next level. They make the market work in these areas with Federal support for capital, expenditures, and discounts to qualified households.

Mr. Spalter, your testimony recommends Congress chart a sustainable future for the Universal Service, and it expresses support for the Fair Contributions Act, which we voted out of this committee in charting the path forward.

Please answer whether the future of Universal Service includes the following priorities, direct support for capital expenditures in rural and high cost areas?

Mr. SPALTER. Yes.

Senator LUJÁN. Direct support for discounts for eligible households to cover the cost of monthly access?

Mr. SPALTER. Yes.

Senator LUJÁN. Direct support for telehealth and remote telemedicine?

Mr. SPALTER. Very much so, yes.

Senator LUJÁN. Direct support for affordable, resilient, and secure broadband for teachers and students wherever they access educational tools?

Mr. SPALTER. Absolutely.

Senator LUJÁN. Direct support for digital literacy, digital inclusion, and digital equity initiatives to ensure adoption follows closely behind access and affordability?

Mr. SPALTER. Yes.

Senator LUJÁN. I appreciate that. And I agree. And I am hopeful that as we look for and create and identify together a permanent solution to close the digital divide, the investment is historic, but the funding for broadband in the bipartisan infrastructure bill is not permanent. The digital divide will not disappear when the funding runs out.

And I think that is an important conversation for all of us to face. I agree with what was presented by Senator Lummis, Senator Tester, Senator Young, Senator Thune, with and in your written testimony, about approval for access for easement approval, especially among Federal agencies in coordination.

Recently, myself and Senator Barrasso wrote a letter to the Department of Interior along these lines. And this should not just be looked at from the perspective of broadband. On the Navajo Nation in New Mexico, we had a horrific rainstorm and a flood that resulted. A declaration of emergency was presented and adopted.

FEMA authorized the funding. Could not secure easement from BIA. The money was almost lost. Which should have taken a year or two to get done with reestablishing a road that was dirt, but a

bridge that was torn out because of the flooding, it took more than a decade.

And that is why I appreciate the conversation of what we are talking about here. That could not have occurred with this initiative. So I am hopeful that we can address those issues as well. And Kimball, the first tribally owned telecom company began in South Dakota, which I have learned a lot more about, the Cheyenne River Sioux tribe when they bought a private company and founded their telecommunication authority.

From New Mexico, Godfrey Enjady of the Mescalero Apache, he leads the National Tribal Telecom Association. In the past, the Santa Fe Indian School has leveraged a model where tribal consortia have worked to build their own fiber networks.

These consortia have reduced broadband costs by up to 95 percent and increased speeds dramatically. Do you believe tribally owned networks have empowered tribes and pueblos to build and sustain self-sufficient and thriving communities?

Ms. SEKAQUAPTEWA. Absolutely. You know, I think that the success of Matty and the other tribal ETCs just speaks to the ability for tribal ISPs to participate successfully in the telecommunications space. You know, in the consortia projects that I have done, you know, we are new entrants into this space.

I heard comments and concerns about sustainability after post grant awards, and that is valid, that is fair. But we also need to look at how we are going to achieve sustainability as us tribes now are proving that we can build and maintain these networks. We have very robust connections, fiber based connections in these communities that I built in.

The costs did go down by 95 percent plus and the speeds went up by over 3,000 percent, and that was just turning our network on low. So I think we can do tremendous work. When we do look at sustainability, and Godfrey, Mr. Enjady will be the first one to mention this, we need to work, come back with Congress and the FCC and look at paths for sustainable funding. Now, whether the ACP continues, hopefully, but also access to Lifeline, and if the barrier to that or a challenge is to become an ETC, maybe we can look at alternative models for—in the regulatory framework where the ETC designation can be modified because not all of the tribes want to serve—provide voice. Broadband only options serve these community needs adequately.

So if we can look at some flexibility in accessing the USF funds, then I think that is going to speak largely to the sustainability of these networks.

Senator LUJÁN. I appreciate that. Before I come back to the other members of the panel, Senator Lummis does have another question.

Senator LUMMIS. Thanks very much, Mr. Chairman. It is nice to be able to take advantage of this panel's expertise while they are here. Sure appreciate it. Mr. Spalter, quick question about developing a location fabric. What are some of the difficulties you faced? We have covered some of them here today.

Are there any we haven't discussed that the Committee should be aware of. And then for the entire panel, how can the FCC best ensure that the broadband maps, which will be used to allocate

BEAD funding, are accurate? So thanks—again, with my thanks to the panel.

Mr. SPALTER. Recognizing the unfortunate history of previous broadband maps, USTelecom endeavored to undertake a pilot program to actually evolve and deploy on a pilot basis location fabrics both in Missouri and Virginia.

We found that we can do so if we were aggressively seeking the types of data that need to contribute to more refined mapping processes, including not only open source data sets, but also proprietary data sets, geocoding, and other sophisticated data analyzes that can actually inform the maps. We presented those pilots and the underlying location fabric to the FCC and are very glad that they have adopted that as a framework for the existing maps.

We absolutely have an opportunity by, we hope in the short time so that we can deploy dollars by the end of June, to have a refined, accurate, and deeply granular set of maps because of things like the location coding—the location fabric's geocoding mechanisms that allow each structure to be identified in serviceable communities, so we will more accurately know where broadband is, but more importantly, where it isn't.

And so we are confident, and I would even say optimistic, that the maps will actually be able to iterate to a place where we can have confidence in them as long as we continue collectively, not only as industry, but with our community partners and the States, to work toward ensuring that the challenge process can move nimbly, quickly, and effectively.

Senator LUMMIS. Thank you. And would anyone else care to weigh in on my broader question? Yes, ma'am.

Ms. SEKAQUAPTEWA. Thank you. I would think speaking to the goal of utilizing the map to close the digital divide speaks to not just the accuracy of what is on the map itself right now, but how we use the map and how we design it as a tool.

You know, I think that we have different—for instance, I am speaking from education. In our schools and those anchor institutions, how are they being categorized on the map? How are other anchor institutions for health centers, for instance, how are they being characterized on the map?

Because the map isn't just for baseline data, but it is also a planning tool. So the more dynamic it is, the more the anchor institutions are included, then we can design different broadband strategies that include the different sectors, and I think that that is what is going to help us realize America's broadband needs.

Ms. SIEFER. Can I add that most communities are not conducting the kind of challenging process, education process that Kimball is. So if we had more communities able to conduct that process, not only are they fixing the maps, they are learning about broadband while they are there.

Senator LUMMIS. Great panel. Thank you so much, Mr. Chairman.

Senator LUJÁN. Thank you very much, Senator. To move past the question I asked Kimball, Mr. Powell, yes or no, do any of your companies intentionally discriminate when providing service?

Mr. POWELL. No.

Senator LUJÁN. Mr. Spalter, same question.

Mr. SPALTER. Absolutely not.

Senator LUJÁN. I appreciate that. If a company were to intentionally discriminate, would that violate existing statute prior to passage of the IIJA? Mr. Spalter.

Mr. POWELL. Well, I think that would depend. There probably are gender, I mean, race, gender, other kinds of discriminatory statutes that might reach that conduct depending on how onerous or how much animus was involved. I mean, classic redlining in different formats is prohibited in different ways.

So I am just not familiar enough with all the things that are available that you could violate. But I do think the IIJA created a communications deployment architecture specific focused on that, and that will become more clear with the FCC's proceeding.

Senator LUJÁN. Appreciate that. Mr. Spalter.

Mr. SPALTER. Well, Section 60506 of the IIJA was very explicit in setting forth an anti-discrimination approach. We believe that intentional discrimination is the core principle the FCC has to use to evaluate whether there is any discriminatory intent. It is a viable one. It must be the basis for its current proceeding.

We have also found that intentional discrimination, as it is applied variously to rooting out discrimination in areas like housing, handicapped Americans and real estate, and I already mentioned housing, and employment is a viable standard and can be applied in this instance.

Senator LUJÁN. I appreciate that. If I was asked the question if a company were to intentionally discriminate, if that would violate existing statute or passage of the IIJA, I would say yes.

And the reason that I ask that particular question is with the proceeding now that is taking place, there are a lot of questions about clarification, things of that nature is, it seems to me based on, no one is intentionally discriminating, no one is intentionally discriminating—you represent the largest members in the particular areas where connectivity, access to communication across America, that if that is the case, that it is not a problem and existing statutes already protect it. Would you agree with that, Mr. Spalter?

Mr. SPALTER. I would have to evaluate that with greater care. But generally speaking, if I could reiterate that under the context that none of our members have or have any intention to discriminate. We are confident that the intention of Section 60506 of the IIJA is sufficient to be a basis for the FCC rulemaking as long as it is based on intentional discrimination and its core principle.

Senator LUJÁN. I appreciate that. Mr. Powell, do you have any feedback there?

Mr. POWELL. I would only add, Senator, that we are very confident that we will pass any test on digital discrimination because of the nature of the way we build our networks. You know, we build into our entire footprint and have for many, many decades, and we upgrade consistently.

I think we have shared data with your office that you can't find differences very easily between wealthy areas and low income areas in most of our footprint, and you can't find any distinguishing factors between Hispanic or African American commu-

nities in those areas. So we feel very good that we build systematically.

We serve everyone. It is in our DNA. And we will work with the FCC to have a workable definition that we can all be clear that we are in compliance with, but we are confident that we will meet that standard.

Senator LUJÁN. So as a follow up to that with the passage of legislation by the House and the Senate, do you believe Congress gave the FCC the authority to define and prevent digital discrimination in order to promote equal access to broadband with comparable speeds, latency, and other quality of service?

Mr. POWELL. Yes, you did give them that authority subject to technical and economic feasibility, but yes.

Senator LUJÁN. And the reason I am asking that question is, as I share with you and we have chatted before the questions that I had surrounding one of the filings around safe harbors, with recent rules as well.

And the reason I am asking that is, to me, it is concerning from the perspective of the history of digital redlining, as we have spoken about before, rural access to tribal telecom that shows that companies use of economic and technical feasibility to not serve entire neighborhoods or entire communities has been used.

And I am hoping that—Mr. Spalter, did you have a reaction to that?

Mr. SPALTER. No, I was——

Senator LUJÁN. OK. And what I am hoping that moves forward here is that if, in fact, the intent, as has been agreed on by everybody, filings, press releases, public statements, things of that nature, is to connect to the country, that loopholes are not created such that they can be hid behind.

You know, in some communities where something is not economically feasible or not technically feasible—and I think in a previous filing, even Mr. Powell, NCTA filed that just because something is not—just because something is not technologically—I think, technically feasible, that it doesn't mean that it is not economically feasible. Did I get that correct? It has been a few years. It was back in 2019 or 2020, if I remember.

Mr. SPALTER. You might have me on that one.

Senator LUJÁN. We can come back to it. We can come back to it. Nonetheless, it has been my experience as a—so as you know, I was a former member of the New Mexico Public Regulation Commission, which is the equivalent to public utilities of different parts of America.

And in New Mexico, we were unique because we had insurance under us, like Vermont had banking underneath them. It was kind of interesting. Sorry to describe those, but nonetheless, the work that I did with the PC at the time I was very proud of.

But it was my experience at the time, and even into the House, that when communities would be told that they could not be built, that it was not economically or technically feasible, and then they would just take it on their own, and then someone would come in and say, oh no, we can do it now. I just don't want to see that.

I guess that is the point that I am raising here is, a loophole that lets you say, nope, can't do it, and then someone does it, and then

all of a sudden it is possible, as we work on these rules. And this is something that I will be looking at closely with the rulemakings that are there to ensure that we don't have loopholes like that that are created.

Because to have this investment at the level that it is, which could cure most of the problem, I am still not convinced it will cure all the problem, that will cure most of the problem of not having households connected, businesses, rural communities, first responders, all the rest in America, for then there to be loopholes that will guarantee that even though there is money, that it won't be connected.

And that is one of my ultimate goals with wanting to have a hearing like this and bringing us all together. You all are going to be critically important to how this gets done, and I pray that it will be.

I am very familiar with the work that Kimball has done in New Mexico, having watched that for years, but especially now with some of the decisions that have been made, going back to the 2020 funding at NTIA, some of the spectrum allocations as well, especially in sovereign indigenous communities across the country and how we can get that right.

So I pray that we can just get this all done, but you are all critically important and it means a lot to have you all here today. I do want to also thank Senator Thune for the work that he has done over the last few years that I have had—or a couple of years that I have had the honor of working with him as well on, on this subcommittee, and I hope to continue working with him in this and other areas.

While we don't always vote the same, I very much appreciate the conversations I have with Mr. Thune and his team and how we have been able to work together. And what is Alex's last name? I also want to thank Alex. Alex—Sachtjen. Kimball, I have problems with everybody's name.

[Laughter.]

Senator LUJÁN. But I also want to recognize Alex for his work, and not only what he does for helping to prepare Mr. Thune, but the work that he does for the Subcommittee with all of our colleagues on the other side of the aisle.

As we all know, it is incredible staff that we all depend on every day to make a profound difference. And to all the staff that are here today, I just want to say thank you to each and every one of you, and happy holidays. Stay safe.

But you have a lot of work in front of you, so please work as much as you can.

[Laughter.]

Senator LUJÁN. Thanks again, everyone. With that being said, we are adjourned.

[Whereupon, at 12:22 p.m., the hearing was adjourned.]

A P P E N D I X

NATIONAL URBAN LEAGUE
December 12, 2022

Hon. BEN RAY LUJÁN,
United States Senate,
Washington, DC.

Dear Chairman Luján,

Thank you for convening the upcoming “Ensuring Solutions to Meet America’s Broadband Needs” hearing. The National Urban League (NUL) remains committed to ensuring the funds from the *Infrastructure Investment and Jobs Act* (IIJA), including Federal support for broadband access, affordability, and adoption, are equitably distributed to the communities that remain unconnected, are at risk of being disconnected, and need increased workforce development and entrepreneurial opportunities.

As the President of the National Urban League and on behalf of our 92 affiliates across 36 states and the District of Columbia, we have long fought for the economic empowerment of historically under-resourced communities across the Nation. That is why NUL was an early advocate for the IIJA. We issued many recommendations that were ultimately reflected in this historic legislation. Notably, in our *Lewis Latimer Plan for Digital Equity and Inclusion* we provided comprehensive and detailed analyses and solutions to address unequal broadband availability, broadband adoption, and access to economic opportunities for communities of color and low-income communities across urban and rural America. We are pleased that this Federal legislation has allocated substantial resources to address these critical issues, including \$42.45 billion to increase broadband access and support broadband adoption, \$14.2 billion toward a national broadband affordability program, and \$2.75 billion for digital equity.

To build on this positive momentum, we have developed a set of recommendations and best practices on how broadband funding from the IIJA would be most effectively spent to drive digital equity where it matters most—connecting unserved and underserved populations while also increasing broadband adoption and economic opportunities for workers and businesses. These recommendations include:

- (1) Establishing a “*Broadband Adoption Office*” or building staff capacity and expertise on broadband adoption issues in state and local broadband offices to focus on the complex needs of non-adopters in order to get more residents online efficiently and rapidly.
- (2) Engaging *underserved and underrepresented communities* in broadband adoption initiatives developed in collaboration with experienced community-based organizations that can help tailor programming to meet the specific needs of non-adopters.
- (3) Facilitating partnerships with experienced, community-based organizations, employers, and educational institutions to promote the recruitment of historically marginalized populations including people of color, women, underemployed, and low-income workers for *workforce development* opportunities and jobs related to BEAD-funded eligible activities.
- (4) Establishing *supplier diversity* initiatives and goals among BEAD program grantees so that economic opportunities associated with broadband deployment projects are available to diverse populations.
- (5) Prioritizing the deployment of timely and cost-effective broadband solutions to *connect unconnected households* within multi-family properties and public housing using BEAD program funding.

We hope these recommendations will encourage lawmakers, government agencies, and community partners to work collaboratively to drive broadband adoption which will ensure all communities can participate in the digital ecosystem.

We also encourage the Subcommittee on Communications, Media, and Broadband to mirror these efforts by ensuring Federal agencies, including the National Telecommunications and Information Administration (NTIA) and the Federal Communications Commission (FCC), continue to prioritize interagency coordination to drive broadband adoption. More specifically, these Federal agencies will need to coordinate on how important FCC proceedings on preventing and eliminating digital discrimination and the broadband “nutrition label” should be applied to the billions of dollars of funding that will be distributed to states and territories through NTIA. Additionally, it is imperative that all states and territories are good stewards of Federal funds and are held accountable if they fail to meet the mandates. We are primarily concerned with states being inclusive by ensuring the participation of diverse stakeholders in state broadband planning processes because we know that the way a problem is analyzed impacts the way the problem is solved. Funds must be equitably distributed in order to make progress in closing the digital divide.

Also, while the Affordable Connectivity Program (ACP) is a more permanent Federal subsidy than its predecessor, the Emergency Broadband Benefit (EBB), which provides eligible households with affordable connectivity and discounts on connected devices, there must be a sustainable funding mechanism for ACP to make the program truly permanent. ACP has already connected more than 15 million households across this Nation to affordable broadband and remains a stellar example of what a whole-of-nation approach to addressing the digital divide looks like. For example, the Biden-Harris Administration secured commitments from Internet service providers to either reduce prices or raise speeds to offer ACP-eligible households a high-speed Internet plan at 100 Megabits per second (Mbps) for no more than \$30 per month, which means millions of people can now get more attractive connectivity options at no cost to them when the ACP subsidy is applied. Failure to extend ACP will mean failing the millions that already benefit from this program and threatens the ability of households to thrive in the digital age, therefore we urge the subcommittee to explore creative options to ensure this critical program receives continued funding. Additionally, we encourage the subcommittee to increase funding for ACP outreach efforts so third-party intermediary organizations working on the ground to secure communities with other critical services such as housing, employment, and health care, can continue our efforts in getting households connected to the Internet which remains equally as important.

Access to the Internet is an economic security issue, not only for individuals and families but for our Nation. The digital age has clearly demonstrated that access to affordable, reliable broadband is indeed a civil right because it impacts one's ability to get an education, find work, obtain healthcare, and even start or sustain a business. It also remains a critical tool for organizing for social justice and civic engagement. The National Urban League looks forward to continuing to work with members of the subcommittee to ensure IJA broadband funds are equitably distributed, interagency coordination is facilitated to promote broadband adoption, and proposals are developed to secure continued funding for critical programs that address access to economic opportunities, affordability, and broadband adoption.

Sincerely,

MARC H. MORIAL,
President and Chief Executive Officer,
National Urban League.



National
Urban League

THE LEWIS LATIMER PLAN FOR DIGITAL EQUITY AND INCLUSION

A COLLABORATION COMMISSIONED BY THE NATIONAL URBAN LEAGUE

This Plan was inspired by, and is offered in memory of, the life of **Lewis Howard Latimer** (1848-1928), a Black American draftsman, soldier, scientist, and researcher whose parents were born into slavery. Despite the severe limitations of his time, Latimer made groundbreaking contributions to science that changed the course of human history. Working with Alexander Graham Bell, Latimer helped draft the patent for Bell's design of the telephone. Latimer also was involved in the field of incandescent lighting, a particularly competitive field in the late 19th century, working for Hiram Maxim and Thomas Edison. Latimer wrote the first book on electric lighting, entitled *Incandescent Electric Lighting* (1890), and supervised the installation of public electric lights throughout New York, Philadelphia, Montreal, and London.

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FOREWORD

MARC H. MORIAL

PRESIDENT AND CEO OF THE NATIONAL URBAN LEAGUE

For decades, the National Urban League has warned of dangers of a persistent digital divide, some obvious and others more subtle but equally troubling. We've reinforced those warnings with our Digital Inclusion Index, providing statistical evidence related to one foundational question: "Are the new job, business and educational opportunities created by increased digitization of our world being equally shared?"

The answer, sadly, remains no. But despite that evidence and those warnings, government actions to address the divide have been at best modest and intermittent.

Then COVID-19 hit. The pandemic has accelerated an already-speedy migration to "remote everything," particularly for such essential activities as employment, health care, and education. The benefits of being connected grew even faster, as did the costs to communities who were not connected.

COVID-19 proved that broadband was no longer a nicety. It had become a necessity.

2020 also witnessed the brutal murder of George Floyd. Tens of millions of Americans saw with clearer eyes what the National Urban League and the people it serves have long known: that the legacy of slavery and systemic racism still plagues America.

These two crises flowed together in demonstrating how acutely the costs of disconnection disparately impacted communities of color. To its credit, many Americans raised their voices in calling on not just their neighbors, but also political actors, policymakers, and corporate leaders, to all address the need for digital equity and inclusion.

Recognizing that America needed a comprehensive plan to address the problem, the National Urban League called upon dozens of experts in a wide range of fields and collected their recommendations for how America could use the tools of the information economy to create a more equitable and inclusive economy and society, solving the problem those same tools had, in part, created.

The result is the Lewis Latimer Plan for Digital Equity and Inclusion. It is named for, and inspired by, the life of Lewis Howard Latimer (1848–1928), a Black American draftsman, who made groundbreaking contributions in his work with, among others, Alexander Graham Bell and Thomas Edison. Just as telephony and electricity changed the world in Latimer's time, digitization is changing ours, and we should act to assure that everyone has the opportunity to contribute to and benefit from that change.

This plan addresses "the three A's"—availability, adoption, and access to economic opportunity. Availability means that a home broadband service is available to all communities, including communities of color. Adoption means that households in

these communities have subscribed to a broadband service. Access to economic opportunity means the industry must employ a diverse workforce and provide business opportunities to communities of color. Millions of American homes, businesses and other enterprises cannot fully participate in 21st-century society because we as a country have not adequately addressed those three A's.

Our goal in producing the Latimer Plan is to offer not only a comprehensive and detailed analysis of the problems of digital inequity and exclusion but, more important, to provide specific, detailed, and pragmatic solutions to these harms, organized as an integrated set of both strategic and tactical plans. Our proposals require action and collaboration across multiple institutions, public and private, and across all levels of jurisdiction. But there is no silver bullet.

The Latimer Plan, though comprehensive, will not be the last word or the only approach worthy of consideration. But whatever elements make up the ultimate solution, government must act quickly to assure that the essential goals of digital equity and inclusion are met: that there are broadband networks everywhere, that everyone can use and afford them, that we utilize those networks to improve the delivery of essential services, and that everyone has access to new economic opportunities and the ability to participate in the continuing growth of the digital economy. We offer the Latimer Plan to serve as the foundation for accomplishing those critical and urgent goals and accelerating their achievement in the next few years.

A CALL TO ACTION:

STATEMENT OF THE EXECUTIVE DIRECTOR

EDWARD "SMITTY" SMITH

SENIOR DIRECTOR OF THE LEWIS LATIMER PLAN FOR DIGITAL EQUITY AND INCLUSION

Our nation's vast resources and technological capabilities have never been greater, nor has the need for all Americans to be connected. It is time for us to acknowledge and embrace the reality that achieving digital equity and inclusion in the United States is not optional, nor is it charity. It is an existential imperative for a healthier, better educated, economically stronger country. The plan we outline herein is one step in the policy process toward achieving this goal, but it is only part of a much greater effort that will require us to marshal forces across government, non-profits, academia, and private enterprises to use technology to finally deliver on some of the old promises that our Nation has failed to keep.

My father was a District of Columbia public school teacher who, in the early 1980s, taught himself COBOL, an old computer programming language, launching him into a career in government as an IT specialist and network engineer. At a time when computers were a rarity in the D.C. public schools, he realized early that computer literacy would soon become an indispensable skillset in our classrooms and beyond. At home, he taught himself how to program and then how to build entire computer systems and networks—our home was always filled with modems, motherboards, and monitors. At school, he started offering computer literacy classes to other teachers, most of whom had never used a computer before, and developed materials and curricula for those teachers to teach computer literacy themselves.

From as early as I can remember, I was taught that computers and connectivity were essential technologies that could help create opportunity for anyone who could access them, afford them, and knew how to use them. This lesson has resonated with me throughout my life and, nearly three decades later, when I joined the Obama Administration, I had the opportunity to put these teachings to work designing and implementing programs that would help provide broadband to millions.

However, years later, one of the broadband grants we funded during my time in the Administration generated a report on the state of the digital divide in my hometown of Washington, D.C. What that 2015 report found was that, even in the heart of the Nation's capital, over 160,000 residents remained without broadband at home. Furthermore, adoption rates in the poorer, largely Black American parts of the city where I grew up and where my father taught, trailed rates in more affluent parts of the city by over twenty percent. D.C. had grown larger and more prosperous but, as always, the poor were left behind.

Today, the rates of adoption have improved in my old neighborhood, but not nearly enough. Failings of digital equity and inclusion persist, and, in our country's lower-income communities, both rural and urban, those without broadband continue to languish in a state of digital poverty that compounds preexisting inequities and prevents them for fully participating in our increasingly connected society. My father saw both the opportunity of connectivity and the danger of being unconnected

before the Internet revolutionized how we work, learn, play, and communicate. Larry Irving saw the danger in the 1990s when he coined the term the “digital divide.” The team that drafted the National Broadband Plan in 2010 presented a prescription for how to close the divide. And Tom Wheeler leveraged the Federal Communications Commission’s resources and expertise to help make parts of that plan a reality.

But, for all of our efforts, of millions still remain unconnected, even as the consequences of digital poverty are greater than ever. Today’s crisis is the COVID-19 pandemic and economic and social turmoil. Tomorrow’s crisis will test us further. But what is certain is that, from now on, the cost of being unconnected will be your livelihood and may be your very life. That is a price that no American should have to pay when we have the means and the knowhow to connect everyone.

What we present in this plan is a not simply a blueprint, or a prescription. It is a call to action. The time to act is now and the costs of inaction are grave. However, the real answers will not come from the pages of any report but, rather, from our ability to work together across sectors to direct our collective expertise and resources towards solving a broader societal problem that harms all of us, both the connected and unconnected. This plan intends to set in motion a greater effort, realized through legislation, regulation, executive action, corporate investment, and public-private partnerships.

Some of the plan’s proposals will become new programs, others will be transformed into something better, and some will end up on the cutting room floor. But what is clear is that we can no longer afford halfway solutions that exclude tens of millions of our fellow citizens. All our communities and neighbors need to be connected and they need to be connected as soon as possible. Thank you for having this conversation with us. We look forward to working together.

ACKNOWLEDGEMENTS

This project was, in every way, a collaborative effort, drawing on a diverse and deep wealth of experience and expertise in the many different fields discussed in the Latimer Plan. In light of that collaboration—designed to enhance the discussion of how to best advance the goals of digital equity and inclusion—it is important to note that the views expressed in this paper are solely those of the National Urban League and the authors of the specific chapters, and not any sponsors of this plan or any others who assisted in this effort. Further, the views expressed in the chapters are the views of the authors in their individual capacity, and should not be attributed to any institution with which they are affiliated.

The first acknowledgements must go to the team at the National Urban League itself. Marc H. Morial, the CEO and President of the National Urban League, provided critical leadership in framing and pressing the project forward. Nicole Lazare, the former General Counsel of the League, initiated the discussions and structured the Plan, while Clint Odom, the former Senior Vice-President for Policy and Advocacy, shepherded the project through its initial drafting. Joi Chaney, the League’s Executive Director for its Washington Bureau and Senior Vice President for Policy and Advocacy, assisted by Danielle Davis, the League’s Tech and Telecom Fellow, took the project over the finish line. The League’s Cara Morris and Robert Pierre provided additional support.

The project also benefitted enormously from the support provided to the League by Edward “Smitty” Smith, a partner at the firm DLA Piper, who served as the Senior Director of the Plan.

Of course any discussion of digital equity and inclusion builds on the foundations laid by many others, including, but not limited to, Larry Irving, the former head of NTIA who warned of, and coined the phrase, the “digital divide” more than two decades ago, Brookings Scholar Nicol Turner-Lee, the work of certain Think Tanks, particularly The Multicultural Media, Telecom and Internet Council (MMTC), founded by David Honig and now under the leadership of Maurita Coley, and the Joint Center for Economic and Political Studies and its President Spencer Overton. In addition, this document was constructed on various analyses of these issues by many at the FCC but most particularly former Commissioner Mignon Clyburn and current Commissioner Geoffrey Starks.

Larry Downes, the author of several best-selling books on business and technology, served as the Editor-in-Chief, and performed an extraordinary service in pulling together a diverse set of contributions and making them all better. Melissa Turcois, an associate at DLA Piper, also assisted with the drafting and editorial functions, particularly in weaving together feedback and suggestions from a number of outside readers.

While all the chapters reflect the input of a number of sources, there were principal authors for each of the chapters. These were as follows:

- Chapter 1: Blair Levin, Senior Non-Resident Fellow, Brookings Institution, Metropolitan Policy Project
- Chapter 2: Larry Downes
- Chapter 3: Paul de Sa of Quadra Partners and Carol Matthey of Matthey Consulting
- Chapter 4: John B. Horrigan, PhD, and Angela Siefer, Executive Director of the National Digital Inclusion Alliance
- Chapter 5: Blair Levin
- Chapter 6: Melissa Turcois
- Chapter 7: Blair Levin and Larry Downes
- Chapter 8: Marcella Gadson, formerly with MMTC (now with CTIA)
- Chapter 9: Kerry McDermott, MPH
- Chapter 10: Steve Midgley, Elise Kohn, and Whitney Whealdon of Learning Tapestry and Derek Mitchell of Partners in School Innovation.
- Chapter 11: Lev Gonick, Chief Information Officer, Arizona State University
- Chapter 12: Rob Atkinson and Daniel Castro of the Information Technology and Innovation Foundation
- Chapter 13: Blair Levin
- Chapter 14: Professor Matt Perault and his Duke University class on technology policy, including Mihir Bellamkonda, James Eide, Lee Foster, Charlie Graham, Zachary Silverman Guffey, Abdur Rehman, and Niharika Vattikonda
- Conclusion: Blair Levin and Larry Downes

We received helpful comments, criticisms, and ideas from a number of different sources. These include, but were not limited to, New Street Research, particularly Jonathan Chaplin and Philip Burnett, who helped us understand market trends related to both the availability and the adoption gap; CTC Technology and Energy, particularly Joanne Hovis and Jacob Levin, who provided insight into state and local efforts to close the availability and adoption gaps, as well as the importance of credit issues; MMTC, particularly David Honig and Maurita Coley, who provided insight on the overall plan and particularly helped review the sections on adoption and workforce development; Peter Bowen and his colleagues at Bain & Company, Patrick Dupree, Mark Bower, and Austin Beck, who shared important insights into the broadband speeds and quality of service metrics that consumers were relying on in the COVID era; the Heartland Forward Foundation, particularly Angie Cooper, John Bailey and Matt Yale, who shared their insights from their own work on similar issues; Common Sense Media, particularly Daniel Weiss and Amina Fazlullah, and EducationSuperhighway, particularly Evan Marwell, provided significant data and insights about digital education generally and addressing the “home-work gap” specifically; Shira Hollander, Samantha Burch, and Ariel Levin of the American Hospital Association assisted with understanding the state of healthcare in light of COVID-19; and the Back to Work Project, and particularly John Schnur, who assisted with the workforce development analysis. Professor Stuart Brotman, of the University of Tennessee and the Wilson Center, provided his expertise on privacy issues. We also benefitted from the insights of a number of former FCC officials who had worked on these issues, including Tom Wheeler, Gigi Sohn, Ruth Milkman and Roger Sherman, and Jim Kohlenberger, who had worked on these issues in two previous administrations.

In addition, Robert F. Smith, of Vista Equity Partners, and his Chief of Staff Ami Desi helped shape our approach and assisted in a number of outreach efforts, Jonathan Chambers of Connexon shared his considerable knowledge of the state of play of broadband in rural America, Tom Kalil of Schmidt Futures assisted in thinking through improving research and job training through AI, Dori Glanz of Manatt Consulting assisted in developing ideas about Medicaid, Karen Kornbluh of the German Marshall Fund and Professor Ellen Goodman of Rutgers Law School provided their expertise on civic engagement, and Hannah Levin provided the research for the recommendation on online tutoring. Peter Christy provided expertise in Internet engineering and network architecture. The economists Professor Greg Rosston of the Stanford Institute for Economic Policy Research and Scott Wallsten of the Technology Policy Institute were generous in sharing ideas based on their recent research on adoption. Bruce Mehlman, one of DC’s premier experts on the intersection of technology and policy and the Co-Chairman of the Internet Innovation Alliance,

graciously used that expertise in helping us road test some of the ideas in the Plan. We also are grateful to the Aspen Digital team, particularly its Executive Director Vivian Schiller, for their advice and for hosting a session with a wide variety of stakeholders to discuss the issues raised in the Plan.

The development of the Plan would not have been possible without the generous funding of the following organizations: Alphabet, Amazon, AT&T, Charter Communications, Comcast, Crown Castle, DISH, Facebook, Google, Microsoft, Nokia, Qualcomm, Schmidt Futures, Starry, T-Mobile, and Verizon. In addition, we benefited from the contribution of substantial pro bono support from the law firm of DLA Piper. The Glen Echo Group, particularly Ellen Satterwhite, also provided pro bono support in a variety of ways. Again, the views expressed in this paper are those of the National Urban League and the authors of the specific outside advisors to this plan.

EXECUTIVE SUMMARY

Ten years ago, the National Broadband Plan observed that as “more aspects of daily life move online and offline alternatives disappear, the range of choices available to people without broadband narrows. Digital exclusion compounds inequities for historically marginalized groups.” In light of these trends, that plan warned “the cost of digital exclusion is large and growing.”

Unfortunately, only modest efforts to address those costs have been expended in the last decade. Now, as the COVID-19 pandemic accelerates a shift to “remote everything,” the costs of exclusion have grown even larger. The need for policymakers to act has become even more urgent, compelling us to ask, *how can the tools of the information economy be employed to create a more equitable and inclusive society?*

The answer lies in accomplishing four big, but achievable, goals:

- Deploying networks everywhere.
- Getting everyone connected.
- Creating new economic opportunities to participate in the growth of the digital economy.
- Using the networks to improve how we deliver essential services, in particular in workforce development, health care and education.

The National Urban League, working with other civil rights organizations and public policy experts, has commissioned the Lewis Latimer Plan for Digital Equity and Inclusion (the “Plan”), a detailed and comprehensive agenda to reach these goals and erase several persistent and dangerous gaps:

The Availability Gap. For millions of American homes, businesses and other enterprises, there is no available broadband network capable of allowing them to participate fully in 21st century life. This is generally a rural problem, where higher capital costs are required to reach fewer customers. In sparsely populated areas of the country, private capital alone is unable to economically justify the investment needed to build high-speed broadband infrastructure.

Currently, the Federal government has not gathered the necessary data to accurately define and identify what constitutes an unserved area, nor does it have a good map of the locations where no networks are available. Further, the current system of subsidizing high-cost deployments is under significant stress, unable to fund the necessary build-out for many years, if not decades.

To Close the Availability Gap, the Plan recommends that Congress provide the FCC with sufficient appropriations to fund capital expenses necessary to deploy broadband networks to all Americans.

The Plan also recommends that the FCC:

- Re-examine, based on network usage during the COVID-19 crisis, the performance standards below which an area is deemed unserved by broadband at home, and above which subsidized networks are required to perform in order to qualify for capital funding support;
- Produce an accurate map of broadband availability, pinpointing unserved by broadband services;
- Eliminate the Eligible Telecommunications Company (ETC) requirement, which disqualifies existing and future broadband providers who could otherwise deliver service quickly and efficiently;
- Produce a set of best practices for reducing deployment costs and times; and
- Hold a series of reverse auctions to allocate subsidies necessary to close the Availability Gap. These investments should be based on technology-neutral criteria, supporting a mix of solutions that can be rapidly deployed. Further, the

FCC should adopt stronger guardrails for the short form process to examine more closely whether an entity seeking to bid has the actual technical, operational, and financial resources necessary to meet its commitments. Enterprises should not be allowed to bid on the basis of unproven technology.

In addition, the Plan recommends that the National Telecommunications and Information Administration (NTIA), which has information on its website about dozens of federal programs that support broadband deployment efforts, provide a search engine that enables stakeholders to more effectively find the programs that serve their needs, and, to the extent feasible, create a common application that enables those applying for funding from more than one program to save time and effort on the application process.

The Adoption Gap. Even among those Americans for whom a broadband network is available, there are still tens of millions who have not adopted broadband in their homes. Indeed, in terms of number of Americans affected, the Adoption Gap is approximately three times larger than the Availability Gap. There are two principal causes of the Adoption Gap. One is a lack of digital readiness. A second, and more significant cause, is the unaffordability of entry level broadband services for a significant portion of the American population.

To Address Digital Readiness. Digital readiness refers to the skills and equipment needed to effectively use information and communications technology to find, evaluate, create, and communicate online. The lack of such skills is a significant barrier for certain demographic groups, hindering their ability to adopt and fully utilize broadband at home.

The Plan's principal recommendation for addressing digital readiness is to create a national Office of Digital Equity to help coordinate training targeted to demographic groups with the lowest rates of adoption.

Among specific recommendations for the Office, the Plan proposes:

- Establishing a Digital Navigators Corps to help unconnected persons solve a wide range of adoption issues;
- Creating an Online Digital Readiness Portal to provide every American with access to free, age-appropriate curricula that teaches digital skills and enhances digital readiness, offered in multiple languages;
- Issuing reports on the effectiveness of different digital readiness strategies.

To Address Affordability. The principal government program addressing broadband affordability today is Lifeline, which provides a \$9.25 monthly subsidy to qualifying low-income households for communications services. There is a broad consensus that Lifeline is deeply flawed, with too small a subsidy, ineffective distribution, and reliance for funding on an unsustainable model that is based on a regressive tax on traditional telephone services. Given these limits, Lifeline today is used almost exclusively for mobile, rather than in-home broadband services.

While mobile services have significant value, broadband at home creates better opportunities with enormous public benefits, benefits that today are not being captured. We all gain, for example, when the unemployed can train online for new careers, and use the same tools everyone else does to search, apply for, and interview for new jobs, getting them back in the workforce quickly. Likewise, everyone benefits when at-risk communities can receive telehealth at home, improving community health outcomes and lowering costs for government medical programs. Finally, everyone wins when all children have the tools to do their homework and engage in online learning in their homes, improving educational achievements.

To capture these benefits, the Lifeline program requires substantial overhaul. The simplest solution, and the approach we favor, would be for Congress to appropriate funds for the FCC to create a permanent version of the Emergency Broadband Benefit that Congress passed earlier this year, which the FCC is currently implementing.

Alternatively, Congress could create a new program to address both mobile and broadband at home needs to assure access to essential government services for workforce development, healthcare, and education. While the program we propose would not have the simplicity—an important virtue in public policy design—of making the EBB permanent, it would have advantages in terms of distribution and cost savings.

The new program, which we call Lifeline+, would include a mobile benefit and a broadband at home benefit, which consists of three related programs:

1. *LifelineMobile*, which would continue the current Lifeline subsidy for basic voice and mobile functions with some limited data, albeit with comprehensive reforms; and

2. *LifelineHome*, composed of:

- a. *LifelineJobs*, which would provide broadband at home to the unemployed, empowering them to utilize online programs to upgrade their skills, as well as search, apply and interview for jobs;
- b. *LifelineMed*, which would provide broadband at home to low-income persons, to utilize the full suite of telehealth services; and
- c. *LifelineEd*, which would provide broadband at home to low-income families with K–12 schoolchildren and members of their households, to utilize all forms of digital learning.

All eligible families or individuals would be eligible for both the mobile and one broadband at home benefit. Use of the broadband at home benefit would not be restricted, so that regardless of the specific service, the person or family could use broadband for any purpose.

The Plan proposes that LifelineMobile and LifelineEd be funded by direct Congressional appropriations. LifelineJobs and LifelineMed should be funded through mandates added to existing government unemployment and medical insurance programs. Providing beneficiaries of these programs with broadband would, if properly designed, largely pay for itself in the form of savings to the delivery of critical services currently provided only through in-person activities.

Broadband provided through one of the LifelineHome programs will likely support several program goals. For example, approximately 70 percent of school children without broadband at home and who would be eligible for a benefit under LifelineEd are also covered by Medicaid, and would therefore already be eligible for LifelineMed. Providing broadband through Medicaid and other government health insurance plans would also improve the distribution of the benefit.

As with infrastructure support, the Plan recommends eliminating the ETC requirement for Lifeline service providers, and recommends that support be provided directly to beneficiaries in the form of any efficient means, such as a debit card, to enhance consumer control and choice and to reduce the possibility of waste and fraud. We note that the FCC will gain experience through the Emergency Broadband Benefit program, and such experience should inform any ultimate permanent broadband benefit.

The Access to Economic Opportunity and Participation Gap. Several decades ago, famed venture capitalist John Doerr said the personal computer industry's growth from zero to \$100 billion in 10 years was "the greatest legal accumulation of wealth in history." Subsequently he had to amend his comment. Noting that the Internet dwarfed the PC revolution by going from zero to \$400 billion in five years, Doerr said "There are waves and then there is a tsunami." That tsunami has continued. Today the top five American companies by market capitalization (Microsoft, Apple, Amazon, Alphabet, and Facebook) all rode the tsunami Doerr described.

Unfortunately, opportunities for wealth accumulation are not equitably distributed. Jobs, especially the higher paying jobs in the technology industry, have not been filled by Blacks and Latinxs in any significant way. The National Urban League's 2018 State of Black America Report found that of the 40,000 employees of four major Silicon Valley technology firms, only 1,000 were Black; the number for Latinx is paltry. Moreover, business inclusion and opportunity in the growing tech sector has lagged miserably for Blacks and Latinx.

This is not a new problem. The person for whom this Plan is named, Lewis Latimer, was a free Black patent-holder and the son of slaves, whose achievements were critical to the success of his employers, Thomas Edison and Alexander Graham Bell. Unfortunately, but typically, while Latimer was a key contributor to Edison's and Bell's seminal wealth-creating inventions, he had no ownership stake in the vast businesses they spawned.

We need to break that historic pattern. While much of the Latimer Plan is focused on assuring that all Americans, regardless of race, income, or location, have the tools and skills to fully participate in the economy and society of the 21st Century, we also want to close gaps that limit opportunities to participate meaningfully in the business of value creation as broadband and broadband-enabled enterprises continue to innovate, grow, and prosper. We must also ensure that job opportunities are available for the country's growing Black and Latinx communities at every level in the technology and technology-related business sectors.

The causes of limited access to economic opportunity and inclusion are complex, but the gap can be closed with public and private intention, leaving our Nation stronger, more equitable, and more prosperous. In truth, this gap was created by legal and historic barriers to capital access and legal barriers to full citizenship and opportunity. In the last decades of the 20th century, government and industry began

to address some of these barriers, but these efforts lack sustainability or face legal challenges that raise the specter of “reverse racism.” The televised murder of George Perry Floyd, Jr. and the Black Lives Matter movement have prompted a renewed interest in a holistic government response and intentionality by many corporations to close the economic opportunity and participation gap. Corporate America, in a number of ways, has accepted accountability to ingrain diversity, equity, and inclusion into their corporate DNA, including creating racially and gender diverse corporate boards, staffing, C-suites, procurement, philanthropy, and community investment.

Civil rights organizations, led by the National Urban League, have pioneered the negotiation of written memorandums of understanding with several communication companies to set forth goals, timetables, and initiatives to achieve greater diversity, equity, and inclusion. As a nation, we should move forward with new vigor and intentionality in utilizing these techniques to drive towards greater economic opportunity for those who have historically been left behind.

To close the economic opportunity and participation gap, industry, government, and community organizations must work together to improve and increase commitments to racial equity in corporate board membership, staffing, the C-suite, procurement, philanthropy, and community investment. To facilitate this collaboration, the Plan recommends:

- *Infrastructure.* As part of any future infrastructure legislation, Congress must include mandates for companies that will directly benefit from increased Federal investment in infrastructure to improve their performance in providing access to economic opportunity and participation in the categories noted above.
- *Measure Diversity.* The Department of Commerce and the FCC should collect information that allows the government and the public to understand and evaluate how the private sector, and the technology and related sectors in particular, are improving economic opportunity and participation in the categories noted above.
- *Incentivize Diversity.* The Department of Commerce, the FCC, the Small Business Administration, and the Securities and Exchange Commission should evaluate annually and report to Congress on measures that could be adopted to enhance the performance of private enterprise in improving economic opportunity and participation in the categories noted above.
- *Highlight Sustainable Success.* The Department of Commerce, the FCC, the Small Business Administration, and the Securities and Exchange Commission should publish an annual report on best practices for enhancing the performance of private enterprise in improving economic opportunity and participation in the categories noted above.

The Utilization Gap. Deploying networks everywhere and assuring that everyone has the skills and means to connect are necessary first steps. But they are not sufficient to achieve digital equity and inclusion. We also need to increase the utilization of digital platforms, which requires substantial improvement to essential government services offered online. The COVID-19 crisis has forced our economy and society to run a massive—if unplanned—experiment in “remote everything.” While that experiment has produced some positive trends, including greater utilization of telehealth, it has also shown that we have a long way to go in other areas, such as education. We need to be more intentional in developing new capabilities, to assure that they lift up, rather than disadvantage, low-income persons and communities of color. The Plan details recommendations on policies that can, in conjunction with universal availability and adoption, improve the delivery of essential services.

Workforce Development. Governments should improve digital tools that enable people interested in every job type to upgrade their skills and to search, apply, and interview for jobs, and ensure that small businesses can use broadband-based tools to improve their prospects.

The Plan makes several recommendations, including:

- The White House and Congress should expand access to digital resources and technical assistance for enterprises located in rural areas and among communities of color;
- The Department of Labor should develop more broadband, technology, and communications sector-related registered apprenticeship training programs;
- The Federal government should provide incentives for companies, states, municipalities, nonprofit organizations, and the private sector to create and scale new workforce development and digital skills training programs;

- Federal agencies should increase and improve data collection related to workforce development; and
- States should modernize their unemployment benefits systems to more effectively offer unemployed citizens access to opportunities for future employment.

Health Care. With healthcare services are increasingly provided online, government must assure that everyone has access to user-friendly, health-enabling tools that connect them to high-quality, affordable health services and medical information they can understand.

To do so, the Plan recommends that Federal and state governments act to reduce disparities in access to health care services by:

- Adopting consistent policies across state Medicaid programs;
- Removing geographic and originating site restrictions;
- Removing limitations on eligible services, providers, and facilities, and removing unnecessary restrictions on practitioners eligible to provide telehealth services; and
- Funding programs supporting digital health care infrastructure and technical assistance, digital health literacy, and workforce diversity.

In addition, the Plan recommends:

- The Department of Health and Human Services should allocate funding to develop, recruit, and retain health care professionals from underrepresented groups; and
- The FCC should modify the Connected Care Pilot Program and the Telehealth Program to focus more on improving health outcomes for low-income communities and communities of color.

K–12 Education. Technology is creating a new educational infrastructure with a vast expanse of new, diverse, and relevant opportunities. Unfortunately, uneven implementation of these technologies is widening rather than narrowing existing gaps in educational outcomes. We must assure that new educational infrastructure provides all students with equal access to the tools and content of fast-evolving digital learning. Further, we need to provide teachers the support they need to enable students to maximize the value of digital content.

To do so, the Plan proposes to:

- Ensure students have support for digital learning from teachers and other appropriately trained adults, such as online tutors;
- Invest in a Federal research and development agenda focused on advancing new models of technology-empowered teaching and learning that promote equity and improve outcomes for all students;
- Invest in culturally responsive and relevant online learning tools;
- Reform funding systems to ensure adequate and equitable distribution of resources, particularly to advance digital learning;
- Improve access for students of color and others to educational experiences that improve their ability to utilize technology; and
- Develop a National Strategic Agenda for Education Technology Research & Development, focused on improving outcomes for students of color.

Higher Education and R&D. Colleges and universities, with some of the best broadband networks in the world, remain an underutilized resource for digital equity and inclusion. We also underfund research and development in improving teaching and training.

To address those shortfalls, the Plan recommends:

- Using university resources to help institutions servicing those who have been disadvantaged by failings of digital equity and inclusion;
- Focusing future research on understanding how digital education can improve outcomes and overcome persistent performance gaps;
- Understanding and promoting best practices for using digital education to build a more equitable and inclusive society; and
- Increasing efforts to identify, develop, test, and deploy applications of digital educational technologies that foster economic and social mobility.

Government Services. Low-income and minority communities would benefit significantly from greater online access to government services. Many government information systems, however, are outdated. Further, budget gaps lead to failures in up-

grading and maintaining digital infrastructure. Overall, governments must systematically improve their ability to use technology to deliver services.

To address these issues, the Plan recommends that federal, state, and local governments:

- Optimize government websites for mobile use;
- Establish a one-stop-shop for citizens to access and control personally-identifiable information held by government agencies; Improve automated online government customer support;
- Take steps to eliminate data poverty, the social and economic inequalities that result from a lack of collection or use of data about an individual or community;
- Require all government forms be provided digitally for data entry, signing, and submission; and
- Modernize and secure existing government systems, and facilitate low-contact and remote access to government websites and services.

Civic Engagement. Failings of digital equity and inclusion limit many Americans from full engagement in the political and civic lives of their communities. Misinformation is overwhelming accurate information and poisoning the digital conversation, particularly for communities of color. Online platforms have created new problems related to micro-targeting in advertising, algorithmic bias, digital redlining, and other uses that make the Internet problematic for communities of color.

To address these problems, the Plan recommends that:

Congress:

- Hold a series of civil rights-focused hearings with high-level executives from companies that have been major repositories of disinformation;
- Increase investment in reliable, relevant, and trusted information for underserved communities by grants through the Corporation for Public Broadcasting to local noncommercial stations, for journalism by and for underserved communities; and
- Restore funding to the Office of Technology Assessment.

The White House:

- Empanel a commission to study how information on COVID-19 was made publicly available, how this information affected societal response, and what should be done to limit the impact of false and dangerously misleading information moving forward, while preserving First Amendment rights and values;
- Promote the establishment of a private industry-led information accuracy certification body.

The FTC:

- Establish social media best practices;
- Propose recommendations with respect to limiting the potential damage of political microtargeting; and
- Mandate real-time ad transparency and access to archives.

Institutionalization. Achieving digital equity and inclusion requires a sustained, systemic, and appropriately resourced effort that is highly reliant on intergovernmental coordination and collaboration. Currently, policymakers do not have the tools or data to monitor and evaluate efforts to close the gaps identified in the Plan. To address these needs, the Plan recommends that the Federal government:

- Examine biases that could affect its existing collection, analysis, and interpretation of data;
- Collect the data necessary to review use of governmental information and digital services by each population it serves, and track how constituents interact with each agency;
- Partner with state and local governments to collect relevant data, including as part of efforts to expand broadband availability, adoption, and utilization carried out at the local level; and
- Convene an annual National Digital Inclusion Summit to review progress, determine key barriers to progress, and adjust policies, as necessary.

Conclusion. While the COVID crisis appears to be ending, the need for digital equity and inclusion is not. Indeed, the economic and societal trends the health crisis

accelerated make the task more urgent. We need a surge of government action that produces sustainable results.

CHAPTER 1.

WHERE DO WE GO FROM HERE WITH BROADBAND: CHAOS OR COMMUNITY?

In 1967, the Reverend Dr. Martin Luther King isolated himself in a house in Jamaica to write about the crossroads he believed the Civil Rights movement faced. The resulting book, tragically his last, is titled: *Where Do We Go from Here: Chaos or Community?* While King thought the movement could look back with pride on its many accomplishments, he candidly acknowledged the mountains yet to climb, and the fissures in the movement that might prevent future progress, or even lead the movement backwards.

Written in the wake of substantial legislative victories, including the Civil Rights Act of 1964 and the Voting Rights Act of 1965, King soberly acknowledged that “Laws only declare rights; they do not deliver them.” The book attempts to chart a path for America, and the world, to move from a society that continued to degrade and exclude millions to a society comprising a “beloved community” that valued and offered opportunity to all.

Much has changed in the United States since then, but the battles that King fought so valiantly continue to rage. As he said then, and as he might say today, “The fight is far from over, because it is neither won, as some assert, nor lost, as the calamity-ridden declare.”

The battlefield, however, has changed. One of the most significant shifts from King’s time is how broadband has emerged as the commons of collaboration in our modern economy, in our society, and in obtaining access to critical services such as health care, education, and job training.

Those skilled in using that commons have enjoyed extraordinary gains in the past several decades. But those who have been kept off the digital platform have experienced exactly the opposite. Ten years ago, the National Broadband Plan observed that as “more aspects of daily life move online and offline alternatives disappear, the range of choices available to people without broadband narrows. Digital exclusion compounds inequities for historically marginalized groups.” In light of these trends, that plan warned the cost of

“[D]igital exclusion is large and growing. For individuals, the cost manifests itself in the form of lost opportunities. As more aspects of daily life relocate online and offline alternatives disappear, the range of choices available to people without broadband narrows. Digital exclusion compounds inequities for historically marginalized groups. People with low incomes, people with disabilities, racial and ethnic minorities, people living on Tribal lands and people living in rural areas are less likely to have broadband at home.”

The Plan further projected that “our accelerating reliance on digital technology appears to be driving greater disparities; left unaddressed, those gaps will likely grow.”

Sadly, despite inspiring public and private efforts to close the gaps, disparities in digital life have grown. Worse, the costs to the digital have-nots have become even more evident with COVID-19. A growing “homework gap,” which kept millions of school children from being able to use the Internet to complete schoolwork at home, has become a total “education gap,” where they are unable even to attend classes. The traditional summer slide in educational achievement—which could be mitigated through a thoughtful summer online tutoring program—is becoming a catastrophic *COVID slide*, with unconnected students falling even farther behind.

A similar story can be told about healthcare. We see the problem in the specific problem of Inequality in broadband access leading to *inequality in obtaining the vaccine* for COVID-19. But the relationship between access to broadband and access to healthcare is not a short-term story but rather, part of what will be a critical long-term trend.

Telehealth, which has become a critical necessity since the start of the COVID-19 pandemic, putting health care out of reach for those without home broadband. A recent *study* found that only 38.6 percent of the people who live more than a 70-minute drive from a primary care physician subscribe to an Internet connection capable of handling telehealth services.

Another illustration of how our country is paying a cost for our failure to close broadband gaps was the *scene in Florida* at the outset of the health crisis, with hun-

dreds of people risking their safety to line up to obtain an unemployment form, because the state's website crashed. In employment, as well as other critical government services, we could point to other, similar examples, all of which make painfully clear that *the public sector is still far behind* where it should be in terms of providing services over the Internet.

As these examples suggest, ten years since the publication of the National Broadband Plan, it is undisputable that Internet services and applications have evolved to provide significant benefits, general and specific, to millions of users. In key areas of daily life, broadband service is quickly becoming a necessity, a reality made more urgent amid the COVID-19 pandemic. Those who, for whatever reasons, are not active Internet users are not just missing out on the latest innovations in entertainment, home automation, and electronic commerce. Increasingly, they are shut out of basic access to essential applications in education, health care, and employment services, among others.

While access to broadband is the latest challenge in the struggle for equal opportunity, the technology itself offers new and innovative avenues to achieving it.

Broadband can be a platform for significant economic, cultural, and social transformation, overcoming distance and transcending the limitations of one's physical surroundings. Because of how it scales, the best applications for one can become available to everyone. Ironically, however, Internet technologies, which have always demonstrated tremendous potential to level playing fields and lower costs, are disproportionately benefiting the most affluent Americans, widening rather than closing social, economic, and political divides.

Digital equity and inclusion offers a means to achieve the more perfect union our founders envisioned, and for which we must constantly strive. By "digital equity and inclusion," we mean the *full participation in digital life by virtually all Americans, using a home broadband Internet service that is available, adopted, and affordable*.

This document lays out an agenda for achieving that vision. It recommends policies, programs, and strategic plans directed to a wide range of public and private stakeholders, aimed at closing the gaps. Our goal, quite simply, is to achieve digital equity and inclusion. This Plan starts by asking *how can we use the tools of the information society to create a more equitable and inclusive economy and society?* It then answers with a comprehensive set of recommendations. It also makes abundantly clear that if we do not act on this Plan our failure will not simply leave us where we are today. It will result in the situation getting much worse, not just for the digitally disconnected, but for everyone.

The case for digital equity and inclusion is animated by the same moral and political philosophy engrained in our country's founding philosophy: that all are created equal, having the same rights to life, liberty, and the pursuit of happiness. It is also grounded in an economic understanding of the common good that King touched on in writing that:

From time immemorial men have lived by the principle that 'self-preservation is the first law of life.' But this is a false assumption. I would say that other preservation is the first law of life. It is the first law of life precisely because we cannot preserve self without being concerned about preserving other selves. We are in the fortunate position of having our deepest sense of morality coalesce with our self-interest. In a real sense, all life is interrelated. The agony of the poor impoverishes the rich; the betterment of the poor enriches the rich. We are inevitably our brother's keeper because we are our brother's brother. Whatever affects one affects all directly.

While King uses the language of morality and biblical texts, there is evidence to support his view embedded in the economics of networks. The value of any network grows, according to Robert Metcalfe, "proportional to the square of the number of nodes in the network." That is, the more users there are, the faster overall value increases for everyone. Conversely, the exclusion of millions decreases the potential value of the network many-fold, including if not especially for those who are already connected.

While the Plan we propose is bold in its call for changes, we take comfort in knowing the new Administration recognizes the importance of equity in access to services and opportunities. As a recent Executive Order mandates, the Federal government is now committed to pursuing "a comprehensive approach to advancing equity, including for people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality. Affirmatively advancing equity, civil rights, racial justice, and equal opportunity is now the responsibility of the whole of our government. Because advancing equity requires a systematic approach to embedding fairness in decision-making processes, executive departments and agencies (agencies) must recognize and work to redress inequities

in their policies and programs that serve as barriers to equal opportunity. By advancing equity across the Federal government, we can create opportunities for the improvement of communities that have been historically underserved, which benefits everyone.” The Executive Order further mandates that “each agency must assess whether, and to what extent, its programs and policies perpetuate systemic barriers to opportunities and benefits for people of color and other underserved groups.”

Such an assessment will inevitably find that today, and to an even a greater extent in the future, those opportunities and benefits are either best or exclusively provided online. It is not surprising that in a report by the Partnership for Public Service on *“Federal Success Stories from the COVID-19 Pandemic”*, the exemplars of improving service to customers all involved an online innovation. One example was the Veterans’ Administration developing a COVID-19 “chatbot” to triage veterans based on their specific questions and needs. Another was the CDC developing a coronavirus “self-checker,” used by over 13 million users, that assists people in checking their symptoms and instructing them what to do next, reducing the burden on health care systems across the country. These models, while deserving of praise, are not available to those who are not online. Therefore, as discussed throughout this Plan, a foundation stone of the efforts called for in the Executive Order should be universal access to the tools of the digital economy and society.

Businesses have also come to recognize that equity and inclusion are critical for sustainable growth. Chapter Two describes in more detail the economic imperatives to close persistent and significant gaps in Internet use by Americans of color, those with lower educational levels, lower income, and those who live in sparsely populated areas of the country.

What are the critical gaps? We focus particular attention on four distinct but interrelated challenges. While the pandemic has shined a glaring spotlight on each of them, these gaps have persisted for at least the past decade:

The Availability Gap. Broadband network availability is the most basic pre-requisite to achieving digital equity and inclusion. Unfortunately, millions of American homes, businesses, and other enterprises cannot connect to a broadband network capable of allowing them to fully participate in the economy, obtain an education and health services, train, search, and apply for a job, and otherwise participate in society. In Chapter 3, we propose a number of policies that, if implemented, would close this gap within three years.

The Adoption Gap. Even among those Americans for whom a broadband network is available, there are still tens of millions who have not adopted broadband in their homes. In Chapter 4, we review the causes of that gap, including digital literacy and digital readiness, and how they can be overcome to assure that all families can both have and benefit from broadband in their homes.

The Affordability Gap. For millions of Americans who do not subscribe to broadband, the cost of service remains an overwhelming obstacle to adoption. Though the current Lifeline program has been adapted to subsidize broadband for the poorest households, legacy features and other limitations of the program’s basic design make it a poor fit as a long-term and sustainable solution. In Chapter 5, we propose more efficient funding and distribution mechanisms to close the affordability gap within three years through a new program we call Lifeline+.

The Access to Economic Opportunity and Participation Gap. While the digital economy has created the greatest opportunity for wealth accumulation in history, those opportunities are not equitably distributed throughout society. This means that the jobs especially the higher paying technology industry have not been filled by Blacks and Latinxs in any significant way. The National Urban League’s 2018 State of Black America Report found that of the 40,000 employees of four major Silicon Valley technology firms, only 1,000 were Blacks; the number for Latinxs is paltry. Moreover, business inclusion and opportunity in the growing tech sector has lagged miserably for Blacks and Latinxs. In Chapter 6, we address ways that the public and private sectors, working together, can help close that gap.

There is an additional challenge, which while it receives less attention in public policy debates, nonetheless presents a serious obstacle to digital equity and inclusion. That is the challenge of improving how we actually utilize the digital platform to improve essential services for all. COVID-19 has forced our economy and society to run a massive—if unplanned—experiment in “remote everything.” That experiment is yielding some positive trends, such as in the utilization of telehealth, while also showing that we have a long way to go to use the new capability more effectively, such as in education.

We need to be more intentional in developing these new capabilities to assure that they lift up, rather than disadvantage, low-income and communities of color. In Chapters 7 through 13, we propose specific and detailed public and private actions

to utilize broadband networks and the applications that run on them to deliver essential services more effectively and efficiently in health care, education, workforce development, general government services, and civic engagement.

In designing policies to overcome the gaps, we have approached the challenge in a *technology-neutral* fashion. We believe the availability gap, for example, may be addressed through a number of different technologies, including fiber, cable, hybrid wired networks, fixed wireless, mobile or fixed cellular, Wi-Fi, and satellite. So long as they facilitate digital equity and inclusion, and meet defined standards for broadband service, we should be agnostic as to the technology or technologies of preference.

The Plan is also *provider neutral*. ISPs can be commercial, governmental, public/private, utility, or community-based, so long as they deliver broadband that enables full participation.

While we see the Plan as critical for making progress towards a more equitable and inclusive America, we recognize that the lack of home broadband Internet services is only one of the many severe challenges experienced by the poorest Americans. Millions today have difficulty, especially during times of economic downturns, paying their rent or mortgage or of having enough food to eat. Many live in sub-standard housing. According to the U.S. census, 1.6 million Americans still live in homes that do not have running water. Home electricity is a prerequisite for using any Internet service. Yet many low-income households cannot afford electricity, if not on an on-going basis, then during times of particular economic hardship. According to a recent survey, in the early months of the COVID-19 crisis, “13 percent of respondents had been unable to pay an energy bill during the prior month, 9 percent had received an electricity utility shutoff notice, and 4 percent had had their electric utility service disconnected.” Such homes are unlikely to be able to enjoy a home Internet service at any price.

These and other social and economic challenges are outside the scope of this Plan, though they play a significant part in our ability to fully close the remaining broadband gaps. Over half a million Americans are homeless, for example, rendering “home” Internet service impossible. And 43 million U.S. adults are functionally illiterate, creating a severe if not complete obstacle to deriving the benefits of Internet connectivity.

The inability to solve every problem, however, is not an excuse for failing to solve those we can, particularly problems for which the kind of targeted policies we propose can quickly and efficiently generate significant and sustainable improvements. The recommendations in this Plan do not take away from efforts to solve other problems. Rather, to a significant extent, they lay the groundwork for addressing a number of problems that have their roots, for example, in inadequate access to quality education, health care or job training for jobs of the future.

Further, while the policies proposed here will accelerate the availability of networks everywhere, with everyone connected and utilizing broadband Internet at home to access essential services more effectively and efficiently, we also know that achieving these goals is not a straight path. What King wrote about the Civil Rights movement applies here: “We will err and falter as we climb the unfamiliar slopes of steep mountains, but there is no alternative, well-trod, level path.”

In that light, we need institutional capacity to experiment, evaluate and, when necessary, course correct. In Chapter 14, we propose ways the government can build that capacity, and continually improve how it facilitates digital equity and inclusion. As the National Broadband Plan stated less eloquently than King but in the language of the technology ecosystem, “this plan is in beta and always will be.”

King closed his book with words that ring true for this effort: “We are now faced with the fact that tomorrow is today. We are confronted with the fierce urgency of now. In this unfolding conundrum of life and history there is such a thing as being too late.”

We don’t think it is too late. But given the speed with which our economy and society is now moving towards “remote everything,” we need to move swiftly on this Plan. Otherwise, we risk increasing rather than decreasing the dangerous chasms that have already formed. We have the capacity to move much closer to the community King envisioned. But if, instead, technology continues to breed a society and economy that is less equitable and less inclusive, chaos will be the inevitable and tragic outcome.

THE ECONOMIC CASE FOR DIGITAL EQUITY AND INCLUSION

Achieving digital equity and inclusion is, first and foremost, a moral imperative. But beyond issues of human rights and racial justice, there are potent economic reasons to ensure that broadband service at home is available to all Americans, and for helping those who remain offline for whatever reasons to overcome the obstacles that keep them from participating in digital life.

An extensive literature on digital equity and inclusion has persuasively established the social value of universal adoption, as well as the systemic and personal obstacles that make it an elusive goal. As noted in Chapter 1, the 2010 National Broadband Plan laid out the economic case for solving the “digital exclusion” crisis, noting how the cost of digital exclusion is large and growing and that cost “imposes inefficiencies on our society as one-third of Americans carry out tasks by means that take more time, effort and resources than if they had used broadband. Since government agencies must maintain both offline and online systems for transactions, many government services are not as effective or efficient as they could be.”

As the National Broadband Plan and the supporting literature suggests, economic rationales for sustained and increasing public investment in digital equity and inclusion can be summarized into three main arguments:

The Rising Tide. Universal broadband can produce positive public externalities, creating a more just, educated, and affluent society.

The Magic of Network Effects. Increasing returns to scale, via network effects, of a more complete, robust, and equitable digital society.

The E-Government Win-Win. Decreasing the costs and increasing the benefits of government services.

This chapter briefly reviews each of these arguments.

2.1. RISING TIDE

As the pandemic has brought into sharp relief, universal broadband connectivity is a goal that would benefit not only those who do not currently use the Internet, but also those who are already online. In that sense, it is similar to public education, which provides benefits even to taxpayers without children. The more educated a society is, the lower the incidence of poverty and crime, for example, and the lower the costs of public health. Education, moreover, boosts earning potential and overall economic output, providing in turn a more stable tax base for services useful to everyone, including national defense, police and fire departments, basic research and development, and the social safety net. Broadband adoption, to use an economic term, generates positive externalities.

Even at the time of the National Broadband Plan in 2010, it was already clear that broadband Internet, both directly as infrastructure and as a platform for delivering services in better and cheaper ways, had the potential to generate substantial, even revolutionary, positive externalities. By now, value generated by the network and its growing range of incremental and disruptive innovations far exceeds even the immense costs already spent in its construction and continuing improvement. While over two trillion dollars has been spent building modern broadband networks in the U.S. alone, the market value of just the top twenty Internet companies—most of which didn’t exist twenty years ago—is more than double that amount. From an economic standpoint, that is a profound example of a positive externality for the country.

Meanwhile, the virtual nature of digital information generates further positive economies of scale. No matter how many people are searching on Google, binge-watching the latest video content, or participating in video conferences for work, education, or family life, the information and software being “used” does not diminish in value or usefulness by simultaneous or future users. (Indeed, as noted below, it likely *increases* in value the more it is used).

The same could not initially be said for the network itself. In the early days of broadband, many of the delivery technologies, as well as the network protocols themselves and the limits of early server capacity, constrained the number of simultaneous users who could be supported in the same local area or accessing the same websites, without performance degrading noticeably for everyone.

These capacity constraints, however, have been significantly reduced for many locations and applications. Three factors contributed to the solution: higher-capacity network technologies, including fiber-optic cable throughout the network and advanced mobile networks (4G LTE and now 5G), better-optimized networking protocols, notably DOCSIS 3.1, which is used by most cable providers, and improved applications and architectures, including data compression, streaming media, content

delivery networks, and Internet exchange points. Each of these innovations have been the result of massive private investments, enabled by effective policy frameworks for most of the last quarter century. Device capabilities have also increased, in parallel with capacity enhancements.

The specifics of these innovations are not relevant here. What is relevant is the end-result: vastly improved efficiency and expanded capacity on broadband networks. Regardless of the last-mile technology on which broadband is delivered, nearly all broadband users have seen dramatic increases in speed. Today, the average is 157 Mbps, an increase of 3,825 percent. As network performance during the COVID-19 crisis has made crystal clear, even if the remaining millions of unconnected U.S. homes suddenly went online, broadband capacity could easily handle the volume. Similar durability—let alone upgrades—have not been seen in other infrastructure, such as power and water, which have deteriorated in quality in many parts of the country.

At the same time, the fixed cost of service per subscriber has declined, as capital and operating expenses are spread among millions of additional consumers every year. The result has been dramatic decreases in unit prices for transit, processing, and storage. For the last several years, the price of each gigabyte of cellular data usage has fallen approximately 50 percent each year. (Of course, most users are now sending, receiving, processing, and storing vastly increased amounts of data, so those declining prices do not necessarily translate to lower bills.)

The net result is that we are now living in a world of abundant broadband capacity, enough to assume that the processing, storage, and transportation of all the information on the Internet can be used by millions of additional users in the near future without noticeable degradation.

This means there are compelling economic reasons, beyond profitability, to expand coverage and adoption as widely as possible. The benefits to broadband providers, as well as to society as a whole, favor universal adoption. More users mean more contributors to network fixed costs—the majority of the providers' cost of service—and opportunities to lower marginal operating costs through economies of scale. For the U.S. as a whole, more importantly, universal adoption means a more equitable society with, as has been shown with correlations to education and income, lower rates of crime, poverty, incarceration, and civil unrest.

Even if many of those users are unable to afford retail prices for broadband services, there are ample reasons for private, public, and private-public partnerships to subsidize costs through reduced rates, tax incentives, and direct government support to individuals. When marginal costs are low, and decreasing with scale, subsidizing costs for lower-income customers can benefit all users. That has been the theory behind public and private broadband support programs that have operated in the last decade. Though the design of the program has substantially limited its effectiveness, Lifeline provides subsidies for 7 million American homes, with an estimated 31 million more households who have not applied qualifying even under current program rules.

2.2. THE MAGIC OF NETWORK EFFECTS

The second economic argument for digital equity and inclusion is related to the characterization of broadband applications as public goods. As noted above, a non-rivalrous good, of which digitized information is a particularly good example, does not diminish in value through simultaneous or serial use. Everyone can read the same digital texts, search the same databases, watch the same streaming content, and make use of the same video conferencing, e-commerce, and government services applications all at once. The use neither degrades nor diminishes the integrity or future value of the information.

In fact, digital information has an additional property that makes it even more valuable than other non-rivalrous goods. In many cases, as digital information sources are accessed, searched, annotated, and viewed, the underlying information not only retains its value but can actually become more valuable for subsequent uses and users. Economists refer to this phenomenon as network effects.

For information networks in particular, network effects offer perhaps the most potent economic argument yet for universal adoption. Consider the work of computer networking pioneer Robert Metcalfe, who in 1993 calculated positive returns to scale in computer networks in a formula known today as "Metcalfe's Law." The value of a computer network, Metcalfe said, was equal to the square of the number of connections, whether those connections were of devices, users, or any other component.

In networks governed by Metcalfe's Law, including today's broadband, the overall value of the network doesn't increase linearly by adding more possible connections. That's because each new node adds not just one potential new connection. A new user or computer can use the Internet to interact not just with its immediate neigh-

bor, in other words, but with every other user or computer already online. The million-and-first Internet user adds a million new possible connections. The billion-and-first device attached to the Internet of Things adds a billion new possible connections.

In fact, Metcalfe may have understated the possibilities of network effects, as his formula assumes only connections between two end users. But many broadband applications, including video conferencing, and social networks, to name just a few, are n-way connections. You can video conference with all or any subset of your colleagues or students or family members. And each new connection adds that many more new possibilities, each with its own unique potential to create non-rivalrous value.

Metcalfe's Law goes a long way toward explaining where all the trillions of dollars of new value the Internet has created has come from, and why the possibility of connecting all the people, places, and things that are currently offline is so powerful, exerting almost a gravitational force on investors, policymakers, and society in general.

For our purposes, however, the essential point of network effects is that it makes digital equity and inclusion an even more urgent imperative. Not only does achieving digital equity and inclusion improve outcomes and reduce overall social costs, it actually generates new value—and does so at an accelerating rate the more people we can connect.

Diversity is also critical to network growth. The on-going digital conversation, which has become more robust on a daily basis as broadband infrastructure and applications improve, is missing essential voices. In the U.S., some communities—communities of color, older Americans, rural Americans, Native Americans, those with less education, those with lower incomes—are disproportionately absent. Their insights, their perspectives, and their needs are not being heard online.

Without them, the Internet risks becoming increasingly insular, parochial, and even fragile—a digital bubble. We need those who are offline to join the conversation just as much as they need the services connectivity makes possible. From an economic perspective, in fact, the Internet needs the disconnected even more than they need it.

2.3. THE E-GOVERNMENT WIN-WIN

Even before the COVID-19 crisis accelerated our reliance on the Internet, digital technology was quickly becoming a basic tool for economic and social well-being. That was particularly true for a wide range of both public and private activities, including shopping, entertainment, lifelong learning, and maintaining family and community connections, to name just a few.

The pandemic, however, has highlighted several acutely painful inequities and missed opportunities in applications central to government and government-supported initiatives, including education, public health, employment, housing, and the social safety net. The Internet has become critical for students to attend class, for seniors to receive timely and safe health care, and for everyone to exercise such basic rights and necessities as job training, preparing to vote, and accessing government programs and services, including unemployment insurance, SNAP, public housing, consumer protections, law enforcement, health insurance, and social security, among many others. For now, and the foreseeable future, those without broadband, quite simply, cannot effectively participate.

The growing importance of these services, particularly for members of at-risk communities, and the dangers, if not impossibility, of using them in person, has erased any remaining doubt about the importance or relevance of the Internet in the lives of those who have remained offline. Tragically, those who most need these services are also the least likely to subscribe to a broadband connection at home to access them.

That reliance is unlikely to disappear with the eventual end of the current COVID-19 related health crisis. For better and for worse, the pandemic has revealed an astonishing range of inefficiencies, inequities, and lost opportunities in pre-crisis systems, both those physically based and those already available in digital form. Despite trillions of dollars in both private and public spending on infrastructure over the last twenty years, key agencies and industries have not invested enough in basic digitization of their core services, nor have they begun to look for innovative ways to do more for current and future users. We need only remember the embarrassment of several governors having to put out urgent calls at the start of the crisis for retired COBOL programmers to work on antiquated benefit systems that could not handle sudden surges in volume. Or, at the start of the COVID-19 outbreak, of Floridians risking their health to stand in line for paper unemployment forms when the state's online system crashed and could not be repaired.

Under and mis-investment in IT, for a variety of reasons, create more serious problems for government supplied and supported services than they do for any industry in the private sector. And the painful irony is that it is precisely the members of communities least likely to have broadband connections who are the most reliant on government services, who may be deterred from subscribing in part because the essential services they need are often not available in efficient, reliable, secure, and easy-to-use digital forms. Americans who are the least likely to have broadband—older, rural, less-educated and lower-income—are all heavy users of government services. For example, 53 percent of benefits go to persons 65 and older.

Any program aimed at solving problems of digital equity and inclusion, as noted in the following chapters, must include not only support for individuals without available network services or the ability to adopt them but also to improve the applications that digital have-nots most require. Deploying e-government apps quickly would not only increase online adoption, it would simultaneously improve government performance and lower its cost.

Though doing so will of course require considerable up-front expenditures of public funds, the result will be systems that can deliver basic entitlements and services more efficiently. As in the private sector, modern information systems can dramatically lower on-going operating costs, generating surplus that can pay back the capital costs many times over during the lifetime of new and upgraded e-government systems.

Better systems will also ensure that those who today cannot gain meaningful access to government services for which they qualify, as well as such basic rights of democratic citizenship as voting and public education, will be served in a manner that is safer and more dignified, with fewer opportunities for waste, fraud, or abuse.

In that regard, a revitalized plan to achieve digital equity and inclusion offers policymakers a profound opportunity both to reduce the costs of delivering government services, and to maximize the benefits of those services for those who need them most. By making government more accessible online, moreover, newly-connected Americans will quickly see the full potential of existing public and private online applications and services, giving them powerful incentives to embrace fully their new digital lives—a truly virtuous cycle of economic improvement, reversing a long history of failed efforts.

For example, the Department of Labor today funds nearly 2,500 American Job Centers to help the unemployed search for work. But due to the pandemic, many of these Centers are temporarily closed or have shifted to online-only access. Other employment-related services offered by government agencies, including some specific to older Americans, Native Americans, farmworkers, and refugees, are likewise only accessible online.

It is also worth noting that, to date, different Federal and state government agencies provide these benefits, and in many cases some information is already on-line. To achieve digital equity and inclusion, we urgently need e-government apps that pull together relevant information across local, state, regional, and agency boundaries, and which are built with design principles focused on convenience for the user. It is one of the best ways to convince those who have not adopted the Internet in part because they do not see the value in doing so.

To jump-start digitization and adoption of these essential services, we need to harness entrepreneurial talent that today is focused on building the next great gaming or social media sensation. That is precisely the mission of the U.S. Digital Service, which recruits top designers, engineers, product managers, and policy experts and pairs them with forward-thinking civil servants, deploying high-powered teams “to untangle the most important government services.”

There’s also Data.gov, which has released hundreds of thousands of government datasets, open to “civic hackers, tech entrepreneurs, data scientists, and developers of all stripes.” Using Data.gov, hundreds of helpful apps have already been built, but there is much more to do. And data sources must be populated by information relating to the entire population, not just those who are already online. As more Americans adopt online services, the more complete—and therefore valuable—these datasets will become.

CHAPTER 3.

CLOSING THE BROADBAND AVAILABILITY GAP

3.1. PROBLEM STATEMENT

Despite a decade which saw private, public and hybrid organizations *investing nearly \$2 trillion* in broadband infrastructure, the unfortunate fact remains that millions of American homes, businesses and other institutions have no available op-

tion to connect to a broadband network capable of supporting full participation in the modern economy. That includes the ability to use the Internet to train, search, and apply for employment, obtain an education and health services, and otherwise benefit from life in an increasingly digital society.

Broadband availability and devices with which to access the Internet are the most basic pre-requisites to achieving digital equity and inclusion. We seek to close the broadband availability gap, which is generally found in less densely populated areas. Most of these areas are populated by low-income communities, including communities of color.

3.2. VISION

Every home, anchor institution, and business location in the United States should have available to them at least one broadband network capable of providing the benefits of current and future economic, social, civic, educational, medical, commercial and entertainment applications.

3.3. GOALS

To close the broadband availability gap, the Federal government should take the following actions:

- By the end of 2021, the FCC should define the characteristics of Internet access that are necessary in order for a location to be considered as “served with broadband” and the minimum level of Internet service that government funds should support in efforts to bring broadband to an unserved area, based on reasonable prediction of excess capacity and future application requirements over the next 10 years, with “excess capacity” and “application requirements” to be defined by the FCC, following analysis of user requirements for current and emerging applications and their technical and utilization characteristics.
- By the end of 2021, the FCC, in consultation with other federal, state, and local governments, should publish best practices for public entities to reduce the costs of, and time required for, broadband deployment.
- By early 2022, the FCC should produce an accurate map of broadband availability in America, including the identification, on a granular level, of those locations without an available network, based on the updated definition of broadband, so that public funding can initially be prioritized for areas lacking any option for broadband. The map should be updated frequently and distinguish different levels of broadband service. By 2022, Congress should provide additional funding to be used by the FCC or other government entity to hold one or more competitive processes to obtain for Federal subsidies to deploy additional broadband infrastructure, closing the availability gap to less than 2 percent of American households.
- In 2022, the FCC or other government entity should hold a competitive process for Federal subsidies, utilizing the FCC’s improved map of broadband availability to target unserved locations.
- By the end of 2023, deployments from authorized winning bidders should be underway to provide broadband to at least 98 percent of premises in America.
- By the end of 2023, the FCC should update its map of broadband availability in America, again identifying on a granular level those areas still without an available network, now or scheduled for completion, so that public funding can be prioritized for the remaining areas lacking any option for broadband.
- The FCC should evaluate, on an on-going basis, the status of new delivery technologies, including but not limited to, low earth orbiting satellites, 5G mobile and fixed wireless, and any other new wireless technologies, and develop a plan to connect the final 2 percent of premises in the United States.
- By the end of 2024, the FCC or other government entity should hold another competitive process designed to assure deployment of a network capable of providing broadband to any remaining unserved premises in the United States.

3.4. THE CURRENT SITUATION

3.4.1. BROADBAND IS STILL UNAVAILABLE TO MILLIONS OF AMERICAN HOMES.

In January 2021, the Federal Communications Commission *declared* in its 14th Broadband Deployment Report that, at the end of 2019, 14.4 million Americans lacked any option for subscribing to home broadband using a “fixed terrestrial” service with speeds of at least 25 Mbps download and 3 Mbps upload (“25/3 Mbps”). Of a total evaluated population of 328.2 million, the FCC estimated 304.3 million had 25/3 Mbps service available using wired technology (principally fiber and cable, and

to a lesser extent DSL), and an additional 9.5 million with 25/3 Mbps service available only using fixed-wireless technology.

There are data that one could use to argue that the number of Americans lacking any option for home broadband may be, at least theoretically, much lower. For example, the FCC reports, but does not count towards its annual assessment of whether broadband is available, deployments of broadband that use non-terrestrial technologies, including cellular and satellite networks, many of which offer speeds that meet or even exceed the FCC's current definition of broadband (or "Advanced Telecommunications Capability" (ATC)). According to the Broadband Deployment Report, for example, "... deployment data for satellite broadband indicate that satellite service offering 25/3 Mbps speeds is available to nearly all of the population." The agency does not count these deployments, however, because "satellite services have a relatively low subscription rate despite their apparent widespread availability."

There may be other reasons to exclude, at least for now, mobile and satellite technologies from any calculation of broadband availability. For purposes of this Plan, we will follow the FCC's analysis, and include as meeting the standard for "available" service only those premises that can be served by fixed terrestrial broadband, with speeds of at least 25/3 Mbps.

Using that criteria, the actual number of Americans lacking any option for fixed terrestrial service may in fact be significantly higher than the reported 14.4 million. Congress and the FCC both acknowledge that under the agency's long-standing data collection methodology, if a broadband provider tells the FCC that it can offer service to a single customer in a given census block, the agency treats that entire census block as served. This assumption overstates actual availability, particularly in rural areas. In addition, the FCC does not routinely verify or audit provider-supplied data, allowing, for example, one company to overstate its service coverage by tens of millions of people and another to find that it had overstated its coverage in thousands of areas.

A sampled check of availability by an independent group in 2020 compared actual availability findings to the assumptions made in the FCC's analysis of the data it collects, and found considerably greater gaps in availability. Their report *concluded* that the actual number of Americans without an available option for broadband network was probably closer to 42 million Americans, a number more than double the number estimated by the FCC based on the data set available at that time.

Criticism of the FCC's broadband mapping process has been offered on a bi-partisan basis, including in a report by the GAO. In response, Congress in March 2020 passed the Broadband DATA Act, directing the FCC to collect data and prepare maps that report broadband availability in the United States much more precisely. In December 2020, Congress appropriated the FCC's requested funding to accomplish that task, and the FCC subsequently adopted final rules in January 2021.

While the precise number of Americans lacking any option for home broadband using fixed terrestrial service is not certain, it is clear that, given significantly higher costs of infrastructure deployment, the vast majority of homes lacking broadband availability are in rural areas. This does not mean, however, that availability is not a substantial issue in some urban communities of color. There are also significant areas in the United States that lack broadband that are populated by Black Americans, Latinxs, and Native Americans.

It may also be the case that the FCC's current 25/3 Mbps definition is no longer sufficient. Indeed, there is currently a debate—one that has intensified with the increased use of broadband caused by COVID-19—as to whether those speeds are sufficient for a nation that has moved so much of its work, education, shopping, entertainment, civic engagement, and social connections online. Since the outbreak of the COVID-19 pandemic, more and more U.S. homes can be characterized as broadband-dependent, with multiple users relying daily on broadband for simultaneous video calling, streaming entertainment, shopping and maintaining social connections. Even once the current crisis eases, there is reason to believe that user behaviors will not revert to previous patterns. Americans have learned the value of broadband applications they may not have been familiar with, and will continue to rely on them, and at an accelerating rate.

More broadly, the agency has made little effort in the last decade to justify the speed standards it has adopted, or why download and upload speeds should form the basis—let alone the sole basis—for determining what constitutes ATC. Download and upload speeds capture only the connection from the ISPs closest node to and from the home. But many other factors determine the quality of a user's interaction with any given Internet service, including the design of the website, app, or Internet service being accessed and the demand on it at any given time, the kind of transit the Internet service utilizes, the performance of intervening services, such

as cloud security intermediaries, and other network optimization technologies, which are constantly being introduced and updated.

3.4.2. *BROADBAND AVAILABILITY IS ALSO A PERSISTENT AND UNIQUE CHALLENGE FOR TRIBAL LANDS.*

Tribal lands present an important, persistent, and unique set of challenges. Ten years ago, the National Broadband Plan noted that the FCC had found, “[b]y virtually any measure, communities on Tribal lands have historically had less access to telecommunications services than any other segment of the population.” The Plan noted that:

[M]any Tribal communities face significant obstacles to the deployment of broadband infrastructure, including high buildout costs, limited financial resources that deter investment by commercial providers and a shortage of technically trained members who can undertake deployment and adoption planning. Current funding programs administered by NTIA and RUS do not specifically target funding for projects on Tribal lands and are insufficient to address all of these challenges. Tribes need substantially greater financial support than is presently available to them and accelerating Tribal broadband deployment will require increased funding.

Unfortunately, the situation has not materially changed over the past decade. According to the FCC, as of December 31, 2019, fixed terrestrial 25/3 Mbps broadband service was deployed to 79.1 percent of Americans on Tribal lands, well under the 95.6 percent level for the entire U.S. population.

The FCC has concluded that the challenging geography and population density of Tribal areas means that addressing the broadband needs of Tribal areas is most likely to be accomplished with non-terrestrial networks, but tribes have not had the ability to control radio spectrum in their jurisdiction. The problem has its roots in the Federal “Reservation Era” policies of the late 1800s, which gave the Federal government the power to sell Tribal frequency resources, along with other natural resources, to for-profit corporations, without Tribal consultation.

Unfortunately, today’s policies still are grounded in that history. As the GAO found in a 2018 study, while the FCC has taken some steps to promote and support Tribal entities’ ability to license and utilize spectrum, these efforts were not sufficient to address Tribal spectrum needs. Among other problems, the FCC does not collect key information related to spectrum over Tribal lands or communicate it to Tribal entities, even though FCC has the information—including broadband availability data from providers, and information on geographic areas covered by spectrum licenses—that could be used for such analysis. Moreover, the GAO found that the tribes faced barriers in participating in spectrum auctions, as well as in purchasing spectrum rights in secondary market transactions.

3.4.3. *MULTIPLE FEDERAL AND STATE PROGRAMS AVAILABLE TO ASSIST WITH BROADBAND DEPLOYMENT.*

While the FCC Universal Service Fund is by far the largest source of funding for addressing the availability gap, the NTIA’s *Broadband Funding Guide* identifies nearly 60 direct and indirect Federal programs, located in more than a dozen Federal agencies, that also support broadband deployment efforts. In addition, there are several programs that either have been initiated or expanded through various COVID-19 relief legislation that provide broadband assistance. Most states also have *their own broadband deployment programs*. While there is information about all of these, there has been to date no coordinated effort that enables service providers, communities, or other stakeholders to efficiently determine which programs they may be eligible for, or to what extent these programs may serve their needs.

3.4.4. *CONGRESS HAS APPROPRIATED FUNDS THAT CAN BE USED FOR BROADBAND DEPLOYMENT.*

As we were concluding the writing of this Plan, Congress passed the “*American Rescue Plan Act of 2021*.” Two provisions related to broadband deployment. First, Congress appropriated \$350 billion to state, local and tribal governments for a variety of uses, but among the eligible uses are “to make necessary investments in “water, sewer or broadband infrastructure.” Second, Congress appropriated \$10 billion to the Department of Treasury to distribute to states, territories and tribal governments to “carry out critical capital projects directly enabling work, education and health monitoring, including remote access. . .” These appropriations provide significant new funding for states, localities and tribal governments that maybe used to directly address availability gaps in their jurisdictions.

3.5. KEY CHALLENGE TO OVERCOME

Universal availability is necessary—but not sufficient—for full digital equity and inclusion. The fundamental challenge to achieving it is primarily one of economics. As is true with other networked infrastructure, such as electricity, water, sewage, and telephony, the costs of making service available to any individual household is largely a function of density. As one would expect, the broadband availability gap is greatest in areas of lowest density. Because service providers in these areas must build over larger areas, while at the same time earning revenues from fewer subscribers, as density declines it becomes less likely that providers can earn enough revenue to cover the costs of deploying and operating networks, including expected returns on capital, to justify the necessary private capital investments.

For over two decades, U.S. policymakers have understood that private capital alone cannot close the availability gap in the most sparsely populated areas of the United States. Federal, state, and public/private partnerships aimed at subsidizing capital and operating costs to overcome these economic realities have, to date, provided more than \$100 billion to extend broadband availability to high-cost areas, through a variety of grants, subsidies, loans, and other incentives to private, public, and private-public providers.

Continual upgrades in the performance, and reductions in the costs, of emerging access technologies may, on the plus side, continue to improve the business case for some areas, making private investment more likely. Still, deploying broadband networks similar in performance to those that are currently serving the vast majority of homes in the United States to areas that currently do not have them will require additional and significant public funding, beyond what Congress and the FCC have established to date for this purpose, including the \$20.4 billion currently budgeted for the Rural Digital Opportunity Fund.

How will we fund the closing of the availability gap? Currently, the most significant source of funding for government-assisted deployments comes from the Universal Service Program, administered by the FCC, which supports deployment in rural areas, connectivity for schools, libraries and health care institutions, and subsidized service for low-income households. That program is funded by communications companies, which pay a percentage of their interstate and international voice revenues, and certain revenues associated with other services, to the FCC's Universal Service Fund (USF). This percentage is called the contribution factor. The contribution factor is adjusted as necessary on a quarterly basis, and is increased or decreased depending on actual and expected participation by qualifying users of all *Universal Service programs*.

The contribution factor has several problems. One is that, as interstate telecommunications revenues go down, the contribution factor must of necessity go up. In the second quarter of 2021, the contribution factor rose to a new high of 33.4 percent. Five years ago, the percentage was only 17.1 percent, and ten years ago, it was 13.6 percent. At some point, the factor will be so high that the system will collapse. Second, some view the fee as a regressive tax, as it applies equally to both high-income and low-income subscribers.

There are also significant challenges in determining just how much public funding will be needed to close the availability gap and how, where, and when funds should be distributed. These challenges are addressed, respectively, in Sections 3.6 and 3.8, below.

3.6. COST TO DEPLOY NETWORKS TO UNSERVED AREAS

The cost to close the availability gap will vary depending on policy choices and actions in four areas that we discuss below. However, given the ever-growing importance of broadband in daily life, we would urge decision makers to adopt *and fund* the most ambitious goals possible to assure digital equity and inclusion.

3.6.1. SETTING THE FLOOR ON SERVICE: BELOW WHAT PERFORMANCE STANDARD IS A HOUSEHOLD DEEMED “UNSERVED” BY BROADBAND SERVICE?

Unlike telephony, electricity, or water—infrastructure-based services that are, by and large, either “available” or “unavailable”—the evolving nature of broadband makes the task of calculating the number of “unserved” Americans a significant policy choice in itself. This is inherent in the Congressional mandate which requires that the Universal Service system assure all areas of the country have “reasonably comparable” service at “reasonably comparable” prices. That statutory language implicitly recognizes that some variation across the country is acceptable, but policymakers do not agree on where to draw the line.

There is no disagreement that the demands of everyday applications on broadband networks have grown over time, and that consumer expectations for serv-

ice quality have increased. Consequently, the minimum download/upload speeds used by the FCC to determine whether fixed terrestrial service is deemed available have been regularly increased as part of the agency’s annual report on deployment. This floor has risen over time from 0.2/0.2 Mbps in 1999, to 4/1 Mbps in 2010, to the current standard of 25/3 Mbps, adopted in 2015. Further, it has also become increasingly important to consider aspects of service quality other than speed to ensure that an available service can indeed meet users’ needs.

As the speed requirements have been raised, a number of locations transitioned from “served” to “unserved,” increasing the availability gap. For example, a location with only 10/1 Mbps broadband service counted by the FCC as served under a 4/1 Mbps standard became unserved when that standard was raised to 25/3 Mbps. Under the 10/1 Mbps standard in effect pre-2015, over 97 percent of the U.S. population would currently be deemed to have an available fixed terrestrial service.

More generally, a rising standard means that even as actions are taken to reduce the availability gap, its closing may only be temporary, as the gap may reemerge if the standard is later raised. Indeed, this has occurred repeatedly, as the Federal government has provided funding to service providers to deploy networks using delivery technologies that could not easily and/or cost-effectively be upgraded as the standard increased. As discussed in the recommendations, policy makers should seek to avoid this treadmill, and to achieve digital equity and inclusion in a more sustainable manner.

3.6.2. ASSESSING THE AVAILABILITY GAP: WHERE ARE THE UNSERVED LOCATIONS AND HOW MANY ARE THERE?

To assess the availability gap under a particular definition of “broadband,” policy-makers need accurate and frequently updated data indicating where the unserved locations both are and will likely remain given expectations about future deployments, both subsidized and otherwise. A process to generate such data is discussed in detail in Section 3.8.1. Here we highlight that the size of the gap will vary greatly based on the performance standard adopted and whether some complying technologies (*e.g.*, satellite service and some high-speed cellular services) nonetheless continue to be excluded for other reasons in calculating “unserved” areas.

Based on FCC deployment findings released in January 2021, as of 2019 the current 25/3 Mbps standard translates to an availability gap that ranges between 0 and 24 million people—24 million if only fixed wired offerings (principally fiber and cable) are counted, 14 million if fixed wireless offerings are added, and no availability gap at all if satellite offerings are also included (Exhibit 3.1).

If download and upload speeds were to be raised, however, the availability gap increases significantly. For example, at 100/10 Mbps, the gap in 2019 would have been 27–30 million people, growing to 42–43 million at a standard of 250/25 Mbps. At the same time, however, improvements over the next three to five years in fixed-wireless performance and, more speculatively, low-earth orbit (LEO) satellite constellations that may be able to offer higher speeds (and lower latency) than current high-earth orbit satellite service, could change the availability equation dramatically in the other direction.

Likewise, including cellular offerings that already meet today’s standard and potential increases (including some LTE and 5G offerings), but which are currently not counted by the FCC’s availability findings, could likewise have a dramatic positive impact on the availability gap. This makes setting and regularly revisiting an appropriate standard, as noted above, increasingly critical, particularly in determining how best to spend limited public funds to support future deployments in unserved areas of the country.

3.6.3. SETTING THE FLOOR ON SUBSIDIZED DEPLOYMENTS: WHAT IS THE MINIMUM SERVICE QUALITY THAT SUBSIDIZED NETWORK DEPLOYMENTS MUST BE ABLE TO OFFER?

Though the speed standards for what the FCC considers as service that constitutes available broadband and the minimum speeds the FCC and other agencies set to qualify for eligibility for public infrastructure funding are often conflated, policymakers may and in fact have used different standards for the two. For example, a rational policy choice may be to consider locations without access to 25/3 Mbps as unserved, but then to subsidize only deployments of higher speeds than the current standard to serve them. Indeed, such a “network leapfrogging” policy could supercharge the broadband-based benefits that closing the availability gap would bring to unserved communities and prove a more cost-effective use of public funds over the medium-to-long term.

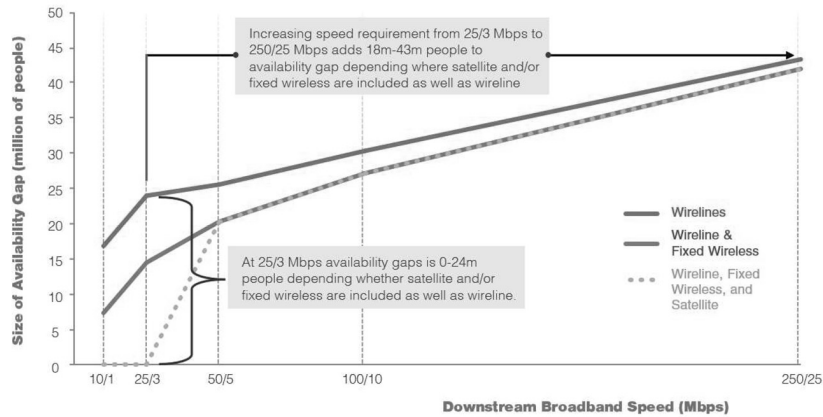


Exhibit 3.1. Size of fixed-broadband deployment gap at different performance standards.

3.6.4. DETERMINING THE COST CURVE: HOW MUCH SUBSIDY IS REQUIRED TO CLOSE—OR NARROW—THE AVAILABILITY GAP?

The cost to close the availability gap in a given geographical area, either entirely or partially, will largely be determined by the three drivers discussed in Sections 3.6.1–3 above, namely: (i) the standard below which broadband is deemed unavailable; (ii) accurate and frequently refreshed mapping to determine the location and number of unserved locations; and (iii) the standard at or above which subsidized networks are required to operate in order to receive funding support.

Assuming analytically sound and evidence-based choices for (i) and (iii), as well as adequate execution of (ii), an allocation mechanism that roughly aligns subsidies with actual costs, and which prioritizes locations that require the lowest subsidy to achieve deployment and sustain ongoing operation,¹ lessons learned from prior broadband deployments lead to two important conclusions about the cost of closing the availability gap:

1. *Tradeoffs are necessary between universality and quality.* Ideally, the budget allocated to close the availability gap will be sufficient to achieve universal deployment, with room for future network upgradability to support expansion of the essential services that must be supported (see Exhibit 3.2). If this is not possible, policymakers face a choice between decreasing deployment to something less than 100 percent or lowering the standard at or above which subsidized networks are required to operate. As noted above, however, subsidizing deployments that may be difficult or impossible to upgrade creates long-term risks, including the risk of stranded assets, and that public funds are not put to their best and highest use.
2. *Tradeoffs should be based on a conscious policy choice.* The most sparsely populated and geographically remote locations to serve are, by definition, the most expensive to serve on a per-person basis. As shown in Exhibit 3.3, variations in density distribution within any reasonably large set of unserved geographies means that the cost per location to close the available gap increases substantially as one gets closer to eliminating the gap entirely. Funding deployment to these locations would require a disproportionately large share of the total budget. Though the ideal policy is to fully close the availability gap, depending on the size of, and potential alternative uses for the deployment budget, a pragmatic second-best alternative may be to close less than 100 percent of the availability gap, while funding cheaper options for the highest-cost areas.²

Policymakers have at times ignored these trade-offs and funded connections at the high end of the cost curve. For example, in 2020, the Rural Utility Service awarded Beehive Telephone Company Inc. a \$2.3 million ReConnect grant to deploy a fiber-to-the-premises network to four residents, four farms and four businesses in Washington County, Utah, and a \$2.7 million grant to deploy a fiber-to-the-premises network to connect 147 people in Elko County, Nevada. These average out to be more than \$33,000 per home passed.

This is not just a Federal problem. For example, the California Advanced Services Fund (CASF), administered by the state's Public Utility Commission, provides grants to network operators, covering up to 100 percent of their total capital costs, for construction of broadband infrastructure in unserved areas of the state. One such grant of nearly \$11 million that went to Frontier Communications in 2019 covered only 222 homes, for an average price per household of over \$49,000.

To further illustrate the tradeoffs that should be examined at the national level, we note that a January 2017 FCC White Paper³ found that with (i) a performance standard defining "unserved" as lacking access to at least 25/3 Mbps-capable fiber-to-the-premises (FTTP) and/or cable service, and (ii) using then-current FCC's deployment data for residential and small business locations, there were approximately 22 million unserved premises. Adopting (iii) a policy of subsidizing only FTTP deployments going forward, the paper found that the total upfront capital expenditures required to fully eliminate the availability gap would be approximately \$80 billion. Critically, however, approximately 85 percent of the gap could be closed while still holding to a FTTP policy for about half that amount. That is, to connect the first 85 percent, or 19 million premises, would cost about \$40 billion, or \$2,100 per location. To connect the last 15 percent of the unserved premises, or 3 million premises (approximately 2 percent of all premises) using FTTP, would cost another \$40 billion, or \$12,800 per location.

Alternatively, connecting the first 90 percent of the gap, or 20 million premises, would cost \$45 billion, or \$2,200 per location, with the last 10 percent, or 2 million premises, costing another \$35 billion, or \$15,600 per location. Further illustrating the shape of the curve, connecting the first 95 percent of the gap, or 21 million premises, would cost \$55 billion, or \$2,600 per location, with the last 5 percent, or 1 million premises, costing another \$25 billion, or \$22,300 per location.

In addition, while the first 85 percent, according to the White Paper, would only require a subsidy for capital expenses, the last 15 percent, even if the capital expense of the network deployment were to be completely subsidized, would require ongoing support for shortfalls in operating expenses.

Though not technology neutral in its viewpoint, a September 2019 study⁴ by the consulting firm Cartesian, on behalf of the Fiber Broadband Association, a trade group whose mission is "to accelerate deployment of all-fiber access networks,"⁵ found that with (i) a performance standard defining "unserved" as lacking access to FTTP (*i.e.*, both using a higher standard than the FCC study, and excluding other access technologies, most notably cable broadband), there will be (ii) approximately 70 million unserved households by 2025. Adopting (iii) a performance standard of only subsidizing FTTP networks, the total investment required to close 80 percent of the gap was estimated to be \$86 billion, but 63 percent of the gap could be closed for about half that amount. (The study did not assess the cost of entirely closing the gap, *i.e.*, it excludes the last 20 percent of households that would be most expensive to connect with FTTP).

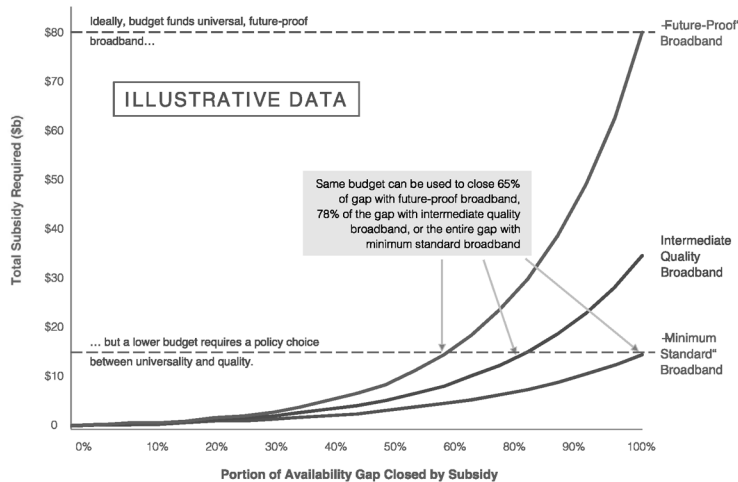


Exhibit 3.2: Depending on budget, a trade off may have to be made between the quality of network deployed and the degree to which the availability gap is closed.

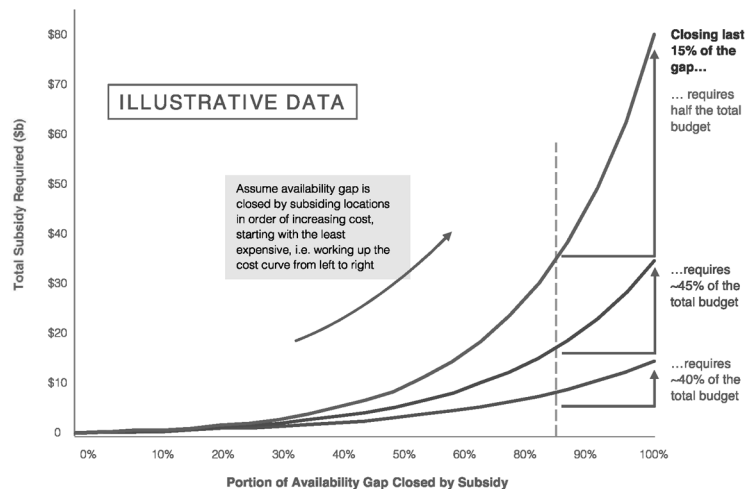


Exhibit 3.3: Even with sufficient budget, given the shape of the cost curve, it may be a reasonable policy choice to stop before the availability gap is completely closed.

3.7. CURRENT PLANS FOR FUTURE NETWORK DEPLOYMENTS

With private and public network operators announcing proposed or planned deployments of new and upgraded broadband infrastructure, it may seem that significant portions of the availability gap will be closed within a few years, largely without the need for public funding support. This section provides a high-level analysis of planned deployments by private and public operators.

1. Existing telephone companies have significant plans for fiber deployments, but even taken together, these plans would leave at least half the customers currently served by these providers using DSL technology without a higher-speed telephone-based offering.

2. Cable operators have already upgraded significant portions of their networks to offer gigabit downstream services and have plans to extend their networks further, but their networks are unlikely to reach more than 90 percent of the U.S. population at the end of decade.
3. The most ambitious plans for extending next generation mobile wireless networks—those stemming from the government requirements on T-Mobile as part of its merger with Sprint—involve an expansion of its 5G cellular network to offer 100 Mbps speeds to 90 percent of the population by 2026. This 90 percent is likely to roughly match the geography of the area covered by cable. Additionally, after recently doubling its C-Band spectrum holdings, Verizon predicts that its mobile wireless networks will cover 175 million people by the end of 2023 and over 250 million people after 2024.
4. Municipalities, utilities companies and other public/private partnerships using a wide range of technical and business solutions plan to bring Internet coverage to specific local areas. Taken together, however, these deployments are unlikely to decrease the number of homes without a fixed terrestrial broadband option by more than 1 percent.
5. A promising technical and business initiative aimed at closing the availability gap, based on currently planned future network deployments, involves the launch of thousands of LEO satellites. While satellites have long been used for rural broadband, the distance between the home and the satellite has been a key impediment for the service, with speeds relatively slow and latency relatively high compared to terrestrial technologies. LEO service has the potential to overcome those limitations and satisfy the requirements of broadband service at home, but there is a level of uncertainty as to its ability to provide an acceptable level of service, particularly if LEOs are used to address the availability gap of a large population.
6. Some believe that 5G fixed-wireless technology offers a compelling new technology for providing rural broadband. Proponents of the technology believe that it can provide 1 gigabit per second service over 4 miles from a cell site. One promising aspect for lowering the cost of 5G deployment, and therefore lowering the price for the service, is the development of Open Radio Access Networks (ORAN). In Chapter 11, we discuss how the government can help can support and accelerate ORAN deployments through R & D efforts.

3.8. OTHER POLICY CONSIDERATIONS

In Section 3.6, we noted some of the trade-offs policy makers have to make to address the availability gap. Here, we note a few others policy considerations.

3.8.1. FUNDING SOURCE.

In Section 3.5, we noted that the current mechanism for funds to close the availability gap is under considerable stress, as it is based on a shrinking revenue stream. With the other programs funded by USF becoming more important in the era of COVID-19 and an economy of remote everything, USF is facing increasing demands. There are several options that have been proposed to address the issue. These include:

- *Change the current funding mechanism.* Alternatives to the current funding mechanism include changing the methodology to assess need based on phone numbers or connections, or broadening the base of assessable revenues to capture a smaller percentage of a larger total. Any effort to reform the funding mechanism for Universal Service will probably take years. Contribution reform effort could also face lengthy legal challenges.
- *Keep the current system but set a cap on total USF annual funding.* Given the shrinking revenue base, this would mean a longer process for closing the availability gap, and could reduce the effectiveness of other Universal Service programs.
- *Keep the current system but do not set a cap on spending.* Given the necessary increase in the contribution factor for this option, this will likely lead to a collapse of the system.
- *Use spectrum revenues.* In the recent debate on authorization for the C-Band auction, and in previous Congressional debates, there were bi-partisan suggestions that the government's share of auction proceeds should be allocated to closing the availability gap or addressing other Universal Service challenges. The idea is that the communications ecosystem that is paying for the spectrum should benefit from the use of those funds to provide services that market forces cannot. Spectrum auctions have produced tens of billions in revenues for the

government but, it should be noted, they are not a routine or dependable source of funds.

- *Use direct Congressional appropriations.* Many economists argue that USF should be funded, like other Federal programs, through direct Congressional appropriations. While there are efficiency and fairness arguments for such a change, there is a fear that a future Congress could simply stop funding the program, either as a conscious choice, or due to a political stalemate on unrelated budget issues.
- *Use a combination of funding sources.* These would include direct Congressional appropriations, special appropriations, such as proceeds from a spectrum auction, and gradually changing the current contribution factor base to something more sustainable in light of market trends.

3.8.2. ELIGIBILITY TO RECEIVE FUNDING.

Providing government funding, whether for a network to address the availability gap, or to subsidize broadband service for a low-income person to close the affordability gap, raises the policy question of who should be eligible to receive the funds. At first blush, it might appear that the same criteria could be used to determine both who should qualify for infrastructure support and for the provision of subsidized service to low-income households. There is, however, a big difference between the two.

First, deployment funding carries an execution risk that the project may not be completed, while the low-income subsidy only goes to firms already offering a qualified service. Second, deployment funding creates a network that likely will not be subject to significant competition, while the low-income subsidy is likely to be used in markets where there are several firms competing for the consumer. We will address the low-income subsidy requirements in Chapter Five, but here we address the requirements for network providers to receive support for infrastructure deployment.

Currently, service providers seeking USF support for infrastructure deployments must be certified as Eligible Telecommunications Carriers (ETC), a designation that essentially limits funding to regulated, facilities-based telephone service providers. Under current law, providers obtain ETC designation from their state, or from the FCC in cases where the state lacks legal authority over the provider. Governing bodies must certify annually that allocated funding is being used as granted by ETCs within their jurisdiction.

The primary justification for the ETC requirement is that government funding should not go to operators who do not meet the kind of requirements that historically applied to common carrier telephone companies, including public interest obligations, in exchange for obtaining a local monopoly to provide telephone service.

The ETC requirement has been criticized as outdated, excluded many providers who are otherwise qualified to deploy infrastructure but who cannot meet the technical definition of an ETC, potentially increasing costs and lowering performance for consumers. Critics of the ETC requirement note that as part of the process of awarding funding, the FCC already conducts an extensive review of the provider's "long-form" application, which ensures the provider is technically and financially capable of fulfilling all relevant funding obligations.

Further, those accepting funding are legally bound by the provision that the funds may be "used. . . only for the provision, maintenance, and upgrading of facilities and services for which the support is intended" (*see* 47 C.F.R. § 54.314) and are obligated to provide service (subject to milestones) of a specified performance level, for a specific number of years, to the locations for which funding is awarded. Assuming a robust audit and/or oversight process, failure to meet these obligations will result in penalties. In that light, the ETC designation or ongoing oversight by states may be redundant, though others argue that having multiple regulators provides additional assurance that companies are complying with the rules.

As a middle ground, relevant ETC requirements could be incorporated into the FCC's long-form review process, making it possible to eliminate a separate ETC requirement. In particular, a service provider seeking FCC funding could be required to certify to the FCC:

- Compliance with applicable service requirements.
- Safeguards to facilitate continuing operations during emergencies, including back-up power sources, the ability to reroute traffic around damaged facilities, and being able to manage traffic spikes during emergencies.
- Compliance with applicable FCC consumer protection and service quality standards.

- Compliance with any specific requirements regarding the terms and conditions of broadband service supported by the government funding.
- Compliance with requirements that it has advertised the availability of the services and the charges for those services using media of general distribution, as required by the FCC.

Carriers' existing ETC designations and obligations—particularly legacy designations and obligations—should also automatically sunset once their funds terminate to avoid imposing costly and discriminatory obligations and burdens on providers. Such legacy obligations can effectively limit budgets that could otherwise support the deployment and maintenance of broadband services.

3.8.3. AUCTION DESIGN AND RULES.

In the last decade, the FCC drew on its long history of spectrum auctions to design rules and procedures to award funding to close the availability gap through competitive auctions. In 2011, the FCC first adopted the strategy of awarding funding on a competitive basis, after an initial period during which incumbent telephone providers would be offered a set amount of money to make relatively modest network upgrades. In areas where the incumbent turned down that initial offer, among others, the agency planned to accelerate competitive auctions. The FCC then finalized rules to implement this strategy for the Connect America Fund.

The FCC conducted the Connect America Fund Phase II auction in 2018, with winning bidders to be awarded approximately \$1.48 billion over a ten-year term, based on commitments to cover about 750,000 unserved homes and small businesses, or about 1.875 million people. That auction focused on areas where incumbents had turned down the initial offer, as well as those areas of the country that the FCC believed would require the highest subsidy.

The Connect America Fund program's 6-year initial support period was scheduled to end in December 2020, but carriers could elect to receive an optional 7th year of transitional funding. The FCC then held an auction for Phase I of the renamed Rural Digital Opportunity Fund (RDOF) in late 2020, which will provide funding over a ten-year period. Nearly 400 entities qualified to bid in the auction, including large and small incumbent telephone companies, competitive fiber providers, cable operators, electric cooperatives, fixed wireless providers, three satellite companies, and consortia. Like the Connect America Fund Phase II auction, the RDOF auction was a multi-round, reverse, descending clock auction with bidders competing nationwide, with some local competition among bidders offering a lower price.

Bidders in the RDOF auction could offer service in one of four speed tiers, with either high or low latency. The speed tiers were 25/3 Mbps, 50/5 Mbps, 100/20 Mbps, and 1 Gigabyte/500 Mbps. By design, bidders in all performance tiers competed against one another, at least in the initial rounds, with a preference built into the auction design for faster service and lower latency. The rules included a complicated system of "weights," which effectively reduced the amount of support provided for slower speed and/or higher latency service.

Only census blocks that were unserved according to the FCC's 2019 broadband availability data by 25/3 Mbps fixed terrestrial broadband were eligible for bidding. Eligible areas also had to be deemed "high cost," meaning the estimated cost to serve was above a threshold that assumed a set level of cost would be covered by end user revenues. The maximum level of funding available for any given area and reserve prices were based on the estimated cost to deploy fiber in the area. Bids represented a percentage of the reserve price, with the weights reducing the effective amount of subsidy for individual bidders.

Ultimately, over 180 entities placed winning bids for \$9.2 billion of the \$16 billion budgeted for Phase I. Collectively, winning bids promised service to over 5.2 million homes and small businesses (roughly 13 million people), which covered more than 99 percent of the locations in the auction. More than 85 percent of the locations received winning bids at the highest speed tier, and virtually all of the remaining locations received winning bid that committed to deliver 100/20 Mbps.

Winning bidders now must undergo a more thorough review of their financial and technical qualifications, and meet certain other requirements, before they receive funding. In January 2021, a bi-partisan group of 157 members of Congress *asked the FCC* to thoroughly vet winning bidders to ensure that they can deliver the broadband service they have promised to unserved consumers.

For the Connect America Fund Phase II auction, the first group of winning bidders were authorized six months after conclusion of the auction, with other bidders authorized on a rolling basis over the following two years. Once authorized, RDOF winning bidders have six years to complete their deployments, with interim milestones beginning at the end of the third year.

The FCC currently plans to hold a second RDOF auction, RDOF Phase II, to address partially served areas and those areas for which there was no winning bid in RDOF Phase I. The FCC said that it would only hold the Phase II auction after it improved its broadband availability data and maps. In December 2020, the FCC *announced* that funding not allocated in the RDOF Phase I auction would be allocated to the RDOF Phase II auction, creating a budget of up to \$11.2 billion.

3.9. POLICY OPTIONS AND RECOMMENDATIONS

While we are generally supportive of several current and proposed efforts to close the availability gap, there are additional policy considerations that should be considered in the interest of achieving digital equity and inclusion.

3.9.1. *THE FCC SHOULD CONDUCT AN EXPEDITED PROCEEDING TO DETERMINE CRITICAL BENCHMARKS FOR BROADBAND.*

As noted above, the FCC's determination of service levels that constitute Advanced Telecommunications Capability (ATC) profoundly affect the determination of which areas are deemed "unserved," and, consequently, how limited funds are allocated to help close the availability gap. The FCC should commence an expedited proceeding to determine:

- What has COVID-19 taught the United States about broadband usage and how that should affect the threshold standard for what the FCC considers the definition of broadband? While we do not express a specific recommendation in this plan for what the definition should be, we believe the evidence is highly likely to demonstrate that the current definition is too low. Since the FCC last upgraded the definition in 2015, broadband usage has significantly increased and the COVID crisis accelerated those usage trends.
- What do technology and market trends indicate about future broadband usage?
- What is the level of broadband service necessary today to utilize essential services, such as education, health care and workforce development today? How might requirements change going forward?
- In light of those findings, what is the level of broadband service below which an area should be considered unserved by broadband?
- In light of those findings, what is the minimum level of broadband service the government should require in funding efforts to bring availability to an unserved area?

In completing this analysis, the FCC should look for guidance to Section 254 of the Communications Act, which defines the principles of Universal Service the FCC is directed to implement. That section states that "consumers in all regions of the Nation . . . should have access to" communications services "that are reasonably comparable to those services provided in urban areas and that are available at rates that are reasonably comparable to rates charged for similar services in urban areas."

"Reasonably comparable" does not necessarily mean identical, but the FCC should choose a level of service below which it cannot be fairly said that consumers are receiving reasonably comparable service. Section 254 also directs the FCC, in establishing the "evolving level" of service that constitutes universal service, to consider, among other factors, "the extent to which" retail services have "through the operation of market choices by customers, been subscribed to by a substantial majority of residential customers."

In establishing and revising the level of broadband service that the government should fund to support an unserved area, the FCC should also seek to balance the objectives of both Sections 254 and Section 706 of the Telecommunications Act of 1996. As noted above, Section 254 promotes the concept of "reasonably comparable service," and directs the FCC to define universal service in part with reference to retail services that have been subscribed to by a substantial majority of residential consumers.

Under Section 706, Congress directs the FCC to act to "encourage the deployment" of ATC to "all Americans" on "a reasonable and timely basis." Congress defines ATC as "with regard to any transmission media or technology, as high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology."

In assessing a forward looking element into the service levels that constitute ATC for purposes of infrastructure funding support, the FCC should include provisions for excess capacity that would reasonably accommodate predicted growth in use and application requirements over the next 10 years, with "excess capacity" and "appli-

cation requirements,” to be defined by the FCC following analysis of user requirements for current and emerging applications and their technical and utilization characteristics. In defining these elements, the FCC should place particular emphasis on service levels necessary to utilize essential services in education, health care and workforce development, as detailed in succeeding chapters.

Through this and related proceedings, the FCC should then establish a set of minimum standards for deployments that qualify for government funds, referred to herein as “Qualifying Networks.”

3.9.2. THE DEPARTMENT OF TREASURY AND THE STATES SHOULD UTILIZE THE NEW APPROPRIATIONS IN A MANNER CONSISTENT WITH THIS PLAN.

As noted above, Congress appropriated funds in the America Rescue Act of 2021 directly to States, territories and tribal entities, as well as to local governments and counties that can be used for broadband infrastructure. Congress also allocated funds to the Department of Treasury to distribute to the states funds that appear to be specifically designated for broadband infrastructure. We recommend that the funds be used in a manner consistent with this plan, including, but not limited, to the following:

- The priority for funding should be to serve unserved areas, according to an upgraded definition of what constitutes broadband, with further prioritization of areas that were unserved under the 25 Mbps/3 Mbps definition of broadband. We note that there are a number of areas where private enterprises already have publicly announced plans to deploy gigabit capable fiber networks. While such areas might currently meet the new definition of unserved, the priority should remain funding in areas where, but for the government funding, Qualifying Networks would not be built.
- The minimum service level required of awardees should be consistent with an updated definition of Qualifying Networks;
- The funds should be awarded through a competitive process with guardrails to ensure that an entity seeking funding has the actual technical, operational, and financial resources necessary to meet its commitments;
- Eligibility to compete for the funds should be consistent with the principles discussed in this Chapter;
- The FCC and NTIA should assist the Department of Treasury, as well as all the different government entities eligible to receive funds for broadband infrastructure projects, with issues related to mapping, definitions, and structuring competitive processes.

3.9.3 THE FCC SHOULD IMPLEMENT THE BROADBAND DATA ACT.

In December 2020, Congress appropriated funding for the FCC to implement the Broadband Data. The FCC should produce maps of fixed terrestrial broadband service availability consistent with the Act by early 2022. While taking care not to harm any privacy rights or confidential business information, the mapping effort should make greater use of existing data private enterprises already have and, where appropriate, use crowdsourcing techniques that provide more accurate and granular information about broadband availability than the FCC currently has. Further, in light of the Congressional appropriations to states and other government jurisdictions for broadband projects, the FCC should seek to accelerate its mapping to assist those governments with their own decision making. While mapping is underway, at the same time, the FCC should complete the necessary proceedings to adopt rules and procedures for the next auction. Upon completion of the mapping, the FCC should release an updated map of areas eligible for funding, solicit applications, and hold an auction to deploy broadband based on the findings of the updated maps.

3.9.4. CONGRESS SHOULD ELIMINATE THE ETC REQUIREMENT AND SIMILAR REQUIREMENTS THAT SUPPRESS SUPPLY.

Congress should instruct the FCC to eliminate the requirement that infrastructure funding recipients be designated as ETCs, and automatically relinquish the designation for existing ETCs in the serving area once their funding ends. Congress should further direct the FCC to incorporate those elements of the existing ETC designation process that remain relevant into its applicant review process, as discussed in Section 3.8.2, and authorize the FCC to consult with appropriate state and local officials, such as state broadband offices familiar with conditions on the ground, so that the FCC is able to develop meaningful audit and oversight capabilities over funding recipients to ensure they perform as expected.

3.9.5. THE DEPARTMENT OF TRANSPORTATION SHOULD STREAMLINE ITS PROCESS FOR GRANTING ACCESS TO FEDERAL RIGHTS OF WAY (ROW).

In the same way that the ETC requirement has suppressed the supply of enterprises interested in obtaining Federal assistance to deploy networks, current Department of Transportation policy that limits access to Federal ROW to certified utilities and communications companies adds unnecessary costs for non-traditional providers who wish to lay fiber or other conduits. The Department of Transportation should create a national policy that (1) provides streamlined access to Federal ROW (e.g., Interstate highway system) for non-utilities or non-certificated operators; (2) simplifies and improves transparency around the permitting process; and (3) creates one point of contact for all approvals required to deploy communications infrastructure.

3.9.6. CONGRESS SHOULD PASS LEGISLATION AND APPROPRIATE FUNDS TO BE DISTRIBUTED BY THE FCC OR OTHER GOVERNMENT ENTITIES THROUGH A SERIES OF COMPETITIVE PROCESSES TO CLOSE THE AVAILABILITY GAP.

We believe the best way to close the availability gap is with a significant one-time appropriation. The following guidelines should be included:

1. The FCC should allocate the funds through multiple competitive processes as described below.
2. Any appropriated funds left over after all auctions are completed should be re-directed to Universal Service programs aimed at closing the adoption and affordability gaps, as discussed in Chapters 4 and 5. Congress should consider the appropriation as a unified effort to achieve digital equity and inclusion. In a well-designed reverse auction, market forces will encourage efficiency, so providing a cushion will not lead to over-expenditures. That cushion, however, should be spent on other programs to address digital equity and inclusion and in particular, to relieve pressure on the Universal Service Fund.
3. Congress should require that the FCC report to Congress on the extent to which it is appropriate to rely on LEOs, next generation VDSL, fixed and/or mobile cellular, or other alternative technologies to completely close the availability gap, or if other technologies will be required to meet the needs of the most remote premises. That report should take into account what the FCC learns from the performance of alternate technologies funded to date.

3.9.7. THE FCC SHOULD HOLD SEVERAL REVERSE AUCTIONS.

The FCC should hold multiple reverse auctions. There are several reasons why this is the preferable approach:

- First, it would allow the FCC to gain real-world experience with the performance of the networks it has financed to date, informing its determination of the service levels alternative technologies are capable of delivering.
- Second, it would provide the agency with market insight into the performance of 5G fixed and mobile networks, as well as the potential of other emerging technologies, such as low earth orbiting satellites.
- Third, a series of auctions will provide a second chance for communities to consider alternatives in the event there is no winning bidder for their area. Unserved communities that are desperate for available service are at different stages of organizing themselves to solve the problem. For some, the answer may be to work more closely with existing or nearby service providers to develop a more attractive business proposition to encourage entry. For others, it may be necessary to explore alternative approaches, including ways to leverage multiple sources of funding from federal, state, and local options.

The FCC should maximize the reach of the Congressional appropriation by considering an auction design that awards funding based on dollar-per-location basis, rather than a bid-to-reserve price ratio. It should prioritize those areas that require the least amount of funding per home.

To close the availability gap as quickly as possible, the FCC should adopt the following schedule:

- In 2022, the FCC should hold a reverse auction designed to assure deployment of a Qualifying Network to 98 percent of premises in the United States. The 98 percent goal is appropriate as it is the point at which the cost curve for connecting each additional premise begins to rise significantly.

- In 2023, the FCC should examine the performance of new delivery technologies, including but not limited to, low earth orbiting satellites and 5G fixed and mobile cellular networks, and develop a plan to provide the final 2 percent of premises in America with a Qualifying Network. To the extent that plan requires additional funding from Congress, the FCC should request, and Congress should appropriate, such funding.
- In 2024, the FCC should hold a reverse auction designed to assure deployment of a Qualifying Network to the final 2 percent of premises.
- The FCC should continually upgrade its availability maps, as noted above, to determine with greater accuracy which areas remain unserved by a Qualifying Network.

3.9.8. *THE FCC SHOULD ADJUST ITS PROCEDURES FOR QUALIFYING TO PARTICIPATE IN REVERSE AUCTIONS.*

We agree with bi-partisan criticism of the FCC’s handling of the recent RDOF Phase I auction. To prevent the risk of having winning bidders who are likely to default on their commitments, we recommend the FCC adopt two additional principles in refining the its requirements for qualification in the next auction.

- The FCC should adopt stronger guardrails for the “short form” review process to ensure that an entity seeking to bid has the actual technical, operational, and financial resources necessary to meet its commitments. In the most recent RDOF auction, the FCC allowed entities to bid anywhere in the nation, subject only to a limitation that their bids not exceed the nationwide auction budget. The FCC used a case-by-case approach to assess the qualifications of applicants to bid. The short-form process—in which applicants seek to qualify to bid in specific states at specific performance tier(s)—should be modified to include more bright-line rules designed to ensure the applicant can to realistically meet the selected performance tier in the desired area(s) of interest. For example, the FCC could establish that no bidder is eligible to bid on more than a specified number of locations or for more than a given dollar amount of support, absent demonstration of operational history meeting a specific threshold. Absent that operational history, the short-form applicant could be required to demonstrate that project financing has been secured up to a set dollar amount, contingent on winning a specified level of support.
- The FCC should not allow enterprises to bid on the basis of unproven technology. In the most recent RDOF auction, the FCC qualified companies to bid that were not existing broadband providers and proposed to use technologies without a proven track record of being commercially offered in the marketplace at required RDOF service levels. In future auctions, the FCC should not allow applicants to bid on selected performance tiers in the absence of real-world market place experience as an existing broadband provider or with those technologies in a variety of relevant markets. At a minimum, there should be some limits on the ability to bid using technologies that lack operational experience.

3.9.9. *THE FCC AND CONGRESS SHOULD INSTITUTE POLICIES TO CONNECT TRIBAL LANDS.*

3.9.9.1. Congress should establish a Tribal Broadband Fund to support sustainable broadband deployment and adoption in Tribal lands.

Grants from a new Tribal Broadband Fund would be used for a variety of purposes, including bringing high-capacity connectivity to Tribal headquarters and other anchor institutions, as well as support for deployment planning, infrastructure buildout, feasibility studies, technical assistance, business plan development and implementation, digital literacy, and outreach. In addition, a portion of the fund should be allocated to provide small, targeted grants on an expedited basis for Internet access and adoption programs. The goal should be deployment of high-capacity infrastructure on Tribal lands that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology.

As part of this effort, Congress should also provide ongoing funding for Federal facilities serving Tribal lands to upgrade and maintain their broadband infrastructure. Consistent with the widely held view that government entities actively seek out and leverage “dig once” coordination opportunities in all areas of the country, all Federal agencies that upgrade network connectivity on Tribal lands should coordinate such upgrades with Tribal governments and the Tribal Broadband Fund grant-making process, exploiting opportunities for joint trenching, laying of conduit, or construction of additional fiber optic facilities. As part of that effort, the FCC, in consultation with relevant stakeholders, should develop a set of best practices that expedite review when infrastructure deployment utilizes existing rights of way,

such as highways, utilities, and rail. In addition, we note that the two appropriations mentioned above in the American Rescue Act of 2021 provide funding to Tribal governments that can be used for broadband infrastructure. The fund we recommend here should be designed in light of the needs after an evaluation of how the Rescue Act funds were utilized.

3.9.9.2. Congress should amend the Communications Act to provide discretion to the FCC to allow anchor institutions on Tribal lands to share broadband network capacity that is funded by the E-rate or the Rural Health Care program with other community institutions designated by Tribal governments.

In recognition of the unique challenges facing Tribal communities, Congress should amend the Communications Act to provide discretion to the FCC to define circumstances in which schools, libraries and health care providers that receive funding from the E-rate or Rural Health Care programs may share broadband network access and capacity that is funded by the E-rate or the Rural Health Care program with other community institutions designated by Tribal governments.

3.9.9.3. Congress and the FCC should develop policies that allow Tribes significant influence over the use of spectrum over their lands.

Congress and the FCC should work together to allow Tribal communities to have an increased ability to utilize spectrum over their lands. This should be based on three principles:

- Require Tribal consultation and approval regarding the use of spectrum over their lands. Because of the way the FCC has allocated spectrum, wireless companies often license the spectrum that lies above Tribal lands, yet do not deploy networks in those areas, allocating their capital to build in more densely populated areas. Native Tribes were promised a level of sovereignty over their lands, and given the importance of spectrum and wireless communications, they should have the right to control that spectrum and deploy it in ways that best suits their needs. Congress should end the FCC's ability to license Tribal spectrum resources without Tribal consultation.
- Require a Tribal Priority Filing Window for every spectrum auction. To the extent that there are frequencies and uses for which automatic Tribal control is not practical, the FCC should create a Tribal Priority Filing Window for licenses over Tribal lands in advance of every spectrum auction, granting Tribes the right to license the spectrum on an exclusive or priority basis.
- Institute a build it or lose it process for future licensees of Tribal spectrum. Because of earlier allocation and licensing of spectrum, private entities hold licenses for significant portions of spectrum over Tribal lands. Often, the economics of serving these lands licensees from building out networks. As noted above, Congress should authorize the FCC to conduct a reverse auction or otherwise determine and provide the support necessary to incent existing spectrum holders to build out their networks over Tribal lands. For future spectrum auctions, the FCC could, with advance notice to all potential bidders, make build-out on Tribal lands a clear and explicit condition of spectrum auctions over these lands.

3.9.10. IMPROVE ACCESS TO INFORMATION ABOUT FEDERAL AND STATE BROADBAND PROGRAMS AND IMPROVE THE APPLICATION PROCESS.

As noted above, according to the *NTIA's Broadband Funding Guide*, there are 59 direct and indirect Federal programs, located in more than a dozen Federal agencies, that support broadband deployment efforts. In addition, there are several programs that have either been initiated or expanded through COVID-19 relief legislation that also provide broadband assistance.

The multitude of these programs raises questions of whether they are being effectively used. Such an analysis is beyond the scope of this effort. But there are obvious problems with current efforts that could be easily addressed and which, if addressed, would improve broadband access.

3.9.10.1. Provide a search engine that enables stakeholders to effectively find the program that serves their needs.

NTIA currently has a search tool, but it only allows one to search for programs to the extent that the parties know the specific program they are looking for. It would be far better if the search engine allowed the party doing the search to enter certain relevant criteria, including the nature of the recipient (schools, libraries, non-profits, local governments, hospitals, etc.), the purpose of the funding (planning, capital expense, adoption, training, etc.), the location of the recipient (rural, exurban, suburban, metro as well as by zip code, as some programs, such as the

Appalachian Regional Council, only service specific regions), and then the search engine would identify relevant programs. In other words, the search engine should be designed to do the searching, rather than forcing the person doing the inquiry to review all 59 programs to determine whether each program's mission and eligibility criteria fit their situation.

3.9.10.2. Require agencies to update their information.

A quick review of the information makes clear that many entries are out of date. There should be a requirement for agencies to periodically update the information and to do so immediately when there is a significant event, such as Congressional action allocating new funds, that affects the nature of their programs.

3.9.10.3. For programs other than the those supported by the Universal Service Fund, create a common application that enables those applying for funding from more than one program to save time and effort on the application process.

The FCC process is unique in a number of ways but there is significant overlap between many of the other Federal programs. NTIA should review the applications for those programs and develop a common application so that the applicant can fill out one, instead of multiple forms, and apply for multiple programs simultaneously. Further, NTIA should standardize, to the extent possible, the application process to ease the administrative burden on applicants. As an illustration, the Department of Education has an online Financial Aid Form application, known as the FAFSA, that is common to all eligible institutions.

3.9.10.4. The website should be designed so that states can also add their broadband related programs to the database.

Several states have programs that subsidize broadband deployments. To assist communities seeking assistance, it would be useful to enable states to add links to their programs, so that potential providers can assess the full menu of available support.

CHAPTER 4.

CLOSING THE BROADBAND ADOPTION GAP

4.1. PROBLEM STATEMENT

The COVID-19 pandemic has wrenched much of our day-to-day life, learning, work, and socializing from the familiar world of the physical to digital equivalents many users had never heard of only a few months ago. One pernicious side-effect of the crisis has been to expose both the extent and the growing cost of persistent digital inequities. It is hard to live your life online if you do not have or know how to use a computer, and don't subscribe to a broadband service that connects it to the rest of the world.

The previous chapter reviewed gaps in broadband availability and the mechanisms that would solve them once and for all. But solely as a function of the number of people affected, the biggest divide remains that of adoption. The Federal Communications Commission estimates that at the end of 2019, the number of Americans with no available broadband service was less than 14.5 million, though other sources suggest the number may be as high as 40 million. Even at the higher end of that range, however, the number of Americans with available service who do not subscribe to broadband is significantly greater. This adoption gap afflicts a wide range of people and geographies, but is most acute among low-income households, those with lower education levels, older adults, Black Americans, Latinxs, and Native Americans.

Extensive public and private surveys suggest that, since 2010, there are three principal causes of the adoption gap, broadly speaking: problems of affordability, digital readiness, and perceived relevance.

The first is obvious. Thirty-four million Americans living below the poverty line struggle with the most basic necessities of life—rent, food, electricity and water, transit, and basic communications. Adding the cost of monthly broadband service makes adoption untenable, even as it becomes increasingly clear that Internet service is more a necessity than a luxury. Issues of affordability are discussed in the next chapter.

Digital readiness constitutes a more complex and interconnected set of issues. For many, including some who can and some who cannot afford a retail broadband service, adoption is complicated by a lack of computing equipment and training. This includes the ability to use a computer or tablet device, to access and use specific services on the Internet, and to set up and maintain connectivity equipment, including modems, routers, and home Wi-Fi networks. It also includes having the training

necessary to overcome the fears, many of them justified, of personal and financial security while using online services.

Longitudinal surveys from both the NTIA and Pew Internet Research have consistently shown that a significant obstacle to broadband adoption is the belief, well-founded or otherwise, that the Internet is not “relevant” to the lives of many non-adopters. But on the problem of relevance, we think the pandemic has changed the environment, perhaps permanently. For now, and perhaps well into the future, education at all levels will take place online. Health care, crucial for all Americans but especially for poorer and older residents and those living in remote locations, has suddenly and irreversibly moved to virtual platforms, with doctor visits, prescriptions, and basic wellness services being delivered largely without physical interaction. Employment opportunities—everything from job training to applying for work and, in many cases, performing one’s job—require broadband. Government services and civic engagement are also increasingly more easily and effectively accessed online, not to mention social engagement, entertainment, shopping, news, and information. Any remaining doubts about the relevance of digital life, and the importance of digital equity and inclusion, have been largely erased.

But the COVID-19 pandemic has not so much created these new realities as it has accelerated paradigm shifts in daily life that were already well underway. The computer is a source of continual disruption across nearly all industries and activities precisely because it offers the promise, if used wisely, of lowering a remarkable range of costs, of improving efficiency and capacity, of equalizing quality of service and opportunity, and of opening doors to new forms of human creativity, innovation, and interaction. In the reaction to many unfortunate but undeniable negative side effects of the digital age, we may forget just how much the technology has and can continue to improve the quality of life, especially for the most disadvantaged populations.

The pandemic, too, has brought that truth into stark focus. With the attention of both policymakers and their constituents acutely fixed on the importance and promise of digital equity and inclusion, the stars have aligned as never before for bold action to close the adoption gap. We must seize it.

4.2. VISION

The Communications Act of 1934 and the Telecommunications Act of 1996 both articulate a vision for communications policy that has taken on renewed importance today: universal and affordable communications services that are widely available.

Those acts were written in an era in which voice communications was dominant. Today, of course, voice is only a small part of the communication ecosystem. That, too, was a shift contemplated by Congress. As the 1996 Act noted “Universal service is an evolving level of telecommunications services that the Commission shall establish periodically under this section, taking into account advances in telecommunications and information technologies and services.” The Act also says that the definition of universal service should be functional, based on what is essential to education, health, and public safety, as well as whether a “substantial majority” of the public has subscribed to certain telecommunications services.

Our vision, therefore, is to reach levels of adoption among low-income households, less educated adults, older Americans, Black Americans, Latinxs, and Native Americans, and other groups who suffer from persistent digital inequity and exclusion, that equals adoption rates seen today among those for whom affordability and digital readiness are not barriers.

4.3. GOALS

By the end of 2023, all K–12 students should be active users of broadband services at home that enables them to attend virtual classes and complete their homework. They should also have devices capable of facilitating all learning activities.

By the end of 2023, all low-income persons on government health plans should be active users of broadband service in their residence that enables them to access the full range of telehealth services.

By the end of 2023, all persons who become unemployed should be active users of broadband service in their residence that enables them to engage in job training, job searching and applying for a job.

By the end of 2021, the Federal Government should establish an Office of Digital Equity (discussed further below in Section 4.5.1) with a mandate to coordinate across agencies and initiatives to increase home broadband adoption, and otherwise advocate for policies designed to achieve digital equity and inclusion.

By the end of 2023, all Americans should have access to programs and services that enable persons to be digitally ready.

4.4. THE CURRENT SITUATION: UNDERSTANDING DIGITAL ADOPTION GAPS

4.4.1. DEFINING BROADBAND ADOPTION.

We define “broadband adoption” to mean subscribing to an available Internet access service, where an individual or family lives, that is always available, offers full access to all parts of the Internet, is secure, and with speed, data, latency and other technical characteristics sufficient to use essential applications such as, but not limited to, education, health care, and employment, along with the necessary equipment and training to benefit from their full potential.

That definition suggests the need for policymakers to devise, enact, and fund solutions to address the persistent adoption problems noted above: affordability, digital readiness, and perceived relevance. Ensuring that today’s non-adopters have the economic means to subscribe to broadband will erase a major obstacle; untangling and solving the many elements of digital readiness ensures that the newly connected can reap the same benefits of digital technology as long-time users, and will likely address remaining questions of relevancy.

A few features of adoption are worth highlighting. Together, fixed terrestrial broadband and large-screen computers or tablets allow users to carry out most on-line tasks with little or no constraints. But there is also the question of what kind of data package is sufficient to enable a household to achieve that full participation in digital life we discussed in Chapter 1. A 2018 study on low-income households who use Wi-Fi hotspots for schoolwork shows that they consume 60 gigabits of data per month—above the 50 GB monthly threshold that many mobile carriers have before slowing access speeds for non-unlimited data plans. Wireline broadband plans generally have either no limits or limits of 1,024 GB per month—well above the average data usage of 344 GB per month they experienced at the end of 2019. Since the pandemic, some mobile data plans have eased constraints on data caps, including within the context of “single payer” agreements between localities and service providers. These solutions are neither generally available nor guaranteed to be permanent but, as discussed later, next generation cellular and other wireless services may at some point change the analysis. In addition, we cannot lose sight of the fact that mobile network wireless hotspots offer unique advantages, including ease of set-up and pack-and-go Internet for students with multiple home locations.

We also believe that non-smartphone devices are an important element of adoption. Though widely adopted and constantly improving their functional abilities, smartphones today are not a *full cure* for problems of digital equity and inclusion. As the pandemic unfolded and citizens sought unemployment benefits, for example, 86 percent of state unemployment websites failed tests for “mobile friendliness.”

4.4.2. CURRENT DATA.

In chapter 3 we analyzed the state of broadband deployment and relied largely on FCC data, which, as discussed, has significant flaws but still provides some insight into the availability gap. For this chapter, we are focused on understanding adoption gaps across socio-economic lines. For these purposes we believe the American Community Survey offers the best information to analyze these gaps and we explain the choice to emphasize wireline connections below.

According to the American Community Survey’s analysis of 2019 census data, 70.8 percent of U.S. households have adopted broadband at home using a wired service—using either cable, fiber, or DSL. This is captured in the ACS question that asks whether “you or any member of this household have access to the Internet using a . . . broadband (high speed) Internet service such as cable, fiber optic, or DSL service installed in this household?” It is worth noting that a “yes” answer to this question does not necessarily mean that the respondent has service that meets the FCC’s current definition of ATC, which requires speeds of 25 Mbps download and 3 Mbps upload. DSL, an older technology that some providers are hoping to phase out, may not satisfy the FCC’s definition.

The 2019 ACS figure of nearly 71 percent represents an increase from 67.3 percent in 2016, when ACS first began to report on broadband adoption. ACS also reports on non-wired services, finding in 2019 that, including cellular and satellite-based broadband services, adoption levels reached 86.4 percent, an increase from 81.4 percent in 2016. In addition to the 70.8 percent of those who have wireline subscriptions, cellular-only users make up nearly 12 percent of Internet adopters, with satellite and other broadband technologies making up the rest.

This means that as of the end of 2019, ACS data suggest that nearly 36 million households, or approximately 96 million people, were not subscribing to broadband at home using a fixed terrestrial service (henceforth “broadband at home”). As noted

in Chapter 3, of course, the lack of an available service plays a significant role in that finding.

Incomplete network availability data make it difficult to say with precision how many non-subscribing households could have broadband at home but currently do not. If between 80 percent and 90 percent of all households have access to at least one available fixed terrestrial service, however, then between 29 to 32 million households, or approximately 69 to 78 million people, do not subscribe to broadband at home for reasons other than network availability.

4.4.2.1. Socio-economic factors and geography.

According to 2019 ACS data, six demographic characteristics correlated strongly to whether or not a household adopts broadband:⁶

Income. One of the most highly correlated variables in adoption of broadband at home is household income. For households with annual incomes of \$50,000 or less, 54.1 percent have adopted broadband at home, compared to households with annual incomes exceeding \$75,000, where 84.3 percent have adopted broadband at home. Non-adopting U.S. households with annual incomes below \$50,000 (representing 42 percent of all U.S. households), equate to 21.9 million households, or approximately 59 million people. [FIGURE 1]

Age. Only 59.0 percent of individuals aged 65 and older have adopted broadband at home, with a particularly sharp drop off for those older than 74, where only 48.7 percent have adopted broadband at home. This leaves 21.6 million older Americans without broadband at home, or 13.3 million households. [FIGURE 2]

Households with school-age children. 77.3 percent of households with children under the age of 18 have adopted broadband at home. This is higher than the national average, reflecting in part the relative youth of these households. Some 16.9 million children under age 18 are estimated to live in households without broadband at home—or approximately 8.4 million households.

Geography. Fewer rural Americans have adopted broadband at home, in part, as noted in Chapter 3, due to a lack of an available fixed terrestrial service. In non-metropolitan areas, only 62.4 percent of households have adopted broadband at home, compared to 72.3 percent for those living in metropolitan areas. In 2019, 7 million households in non-metro areas had not adopted broadband at home.

Given the concentration of population in metro areas however, there are far more urban households who have not adopted broadband at home—an estimated 29 to 32 million households, or approximately 69 to 78 million people.

Race and Ethnicity. Broadband adoption has historically been adopted at higher rates by white Americans relative to Black Americans, Latinxs, and Native American/Alaskan Natives. The 2018 ACS data show this trend continuing. Compounding the problem, adoption rates for Black American, Latinxs, and Native American/Alaskan Natives are significantly lower even when controlling for household income, age, educational attainment, and other factors. [FIGURE 3] Specifically, broadband at home has been adopted in the following percentages:

- 82.2 percent of Asian Americans
- 72.2 percent of whites
- 65.7 percent of Latinxs
- 61.8 percent of Black Americans
- 60.3 percent of Native Americans or Alaskan Natives.

Educational attainment. Broadband adoption also correlates strongly with higher levels of educational attainment. Those with higher levels of educational attainment may, for example, have jobs that require digital skills, not to mention the income to afford broadband at home. For those with high school degrees or less, their jobs or income levels may contribute to lower levels of adoption for broadband at home. Each of the three groups below make up about one-third of the adult population. The data shows [FIGURE 4]:

- 54.4 percent of those with high school degrees or less have broadband at home.
- 72.5 percent of those with some college experience or an associate degree have broadband at home.
- 84.8 percent of those with college degrees or more have broadband at home.

4.4.2.2. Other demographic groups of special interest.

Government services are increasingly available and essential as Internet applications. But in many cases, those who would most benefit from the timesaving and convenience of e-government services have not adopted broadband at home. As of

2018, adoption rates lagged behind the average among beneficiaries of the most important government programs:

Health insurance. For Americans using Medicare as their health insurance, 57.9 percent have adopted broadband at home, a figure which tracks with the adoption rate for those age 65 or older. 52.1 percent of Medicaid beneficiaries have adopted broadband at home. Military personnel and their dependents with Tricare health insurance show higher rates of adoption of broadband at home, at 74.4 percent. Veterans have adopted at a lower rate, at 65.3 percent. [FIGURE 5]

Government benefits, including Supplemental Security Income (SSI) and Supplemental Nutrition Assistance Program (SNAP). These benefit programs are available to households whose gross incomes are no more than 130 percent of the poverty level (for SNAP), while SSI eligibility depends on age, income, and disability status. For adults eligible for either of these programs, only 52.5 percent have adopted broadband at home.

People with disabilities. Computers and many web-based interfaces are difficult if not impossible to use by people with certain visual, movement, and learning disabilities. Adults with disabilities have low rates of adoption, with 54.4 percent having broadband at home.

4.4.2.3. Broadband in Urban America—an analysis of cities

As noted in at home. As a result, much of the attention and funding directed to closing the availability and adoption gaps in recent years has been focused on rural America.

But given the higher concentration of population in urban areas, far larger numbers of non-adopting households are located in cities than in the more sparsely populated areas of the country. For example, a recent analysis of broadband adoption in *Baltimore, Maryland* showed that 40 percent of residents had not adopted broadband at home as of 2018. Among the poorest (those with annual household income of \$25,000 or less), 66 percent had not adopted. And one in three Baltimore City households did not have either a desktop or laptop computer.

One common denominator in these and other examples is poverty. Urban areas with high rates of poverty have low rates of broadband adoption.

There are also data that suggest lower adoption rates occur in neighborhoods that are more segregated. A possible explanation for that result pertains to network effects—or how behavior by others in one's social networks influence behavior. The likelihood of someone adopting broadband at home is higher if nearby peers have already adopted. This dynamic first emerged for computer adoption generally in the late 1990s, when *research showed* that people were more likely to buy computers if a large share of their friends had one, even when controlling for demographic and socio-economic factors.

The following table shows broadband adoption at home in the 50 cities with the lowest adoption rates, along with rates of poverty and residential segregation. The data on residential segregation comes from the *Diversity and Disparities* project at Brown University; a residential segregation figure of 50 or more indicates high levels of residential segregation. Figures on poverty use table *S1701* from the Census Bureau. The Appendix presents data for 100 of the largest U.S. cities. For all 100 cities, the average adoption rate for 2019 is 72.2 percent, and the poverty rate for 2019 is 15.9 percent. The broadband adoption rate for all 100 cities is 68.1 percent for 2016.

Table 1: 50 cities with *lowest* broadband adoption at home

City	Wireline Broadband 2019	Wireline Broadband 2016	Poverty 2019 Rate	White-Black residential segregation	White- Hispanic residential segregation	Number of households
Birmingham, Alabama	52.4%	55.7%	25.2%	62.6	52.4	93,300
Detroit, Michigan	53.7%	42.7%	30.6%	59.2	59.4	267,139
Cleveland, Ohio	54.0%	50.8%	30.8%	69	37.5	171,632
Memphis, Tennessee	55.8%	50.1%	21.7%	67.9	54.5	254,423
Newark, New Jersey	58.6%	53.5%	25.2%	71.2	47.4	102,155
Rochester, New York	59.3%	56.5%	25.3%	51.6	54.1	87,679
Baltimore, Maryland	59.4%	58.4%	20.2%	68.9	45	242,694
Des Moines, Iowa	62.8%	64.0%	15.5%	36.5	34.4	91,045
New Orleans, Louisiana	63.0%	56.9%	23.2%	67.6	40.6	151,753
Stockton, California	63.0%	60.8%	15.4%	37.2	40.5	96,149
Knoxville, Tennessee	63.4%	63.3%	21.8%	47.8	25.9	83,492
Toledo, Ohio	63.9%	61.2%	25.2%	53.4	33.9	121,022
Glendale, Arizona	64.0%	65.1%	18.9%	39.1	48.1	81,065
Winston-Salem, North	64.5%	66.5%	19.7%	50.4	48.2	94,884
Little Rock, Arkansas	65.2%	57.9%	12.3%	58.6	57.7	80,063
St. Louis, Missouri	65.6%	62.2%	19.1%	65.3	35.5	146,779
Indianapolis, Indiana	65.8%	59.2%	15.8%	62.3	18.8	340,639
Irving, Texas	65.9%	70.2%	10.3%	36.6	33.6	83,345

City	Wireline Broadband 2019	Wireline Broadband 2016	Poverty 2019 Rate	White-Black residential segregation	White- Hispanic residential segregation	Number of households
Milwaukee, Wisconsin	65.9%	57.9%	22.4%	70.1	60.7	232,176
Buffalo, New York	66.2%	57.8%	28.8%	65.9	43.4	109,163
Las Vegas, Nevada	66.6%	68.7%	14.9%	32.4	48.3	235,628
Baton Rouge, Louisiana	66.6%	64.0%	23.7%	66.9	38.1	82,097
Oklahoma City, Oklahoma	66.7%	66.0%	15.8%	46.7	51.6	249,615
Dallas, Texas	66.8%	57.7%	17.5%	66.1	61.1	518,998
Louisville, Kentucky	66.9%	68.8%	15.4%	66	36.2	252,784
Fresno, California	67.1%	63.9%	23.2%	42	42.4	172,815
El Paso, Texas	67.3%	62.9%	18.6%	30.8	39.7	223,076
Tucson, Arizona	67.6%	66.4%	19.1%	25.6	47.2	217,993
Richmond, Virginia	67.7%	58.4%	18.9%	63.5	60.8	89,878
Jacksonville, Florida	67.9%	68.0%	14.1%	47.5	22.4	349,171
Lubbock, Texas	67.9%	68.2%	20.6%	47.2	39.5	99,104
Kansas City, Missouri	68.3%	64.4%	15.3%	62.2	47.1	209,768
Chicago, Illinois	68.3%	64.1%	16.4%	82.5	60.9	1,080,345
Tulsa, Oklahoma	68.4%	63.7%	18.6%	49.8	44	163,801
Norfolk, Virginia	68.5%	63.2%	17.9%	50.8	26.8	88,387
Houston, Texas	68.5%	61.8%	19.7%	68.6	60.4	876,504
Akron, Ohio	68.7%	56.4%	23.6%	48.6	31.1	83,821
San Antonio, Texas	68.8%	61.8%	16.8%	43.1	46.8	512,273
Albuquerque, New Mexico	69.1%	64.7%	16.0%	28.5	37.1	227,179
Phoenix, Arizona	69.6%	66.4%	15.6%	49.9	57.7	586,878
Wichita, Kansas	70.2%	65.1%	14.2%	49.3	38.6	153,454
Corpus Christi, Texas	70.4%	64.7%	17.25	40.2	39.8	119,184
Philadelphia, Pennsylvania	70.4%	60.6%	23.3%	73.4	62	619,505
New York, New York	71.3%	69.3%	16.0%	81.4	65.8	3,211,033
Salt Lake City, Utah	71.3%	66.8%	14.4%	40.5	55.4	81,839
Oakland, California	71.7%	69.9%	13.9%	51.9	66.9	168,413
Tacoma, Washington	71.9%	67.2%	12.6%	31.5	33.1	87,016
Bakersfield, California	72.0%	69.9%	14.6%	43.4	39.2	116,558
Greensboro, North Carolina	72.4%	60.6%	19.7%	56.6	49.2	118,046
St. Paul, Minnesota	72.5%	66.3%	15.9%	43.4	44.1	110,782

A striking pattern in Table 1 is the correlation between poverty and broadband adoption at home. For all 100 cities, there is a strong negative correlation of -0.79, which means that the higher a city's poverty rate, the lower its rate of broadband adoption at home. The same is true for residential segregation. For White-Black segregation, the negative correlation is -0.47; for White-Hispanic residential segregation, the figure is -0.32. Of course, there is a strong association between poverty and residential segregation, but multivariate analysis suggests that both variables have significant and negative associations with lower rates of broadband adoption at home.

Although poverty and residential segregation rates play a role in explaining differences in broadband adoption between different cities, it is possible that public policy decisions can make a difference. Evidence at the city level is, at best, suggestive. Detroit, for example, has shown significant growth in broadband adoption at home since 2016, during which time it has developed a digital inclusion plan and allocated funding to support digital inclusion programs. Philadelphia, despite high levels of poverty and residential segregation, has seen a 10-percentage point gain in broadband adoption at home since 2016, likely attributable, in part, to the establishment of a public-private digital inclusion alliance to promote digital literacy. By contrast, the City of Baltimore, before the pandemic had no digital inclusion initiatives, and Baltimore's broadband adoption rates have changed very little since 2016.

4.4.3. WHAT EXPLAINS GAPS IN HOME BROADBAND ADOPTION?

Three factors figure prominently in understanding the adoption gap: affordability, digital readiness, and perceived lack of relevance.

Affordability. Analysis of national data on broadband adoption at home shows that income is a highly significant predictor of whether a household subscribes to service. For non-broadband subscribers, the threshold for what constitutes "affordability" has no single answer. Research has shown that large portions of non-subscribers set their preferred price at zero. This may reflect extreme poverty on their part, and/or a lack of skills or interest in using the Internet.

Qualitative research shows that those unwilling to pay anything for broadband may be well aware of its value; but they lack the ability to pay for service or the devices necessary to access it. Most discounted service offerings aimed at non-adopters are \$20 per month or less, with a couple of programs including Comcast's Internet Essentials and Access from AT&T at \$10 per month. From the public interest perspective, an important objective is to ensure that discount Internet offers are widely available, that information about them is aggressively disseminated, and that sign-up processes for potential users is not burdensome.

Chapter 5 reviews the affordability problem in further detail and provides policy options for addressing the challenge. But while affordability is a significant issue, it is not a binary problem. That is, it is not a simple question of whether one can or cannot afford home broadband service and the devices needed to access such service. There are related financial issues, such as access to credit. For example, one of the most important service developments encouraging new subscribers to mobile broadband services was the introduction of pre-paid services, which mitigated credit issues limiting the market of potential subscribers. There are similar pre-paid options for broadband at home, such as with Internet Essentials which does not require a credit check, but these prepaid programs have not had the impact that such options have had in the mobile market. The situation is described in more detail in Appendix 4A.

Digital Readiness. The second substantial constraint on broadband adoption at home is often referred to as “digital readiness.” Digital readiness is an evolving concept, generally referring to a set of skills associated with using information and communications technology (ICT) to find, evaluate, create, and communicate information. It is the sum of the technical skills and cognitive skills people employ to use computers to retrieve information, interpret what they find, and judge the quality of that information. It also includes the ability to communicate and collaborate using the Internet, which, of course, requires access to devices.

A lack of digital readiness reflects the uncertainty that new Internet users bring to their online experience. One component of digital readiness are the skills required to access and use Internet services, including for example, how to operate a computer or upload a resume. Another component of digital readiness is trust, including confidence that the information they provide and access online is reliable. Concerns about the level of misinformation and, in particular, applications that can use personal financial information in problematic ways in today’s Internet and social media environments, underscore the importance of information and media literacy in digital readiness programs.

Finally, there can be no digital readiness without access to computers and other devices, and the ability to use them. A lack of digital readiness limits the abilities of those new to the Internet to fully utilize online services. It may also affect some experienced users, who may struggle with new applications and services.

The prevalence of digital readiness issues is substantial. In the U.S., *one-third of adults* have low levels of digital skills for emerging applications, such as the Internet of Things. As many as *half of the population* exhibit some level of reluctance to use online educational resources, because they lack confidence on how to use such applications. In health care, inexperience with technology leaves more than *one-third of older adults* unable to have video visits with their doctors during the pandemic. In workforce preparedness, *large numbers of workers* lack the digital skills needed to perform many well-paying jobs that are in demand.

A lack of overall digital readiness fuels strong levels of demand for digital skills training, something that is unlikely to subside after the pandemic. A *2017 Pew Research Center* study, for example, found that 60 percent of all adults were interested in training on how to use online resources to find trustworthy information. Another 54 percent of all adults expressed interest in training on how to better use the Internet, computers, and smartphones generally.

Perceived lack of relevance. Some non-adopters of broadband service may view the Internet as something that is not relevant to their lives. Research findings vary on the degree of this problem. The NTIA finds that *58 percent of non-adopters* cite “don’t need” or “not interested” as a reason they do not subscribe.

However, qualitative research *finds that*, when digging into survey responses that cite lack of relevance, many respondents cite cost of service and insufficient digital skills as significant issues for them. Other *surveys* reach different conclusions, finding cost is the leading reason for non-adoption among 34 percent of respondents, with “don’t need/not interested” cited by 22 percent.

Whatever the precise magnitude of the problem, significant numbers of non-adopters may benefit from information demonstrating the utility of being online. An unintended positive consequence of the pandemic may help address this. Online access, for example, can greatly facilitate finding out where to get the vaccine and signing up for a shot. The pandemic has also resulted in social isolation for some people—particularly older adults—which makes the consequences of not having online access more evident to people. The significant levels of non-users citing lack of relevance points to an informational component addressing barriers. Addressing informational needs in the context of broadband adoption is something addressed below as part of encouraging digital readiness.

4.5. CLOSING THE DIGITAL READINESS GAP

The recommendations in this section will help non-adopting Americans develop basic digital skills, lowering barriers to broadband adoption and encouraging full utilization.

We are not starting from a blank slate. In the past several years, digital readiness initiatives throughout the country offer templates for successful solutions to the adoption gap. Examples include:

- The Community Technology Network, which was established in 2008 and which has grown to serve the Bay Area in San Francisco and Central Texas.
- Older Adults Technology Services (OATS) which, as its name suggests, address the technology and digital skills needs of older adults.
- A number of local public libraries and community colleges, which have spear-headed programs to provide their patrons digital skills training, often with an aim at job training and entrepreneurship.
- The National Science Foundation, which has funded a “rec-to-tech” project in Baltimore and Pittsburgh, which uses city recreation centers as sites to train young people in digital skills that they can take to the workforce.

4.5.1. ESTABLISH AN OFFICE OF DIGITAL EQUITY.

Congress should establish an Office of Digital Equity to coordinate across Federal agencies and initiatives to increase adoption of broadband at home, and to advocate for policies designed to achieve digital equity and inclusion. As its principal role aligns with community development, we think it best suited for the Department of Commerce, but it could also be housed within the Departments of Education, Housing and Urban Development, or the FCC.

The Office would be the principal entity charged with meeting broadband adoption goals and tracking progress towards those goals. The Office would take on the responsibilities of the *American Broadband Initiative*, with an expanded scope of functions and new funding to help meet the goals.

Specifically, the Office would:

- Expand and coordinate digital equity strategies and efforts within and among federal, state, and local governments, including coordinating with all stakeholders of the new affordability programs discussed in Chapter 5, to assure administrative ease and efficiency;
- Incentivize participation in digital equity strategies from all sectors, particularly employment training, education, health care, finance, and retail;
- Coordinate and streamline Federal grant programs aimed at increasing broadband adoption and network deployment;
- Work with private and public affordable housing owners and agencies to implement programs aimed at increasing digital literacy in their communities
- Establish or support existing local “hotlines” to answer digital literacy questions;
- Conduct research, if possible, with National Science Foundation Funding, on the effectiveness of digital equity strategies, including:
- Identifying a threshold of affordability for discount home broadband offers. This should take into account household expenditures for other necessities including (but not limited to) rent, food, utilities, and medical care, and;
- Evaluating the effectiveness of programs designed to increase broadband adoption.
- With a working group of public and private experts, create and continuously update a digital skills framework for adult education, workforce, and training programs;
- Encourage Internet service providers (ISPs) to develop and strengthen voluntary low-cost broadband plans for low-income populations, with emphasis on aligning eligibility for low-cost offerings across providers;
- Encourage hardware, device, and other equipment manufacturers, software companies, and device-related service providers to make available low-cost laptop and computer purchase plans and essential software and other online tools for low-income populations.

4.5.2. ESTABLISH A NATIONAL DIGITAL LITERACY PROGRAM.

Congress should launch a National Digital Literacy Program that creates a workforce of “Digital Navigators, described further below, increases the capacity of local

digital literacy programs, and creates an Online Digital Literacy Portal of up-to-date training resources.

4.5.2.1. Congress should create a Digital Navigators Corps to conduct training and outreach in non-adopting communities.

Congress should create a Digital Navigators Corps composed of skilled experts working to solve a wide range of identified adoption issues—including home connectivity, devices, and digital skills—on behalf of local community members, either remotely or in-person. Members of the Corps should include personnel from social service agencies, libraries, health centers, community-based organizations, private sector, volunteers, and other anchor institutions.

Many existing digital literacy training programs, both in the United States and abroad, rely on face-to-face training provided by trusted experts within local communities. Whether using intergenerational training that allows youth committed to community service to train senior citizens, peer-to-peer training that enhances connections among seniors or youth, or mentoring models under which skilled college graduates reach out to currently unconnected citizens, these programs help non-adopters become more comfortable with technology while also fostering volunteers' commitment to community service.

State and local efforts like these offer valuable lessons for digital literacy services delivered at scale. A national program can build on these successful models and ensure the expansion needed to address digital literacy barriers. Specifically, Congress should direct the NTIA and the Corporation for National and Community Service (CNCS) to create the Digital Navigators Corps. In collaboration, NTIA and CNCS can explore best-practice models for building and managing the Corps, leveraging lessons learned from existing programs like AmeriCorps, Senior Corps and Learn and Serve America. CNCS can also leverage its own experience with the digital television transition, during which it made sure that AmeriCorps members were in communities across the country helping individuals become more comfortable with unfamiliar technology.

The Corps should target segments of the population that are less likely to have adopted broadband at home, including low-income individuals, racial and ethnic minorities, senior citizens, people with disabilities, those with lower education levels, people in rural communities, those on Tribal lands, and people whose primary or only language is not English.

4.5.2.2. The Office of Management and Budget (OMB), in consultation with the Institute of Museums and Library Sciences (IMLS), should develop guidelines to ensure that librarians and Community Based Organizations (CBOs) have the ongoing training they need to help patrons use next-generation e-government applications.

As government services increasingly go online, libraries shoulder responsibility for helping people learn how to use these online services. Already, eighty percent of libraries report that they help patrons use e-government applications. However, some librarians say they have been overwhelmed by patrons seeking help with government services and online programs, particularly in an emergency or with a new government program, such as Federal Emergency Management Agency forms following Hurricane Katrina and Medicare Part D paperwork. These librarians also say that they did not receive suitable training or information from the agencies that provided the e-government solutions.

OMB, in consultation with IMLS, should develop and update guidelines to help Federal agencies develop e-government services that leverage the role of public libraries and CBOs as delivery points for new services and programs as well as for next generation technologies. Agencies should work with IMLS to develop online tutorials for using government websites and toolkits for librarians who help patrons use online government services.

4.5.2.3. Congress should fund an Online Digital Readiness Portal.

Every American should have access to free, age-appropriate content that teaches digital skills and enhances digital readiness. This content should be available in a user's native language and should meet the accessibility requirements applicable to Federal agencies under Section 508 of the Rehabilitation Act. To achieve this, Congress should fund the creation of an Online Digital Readiness Portal (ODRP), and the relevant government agencies (including but not limited to the NTIA, FCC, Department of Education, Department of Labor, the Department of Health and Human Services, the Bureau of Indian Affairs, and the Department of Housing and Urban Development (HUD)) should oversee the portal and partner with the technology industry and education sector to approve or create high-quality online lessons that users can access and use at their own pace. The collaboration between the agencies

and non-government partners should be similar to efforts that have produced the online safety resources available through OnGuardOnline.gov.

Offline resources will be important complements to this online content. They should be made available for printing or ordering, and distributed by libraries, CBOs, and other community organizations.

The ODRP should build on the collaborative model that has been successful in programs such as the HUD Community Outreach Partnerships Program, which brings institutions of higher education and community partners together to revitalize communities, including the Historically Black Colleges and Universities (HBCUs), Hispanic-Serving Institutions Assisting Communities (HSIACs), Tribal Colleges and Universities (TCUs) and Tribal Libraries. In addition to their educational missions, through the Community Outreach Partnerships Program, these organizations provide links to community employment assistance, childcare, health care information, fair housing assistance, job training, youth programs and other services. As crucial community institutions and trusted sources of information, HBCUs, HSIACs and TCUs could also serve as ambassadors to promote digital literacy and other national digital priorities. HUD and NTIA should also use existing relationships—for example, with state broadband offices—to distribute outreach materials associated with the OLDLP.

The OLDLP should be evaluated after two years to assess its impact. The evaluation should consider, among other metrics, the total number of individuals accessing the portal, the number of individuals from specific target populations accessing the portal, and the effectiveness of different offline resources in promoting the portal.

4.5.2.4. Reinvigorate Federal efforts to support digital literacy efforts through revitalizing the www.DigitalLiteracy.gov platform.

The Obama Administration launched DigitalLiteracy.gov to serve as a resource to practitioners delivering digital literacy training in their communities. The platform aggregated best practices, organized available educational content, and increased coordination among stakeholders. Unfortunately, the platform was not appropriately maintained, and has now been disabled. A revitalized and continually upgraded central website, administered by the NTIA, can serve as the foundation for digital equity and inclusion efforts, assisting with and improving the efforts of state and local digital inclusion organizations.

4.5.2.5. Integrate information outreach into digital readiness initiatives.

Providing information is key to addressing the view of some non-adopters that the Internet is not relevant. Conveying to such persons that the Internet is a pathway to a vaccine, a doctor, or a grandchild, bundled with access to digital skills and affordable service plans, can increase adoption. The Federal government's current emergency broadband benefit program, which provides a \$50 per month subsidy for low-income households during the pandemic, does not include funds for outreach to communities. As the policymakers contemplate future broadband adoption policy interventions, providing funding for outreach (to, for example, community anchor institutions and community non-profits) can help address the relevance barrier.

4.5.3. CONGRESS SHOULD APPROPRIATE FUNDS TO SUPPORT DIGITAL EQUITY PLANNING AND DIGITAL INCLUSION INITIATIVES.

Congress should appropriate funding for development of adoption focused state, local, and Tribal digital equity plans, and competitive state and national grant programs for digital inclusion initiatives. State level planning provides an opportunity to identify existing assets, and for stakeholders to prioritize digital equity needs. One approach would be to pass and fund the proposed Digital Equity Act, which would spend \$250 million over each of the next five years for state level planning and digital inclusion grants.

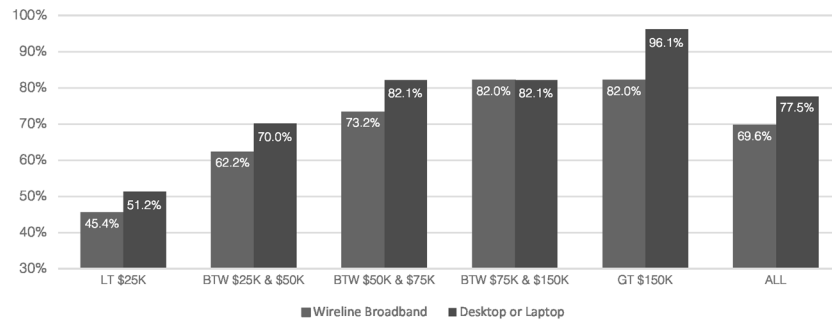
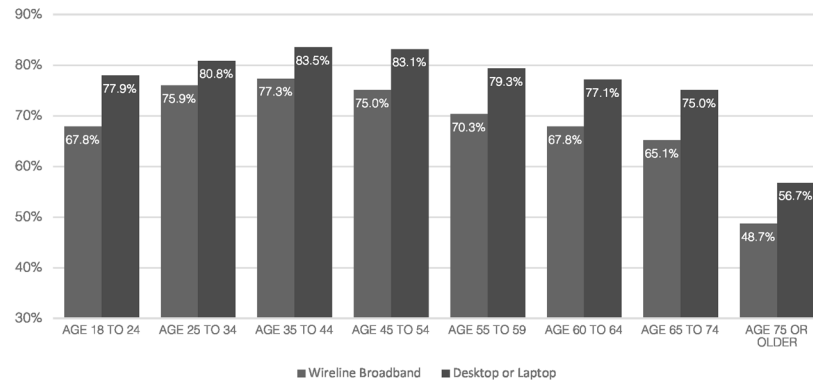
FIGURE 1**HOUSEHOLD WIRELINE BROADBAND & COMPUTER ADOPTION BY INCOME (2018)****FIGURE 2****HOUSEHOLD WIRELINE BROADBAND & COMPUTER ADOPTION BY AGE (2018)**

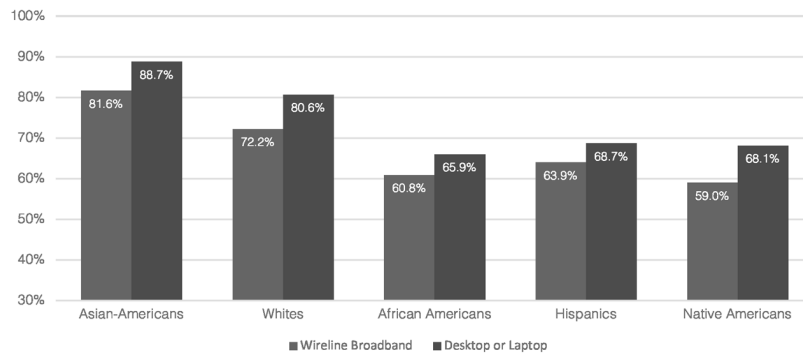
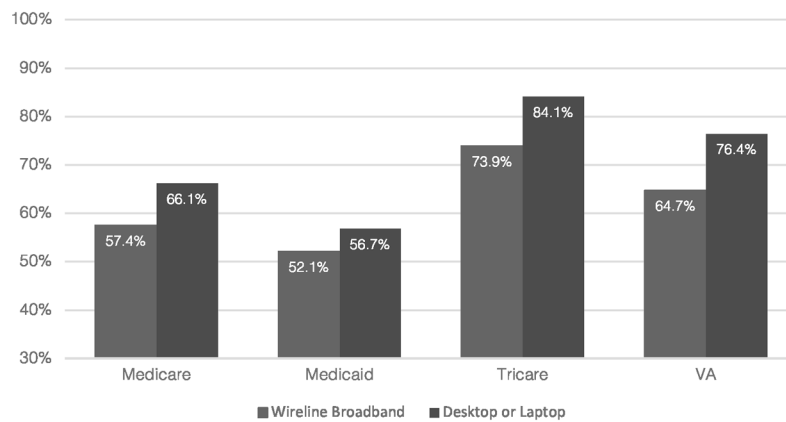
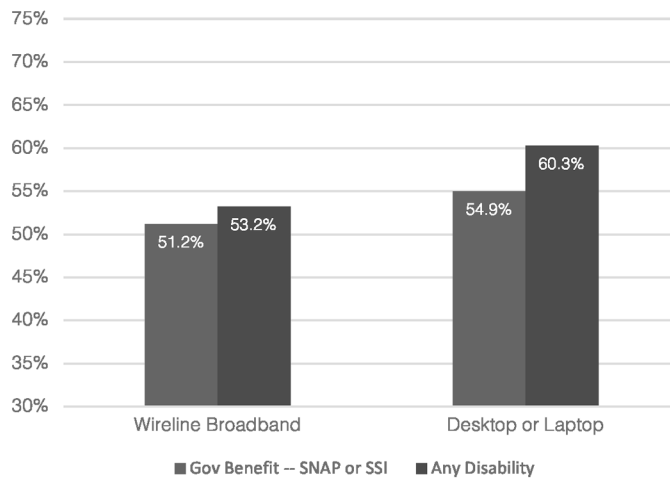
FIGURE 3**HOUSEHOLD WIRELINE BROADBAND & COMPUTER ADOPTION
BY RACE & ETHNICITY (2018)****FIGURE 4****HOUSEHOLD WIRELINE BROADBAND & COMPUTER ADOPTION BY
GOVERNMENT HEALTH INSURANCE PROGRAM (2018)**

FIGURE 5**HOUSEHOLD WIRELINE BROADBAND & COMPUTER ADOPTION BY GOVERNMENT HEALTH INSURANCE PROGRAM (2018)****CHAPTER 5.****CLOSING THE AFFORDABILITY GAP****5.1. INTRODUCTION**

In the previous two chapters, we described the state of broadband in the United States and identified the principal barriers to achieving digital equity and inclusion: an availability gap and an adoption gap, with the principal issues limiting adoption being affordability, digital readiness, and perceived relevance.

In this chapter, we describe the principal government effort to-date aimed at addressing affordability—Lifeline—and why that program has not succeeded in closing the affordability gap. Based on that analysis, we propose a plan to eliminate the affordability gap, based on a new Federal program that we call Lifeline+. Adopting and funding Lifeline+ would yield significant public benefits, creating a more equitable and inclusive economy and society by expanding broadband utilization overall, and closing specific gaps in digital education, health care, and workforce development.

5.2. CURRENT PUBLIC AND PRIVATE EFFORTS TO ADDRESS AFFORDABILITY**5.2.1 THE LIFELINE PROGRAM.**

The principal Federal government program aimed at closing the adoption gap is Lifeline. The Reagan-era FCC created the program in the mid-1980s to help low-income Americans pay for local telephone service. Lifeline lowers the cost of monthly service for eligible consumers by providing subsidies to service providers on behalf of consumer households.

A number of states also have their own programs to assist low-income persons afford communications services. While many provide critical funds, none is robust enough to solve the affordability gap we discuss here.

Further, as this Plan is focused primarily on Federal policies, we will not discuss individual state efforts in this chapter.

In 2005, the FCC made two major reforms to Lifeline. First, it ruled wireless carriers could be eligible to provide phone service. Second, it eliminated a requirement

that eligible providers own the facilities they use, permitting companies like TracFone, which leases wireless services from “facilities based” providers, to become major providers of Lifeline.

In 2015, the FCC reformed the program again, this time to allow the subsidy to be used for either broadband or voice service, or bundles that include broadband service. Given the cost of home broadband and the need for phone service, however, most Lifeline users continue to apply the subsidy to low-cost mobile service.

To participate in the program, subscribers must have either an income that is at or below 135 percent of the Federal poverty guidelines, or participate in certain Federal *assistance programs*, including SNAP, Medicaid, or SSI. The Lifeline subsidy on qualifying monthly broadband service for eligible subscribers is \$9.25 per month, with up to an additional \$25 per month for qualifying Tribal subscribers. The subsidy for voice service is \$5.25 as of December 1, 2020; absent further action by the FCC, no subsidy will be provided for voice starting December 1, 2021. As of October 2020, 8.2 million households participated in the program.

5.2.1.1 Criticisms of the current program.

There is widespread agreement that Lifeline in its current form does not achieve the goals of digital equity and inclusion, nor is it designed in a way that would make that outcome likely over time. As a practical matter, the program has become a subsidy for a low-end mobile Internet service, not for broadband at home. Even with its more limited reach, the program has been less than successful. As of January 2021, only 8.7 million of the 33.2 million eligible households participate in the program.

Generally, there are three explanations for why the system is failing. First, many believe that the level of subsidy, at \$9.25, is insufficient to subscribe to broadband service at home. A related argument is that when forced to choose between broadband at home or a mobile service, many low-income persons prefer the mobile service.

Second, many believe that not only is the cost of the monthly service a barrier to an in home subscription but in addition, the cost of a device capable of doing work, school work, telehealth or other such functions is a barrier to adopting.

Third, many believe that lack of information about the program and undue complexities in the administrative process for applying for it results in the vast majority of eligible households forgoing participation.

Fourth, many believe that because companies that offer Lifeline services must satisfy state requirements for “Eligible Telecommunications Carriers” (ETCs), the number and quality of Lifeline providers is artificially reduced, effectively limiting participation to niche voice communications providers. The ETC requirement unnecessarily undercuts market dynamics that, with more providers offering competitive products, could lower the costs and increase the quality of Lifeline programs.

5.2.1.2 The current funding mechanism.

Lifeline is part of the broader Universal Service Program (USF), which also subsidizes network infrastructure deployment in sparsely populated or geographically challenging areas, where expected returns on the capital necessary to build a broadband network do not justify private investment. USF also subsidizes equipment and network connections costs for anchor institutions (schools, and libraries facilities, generally known as the “E-Rate Program”), and rural health care facilities. *According to the Universal Service Administrative Co.*, which collects funds and services USF programs, total USF disbursements have held steady at approximately \$8.5 billion over the last three years.

As discussed in Chapter 3, the sole funding mechanism for providing all USF programs to an increasing number of homes, institutions, and individuals has significant structural problems, and, it is generally agreed, is unsustainable. Under FCC rules, revenue to support USF programs, including Lifeline, is paid by providers of certain voice communications services, primarily but not exclusively voice services, most of whom pass this cost along to consumers. The providers pay USF a prescribed percentage of the amount their customers pay for interstate and international services. That rate, known as the “contribution factor,” is *adjusted quarterly* based on rising or falling demand from eligible participants in USF-funded programs. There are several issues with this mechanism:

Not sustainable or expandable. Due to declining revenues for the services on which the contribution factor is based, the percentage assessed from consumers has continued to increase. Ten years ago, the rate was 12.9 percent. By 2017 it had risen to 16.7 percent. The 2Q21 contribution factor is 33.4 percent. As the associated revenue goes down, the contribution factor goes up, encouraging providers and their

customers to substitute other services that are not assessed, putting the funding mechanism and the entire USF program into a death spiral.

Unfair regressive tax. Not only is the system structurally unsound, but it is also unfair. Since the percentage is applied regardless of the economic status of the consumer, it is in effect a regressive tax, hitting low-income consumers harder than more affluent users.

Support for broadband service has raised legal questions. In addition to these problems, some have raised legal concerns. *The DC Circuit Court of Appeals*, in remanding parts of the FCC's 2017 Restoring Internet Freedom Order (RIFO) called on the FCC to explain the statutory basis for continuing Lifeline subsidies for broadband even though the FCC no longer classified broadband as a telecommunications service.

In its order responding to the remand, the FCC explained its finding that it has legal authority under section 254(e) of the Act to distribute Lifeline support for broadband service provided by ETCs, and that that authority is undergirded by the clear intent of Congress in Section 254(b) and elsewhere that universal service efforts should increase access to advanced services.

While the FCC addressed the issue, the situation demonstrates another potential question in relying on the current funding mechanism to support expanded efforts to close the affordability gap.

5.2.2. NEW PUBLIC SECTOR EFFORTS TO ADDRESS THE AFFORDABILITY GAP.

As we were preparing this Plan, Congress, for the first time, directly appropriated funds for broadband subsidies for low-income persons. This effort, part of a COVID-19 relief package, the *Consolidated Appropriations Act of 2021*, allocated \$3.2 billion for an Emergency Broadband Benefit Program (EBB) to connect low-income households. The funds will be used to reimburse broadband providers up to \$50/month per low-income household it serves, or \$75/month if the household is on Tribal land. The Act also authorizes reimbursements to providers of up to \$100 for providing the household with a connected device (desktop, laptop, or tablet computer), if the household contributes \$10–\$50 for the device. Households are only eligible for one device.

The EBB program is temporary, to last no longer than six months after the COVID-19 crisis ends. Funds will be administered through the FCC. Congress gave the agency sixty days to determine the details of administering the program.

On January 4, the FCC released a *Public Notice* seeking comments on how to best implement the program. Notably, the EBB program is not limited to ETCs, and the FCC, through its Notice proposes to establish an “expedited process” to approve non-ETC providers who wish to participate. The FCC process also asked several questions about devices, family or personal eligibility and verification, and how best to publicize the program. The FCC adopted *its order* on the program on February 25.

In addition, as part of the *American Rescue Plan of 2021*, Congress appropriated \$7.17 billion in funding to augment the E-Rate program. The appropriation makes available funds for elementary and secondary schools and libraries to provide Wi-Fi hotspots, modems, routers, and Internet-enabled devices. While E-Rate funding traditionally has only gone to connect educational institutions, this money could be used to fund Internet services for students, staff, and library patrons. Congress instructed the FCC to promulgate regulations concerning the allocation of these funds within 60 days of the bill's passage.

While both programs represent one-time appropriations, they also provide opportunities for the FCC and our country to consider new ways of addressing the affordability gap.

5.2.3 PRIVATE SECTOR EFFORTS TO ADDRESS THE AFFORDABILITY GAP.

In addition to government efforts to close the affordability gap, there are also a significant number of voluntary private efforts to connect low-income persons from leading fixed and mobile broadband providers. These efforts have already resulted in millions of homes being connected to broadband at a greatly reduced price. Such efforts should not be considered a replacement for public programs, but their availability and operation provide important lessons for the design of new governmental programs aimed at overcoming barriers to adoption, including affordability.

Key findings from our review of these private sector efforts include:

- While private efforts are not available everywhere, companies offering low-income programs cover over 90 percent of American homes.
- Because of overlaps in footprints, two or more low income offers are probably available to about 50 percent of homes, though again, the eligible number of

homes is likely to be less. Still, it is likely that a material percentage of non-adopting households are eligible for an available program.

- The private efforts offer broadband at significantly discounted prices. While the average price for a retail broadband service is almost \$70 a month, the cost of the low-income programs—which may be offered at lower speeds than the average service—ranges from \$10–\$20 a month.
- The private efforts are not integrated into public programs aimed at closing the affordability gap. For example, several of the largest private providers of broadband programs for low-income households are not and could not easily become ETCs, and therefore cannot take advantage of the current Lifeline subsidy to further reduce the cost of participation. Further, even some ETCs that offer a private low-income program do not seek to offer those services in coordination with Lifeline, citing numerous administrative difficulties.
- The private efforts are not currently utilized to any significant degree in partnership with public programs aimed at closing the affordability gap.
- As noted earlier, the FCC has not updated its view on the functional requirements, such as speed, for accessing services. In that light, there is uncertainty as to the extent to which these private programs meet those needs. It is worth noting that while these programs may not be subject to the same market dynamics as competition for customers able to pay standard retail rates, there are forces in the market that drive improvements in the offering. For example, Comcast recently doubled its download speed for its Internet Essentials program from 25Mbps to 50Mbps.
- Similarly, while some of the programs have won significant praise for their outreach efforts, there is uncertainty as to how effectively some of these programs are marketed to eligible households. Again, on this issue, there has been no public assessment by the FCC or other public entity.

In addition to private retail efforts, there are several wholesale programs, such as that offered by AT&T and Verizon, which offer discounted services to local school districts whose administrators can in turn use to offer a low-cost service to students. These programs, however, generally limit the use to educational purposes only. If such efforts are expanded to achieve the goals of a reformed low-income subsidy program, it would be important to examine any limitations and modify such restrictions.

5.2.4. *THE CHALLENGE: THE CURRENT SYSTEM CANNOT MEET CURRENT, LET ALONE FUTURE, NEEDS.*

Existing public programs, even supplemented and supported by private efforts, have and will continue to fail to close the affordability gap. The two most obvious improvements—increasing the monthly subsidy and connecting all eligible households—would certainly be welcome, but both would require dramatic increases to Lifeline’s budget and major changes to its operating model. In any event, increasing the contribution factor to accommodate either, let alone both, would collapse the system. Further, the EBB is a temporary fix for a problem that will continue to exist after the COVID-19 crisis.

There are other limits to Lifeline. The program does not include support to acquire devices, which some of the private offerings do include, along with other forms of technical support not part of Lifeline. Some of the discounted mobile broadband plans, for example, come with data allowances that may be insufficient to complete essential tasks, especially for families with K–12 children or medical problems, or during times of job training or job searches. Many of the non-financial factors described in Chapter 4 are also not adequately addressed by any existing program.

5.2.4.1. The Federal government has a history of setting national baselines for the delivery of critical public services that are now heavily reliant on broadband access.

In proposing a reform or restructuring of low-income broadband programs, it is worth considering, at the outset, the value of setting baseline requirements and identifying essential services, factors that regulators have historically relied on in program design. With particular relevance to workforce, health care and education, we note that:

- Workforce. The primary governmental support for unemployed persons is provided at the state level but receives at least partial funding from the Federal government. Beyond financial assistance, public and private services provide education and job training. Many of these services can best be utilized through the Internet, especially during the current medical emergency, as many of the

2,400 in-person Federal American Jobs Centers, for example, remain closed. As a visit to *the website for the federal program* implicitly acknowledges, Internet access is essential for taking advantage of the training services and being about to obtain benefits, as the site has the following message: “Nearly 2,400 AJCs nationwide help people search for jobs, find training, and answer other employment related questions. *COVID-19 update: Please note that many AJCs are temporarily closed or shifted to virtual services; you will see a special note in red if we have information about closures or alternative services.* If you need to file for unemployment insurance, please visit *Unemployment Benefits Finder.*”

- **Health Care.** The Federal government is the largest purchaser and provider of health care and health insurance in the country. It does so principally through Medicare, which covers over 60 million persons 65 years old or older, as well as covering some younger persons with disabilities; Medicaid, a partnership between the Federal and state governments to provide health care coverage to low-income persons, covering over 75 million people, and services to over 9 million veterans, administered by the Veterans Health Administration, the largest component of the Department of Veterans Affairs. Here too, the government’s ability to deliver such services is increasingly dependent on the persons they cover having broadband at home. For example, In February 2020, *less than 1 percent of Medicare primary care visits* utilized telehealth. By April of that year, that number was 43.5 percent.
- **Education.** The Federal government has long-supported local schools. In the 1940s, for example, Congress recognized an obligation to make sure that all children attending school had a hot lunch. The National School Lunch Act provides nutritionally balanced, low-cost or no-cost lunches to children each school day in public and nonprofit private schools, and in residential childcare institutions. The Department of Education also provides direct funding to elementary and secondary school with economically disadvantaged students (the Elementary and Secondary Education Act (*ESEA*) Title I and children with disabilities through the *Individuals with Disabilities Education Act (IDEA)*.

Increasingly, many of the most basic tasks associated with workforce development, health care, education, and other critical aspects of daily life can be done most effectively, efficiently, and reliably when done online. As discussed further in Chapter 8 on workforce development, for example, a *2012 study* showed broadband use at home or in a public place such as a library reduced the probability that an unemployed person will stop their job search entirely by 50 percent relative to people who are unemployed and do not use Internet, while a *recent study from the Philadelphia Federal Reserve* found “promoting broadband device access and digital literacy training to households where an individual may have lost employment is crucial to ensuring people remain attached to the labor market following such an event.”

As discussed further in Chapter 9 on health care, here too, the government’s ability to deliver such services is increasingly dependent on the persons they cover having broadband at home. For example, In February 2020 *less than 1 percent of Medicare primary care visits* utilized telehealth. By April of that year, that number was 43.5 percent.

Not only has the use of telehealth increased, but the range of services has also increased as well. But there is a significant gap in who can utilize such services. According to *research from University of Pittsburgh and Harvard Medical School*, more than 41 percent of Medicare patients lack access to a desktop or laptop computer with a high-speed Internet connection at home. Almost 41 percent do not have a smartphone, and more than 26 percent don’t have access to either.

Finally, as discussed in Chapter 10 on education, the inability to keep up with schoolwork or learn Internet skills at a young age puts students at a significant disadvantage in the future. *94 percent of low-income school districts* assign homework that is online, which makes Internet access a necessity for students. Yet *research based on the most recent census data* shows that 15–16 million K–12 students lack adequate access to the Internet and/or a device on which to do school work at home.

COVID-19 has now transformed a serious “homework gap” into a full-fledged learning gap, as schools are forced to offer only or mostly virtual learning. Computers and broadband at home have become essential not just to complete homework, but for all or almost all classroom and school-related learning. While COVID-19 has shined a spotlight on the need for students to have connectivity in the homes, schools close for reasons other than the pandemic, including winter weather, extreme heat, wildfires, flooding, hurricanes, and tornadoes, which all cause extended disruptions to in-school instruction, and likely will increase in the future.

This transformation of in-person services long considered essential to digital alternatives necessitates access to an appropriate device and broadband at home, a trend

that will only increase in the future. Policymakers will need to continuously adapt to new developments and challenges, creating programs that assure access to what are considered essential services by all citizens, most of all those facing significant obstacles due to financial, social, cultural, language, or other causes.

To the extent that lawmakers have long-supported the in-person versions of these essential services and activities through a variety of mechanisms, programs, and funding models, we believe it is now time to include an appropriate level of support for their Internet-based equivalents. Broadband-based delivery and full utilization of these essential services must become part of the DNA of the respective public, private, and public-private collaborations involved in, at a minimum, workforce, health care, and education. It is both the reason closing the availability and affordability gaps is so critical to achieving digital equity and inclusion, and the most compelling way, at the same time, to remove any remaining issues of relevance in closing the adoption gap.

Reforming current public programs to assure broadband adoption to utilize these essential services, described below and in more detail in succeeding chapters, is among the most critical recommendation in this Plan for improving digital equity and inclusion.

5.3. RETHINKING AFFORDABILITY: FIRST PRINCIPLES.

We need a program to ensure that everyone can afford broadband at home to access essential services. By design and practicality, the existing Lifeline program will likely never be more than a lower-end mobility and voice program. While Lifeline certainly can and should be improved, and while mobile and fixed service capabilities are converging, we believe there remains a material difference between the lower priced mobile data and voice services we want everyone to have for purposes of emergency communications and other critical uses, and the broadband at home necessary for an entire household to participate in 21st century life.

We believe it is time for a new national strategy for universal broadband, one that supports the goals of digital equity and inclusion. That program, which we describe below, should be grounded in several basic principles, including:

5.3.1. DON'T TAKE AWAY EXISTING BENEFITS.

The purpose of the new programs is to expand broadband adoption and utilization. In so doing, the program should not take away benefits that people already have and rely on. We should not force low-income households to choose between a mobile service and broadband at home.

5.3.2. ADDRESS THE MOST URGENT NEEDS FOR BROADBAND AT HOME, INCLUDING BROADBAND FUNCTIONALITY, APPROPRIATE DATA PLANS, AND DEVICES THAT ENABLE THE DESIRED ACTIVITY.

Building on existing benefits, the new programs we propose must at a minimum provide for broadband at home that can support the essential services we have identified. Specifically, the new program must empower those who become underemployed or unemployed to train, search, apply, and interview for new jobs using the same online tools that have long since been adopted by higher-income workers, support K–12 students with the connectivity. Further the new program needs to provide devices recipients need to attend classes and complete schoolwork, and allow recipients of government health benefits to take full advantage of a growing range of online services.

5.3.3. ALIGN GOVERNMENT INSTITUTIONAL INCENTIVES.

As currently designed, Lifeline has created an inherent conflict of interest for those charged with administering it. On the one hand, the FCC is tasked with administering Lifeline to assure that low-income persons have access to communications services. At the same time, the agency is constrained by a regressive contribution factor. The more people it signs up, the higher the prices paid for voice services by everyone, especially the poor, even though most of the universal service funding goes to programs other than Lifeline.

A new program should seek to eliminate that conflict, by ensuring a more sustainable, stable, and progressive funding mechanism.

In doing so, it is worth considering ways in which in the achievement of digital equity and inclusion can promote, rather than conflict, with the goal of providing essential services in the most cost-effective manner possible. It might make sense for some institutions, public and private, to fund the new broadband services we propose because doing so, in the long run, would pay for itself in the form of reduced costs and improved service levels. Widespread use of online health care, for example, could reduce the incidence of post-natal complications for infants and chronic medical conditions for adults, which not only means better health outcomes for indi-

viduals but also lower long-term costs for public health. Similar improvements in workforce development and education are likely.

5.3.4. DESIGN PROGRAMS TO BE POLITICALLY SECURE.

To the extent that consumers or taxpayers will ultimately pay for the programs we propose, public perceptions of the benefits of digital equity and inclusion matter deeply. To the extent that the program we propose provides broadband for specific uses and essential services that the public sees as creating public benefits, ongoing support for the program is likely to be more sustainable.

5.3.5. STANDARDIZE PROGRAM REQUIREMENTS TO THE EXTENT POSSIBLE.

While the new program should be designed to meet different needs and use cases, it should be engineered to standardize eligibility, funding, participation, and reimbursement requirements, to the extent practical, to improve customer access and protection, lower administrative costs, and encourage participation by the maximum number of broadband providers, private and public.

5.3.6. MAINTAIN TECHNOLOGICAL AND PROVIDER NEUTRALITY.

The new program should be focused on achieving digital equity and inclusion. For reasons of practicality, timing, and budget, achieving those goals requires programs that are inherently technology neutral. So long as new or emerging technologies can support the effective use of the essential services we have identified, providers using those technologies should be eligible to participate in the programs. Any provider, or combination of providers, who can satisfy the requirements for delivering broadband at home should be considered eligible for participation in the programs. This could include public, private, and public/private partnerships, and both for-profit and not-for-profit enterprises. Technology and provider neutrality will not only close the remaining gaps more quickly and efficiently, but it will also encourage competition, lowering costs and improving choice.

5.3.7. DESIGN THE PROGRAM SO THAT THE GOVERNMENT CAN LEARN AND ADJUST TO REAL-LIFE, MAXIMIZING BENEFITS WHILE MINIMIZING COSTS AS TECHNOLOGIES AND MARKETS EVOLVE.

Any new programs will encounter unexpected issues. Further, markets and technology will change, producing impacts on the program that are not foreseeable today. This is especially true for digital innovations, which evolve quickly and often unpredictably. In that light, the programs we propose should be flexible, and designed to provide necessary information to those administering the program to be able to quickly modify the programs to maximize benefits while minimizing costs.

5.3.8. TAKE ADVANTAGE OF OVERLAPPING BROADBAND USE CASES TO IMPROVE THE EFFICIENCY OF THE PROGRAM.

As discussed throughout this document, those who currently have not adopted broadband could use broadband for multiple purposes with public benefits, including workforce development, healthcare, and education. The program should be designed to enable all such uses.

Further, the program should be designed to utilize those overlapping uses to lower costs and improve efficiency. For example, there is a significant overlap between the population that needs broadband at home for education and for healthcare. For 2019, *Medicaid reported* a total of 71.4 million people covered by the program (which includes the 6.7 million on the Children Health Insurance Program (CHIPs)). Roughly half of all people on Medicaid or CHIPs are between the ages 0–19. That translates to 34.7 million children on Medicaid/CHIPs. The American Community Survey reports that 66 percent of households with children under the age of 18 have broadband at home. That means approximately 11.8 million children (age 0 to 19) covered by Medicaid/CHIPs live in 5.9 million homes without broadband at home. The “homework gap,” meanwhile, is 16.9 million kids, or 8.4 million households.

We believe that there is, deservedly, significant support for a new program to address the homework gap. We support any effort to do so. We note, however, that funding programs to eliminate the homework gap, while paying huge benefits to society in the long term, do not result in near term savings. On the other hand, providing a broadband benefit to low-income families to enable access to telehealth services, as discussed in Section 5.4.5.7 and Chapter 9, can result in both improved health outcomes and reduce the cost of health care services, cost reductions that could be used to provide the broadband benefit.

Here, a broadband benefit utilizing the savings to the Medicaid/CHIPs health insurance system could cover about 70 percent of those currently suffering from the homework gap. Using such a benefit to address the homework gap would not solve

the whole problem. There would still be approximately 5 million school children living in 2.5 million households who would not be covered. Still, paying to address the homework gap through savings to be found for existing government health insurance systems would quickly increase the number of connected homes with school children and significantly reduce the annual cost of program. Further, because of the existing relationships between the Medicaid/CHIPs programs and their beneficiaries, there are existing channels that would improve the efficacy of the distribution of the broadband benefit.

In short, in designing the Lifeline+ program, the government should look at all existing programs that serve low-income persons to determine how to provide a broadband benefit in ways that will both generate savings that can be used to pay for the broadband benefit while also improving distribution of the benefit.

5.4. RECOMMENDATIONS

Based on those principles, we have the following recommendations.

5.4.1. *BUILD THE ADMINISTRATION OF A NEW PROGRAM ON WHAT THE FCC DOES AND LEARNS FROM IN ITS ADMINISTRATION OF THE EBB AND THE AUGMENTED E-RATE PROGRAM.*

As noted above, the FCC set rules and just started administering the \$3.2 billion EBB program and is now developing rules for an augmented E-Rate program. Both programs are designed to address the affordability gap. As of this writing, we cannot know what lessons the FCC will learn in the implementation of the programs. We believe, however, that the administrative issues will be similar to those that the FCC would face in implementing the long-term program we propose. While we will make a number of design recommendations, we think that the real-world experience of the FCC is likely to be the best guide for how to implement such programs. Therefore, all or our recommendations should be reevaluated in light of how the COVID-19 related programs are implemented and their impact on adoption.

5.4.2. *CONGRESS SHOULD IMPLEMENT A PERMANENT VERSION OF THE EBB.*

We think Congress was correct in providing an EBB to address problems created by COVID-19. Further, we think making that benefit permanent through an ongoing Congressional appropriation would accomplish the fundamental goal of largely eliminating affordability as an obstacle to adoption. Of course, the FCC should study its initial implementation of the EBB to refine and improve its effectiveness and should, with congressional direction, implement a direct-to-beneficiary distribution of the funding to enhance consumer control and choice. Still, making the EBB permanent would be the single most important action to increase the number of Americans connected to broadband in the home.

5.4.3. *ALTERNATIVELY, CONGRESS COULD CONSIDER A FUNCTIONAL APPROACH THAT CREATE A NEW PROGRAM TO SERVE BOTH MOBILE AND BROADBAND AT HOME NEEDS TO ASSURE ACCESS TO WORKFORCE DEVELOPMENT, HEALTHCARE, AND EDUCATION.*

While we favor a permanent program based on the EBB, we also understand that there are challenges to enacting such legislation. In that light, we present an alternative that focuses on addressing those in-home needs that create clear public benefits in the form of improved outcomes in workforce development, healthcare, and education. While the program we propose would not have the simplicity—an important virtue in public policy design—of making the EBB permanent, it would have advantages in terms of distribution and cost savings, as described below.

The remainder of this chapter relates to our recommendations concerning the implementation of a new program based on a functional approach, which we call Lifeline+. We note, however, that many of the recommendations for administering the program, set forth in 5.4.5 below, would apply to both a permanent EBB program and to Lifeline+.

5.4.4. *THE BASIC STRUCTURE OF LIFELINE+ SHOULD SERVE BOTH MOBILE AND IN-HOME NEEDS.*

Lifeline+ would consist of a mobile benefit and a broadband at home benefit. The in-home benefit would consist of one of three broadband at home services. The components of Lifeline+ are:

1. *LifelineMobile*, which, while in need of comprehensive reform, for purposes of these recommendations would continue the current Lifeline subsidy for basic voice and mobile functions; and
2. *LifelineHome*, which itself is composed of:

- a. *LifelineJobs*, which would support the unemployed, empowering them to utilize online programs to upgrade their skills, as well as search and apply for jobs;
- b. *LifelineMed*, which would support low-income persons in utilizing the full suite of telehealth services; and
- c. *LifelineEd*, which would support low-income families with K–12 school children and members of their households utilizing all forms of digital learning.

All eligible families or persons would be eligible for both the mobile and one broadband at home benefit. Use of the in-home benefit would not be restricted, so that regardless of specific service, the person or family could use broadband for any purpose.

5.4.5. ADMINISTRATIVE RECOMMENDATIONS COMMON TO EITHER A PERMANENT EBB OR A LIFELINE+ PROGRAM.

5.4.5.1. Fund both services and devices.

The program should fund both connectivity and devices capable of performing relevant functions. This could include desktop, laptop, or tablet computers, but not, due to limited display and keyboard size among other factors, most current smartphones, unless the smartphones will be used as a mobile hotspot in conjunction with other equipment capable of performing the relevant functions.

5.4.5.2. Assure minimum standards for both the device and the broadband service.

As discussed in Chapter 3, the FCC should define standards for networks and services that qualify for subsidy support. This includes a determination of requirements for a device = capable of performing what the FCC determines are relevant functions (such as those required to do school work or access health care), and update that definition periodically to assure that changes in requirements are reflected in the program.

In addition, the FCC should determine a minimum standard for upload and download speeds, latency, data allowance and other technical and non-technical factors, but only to the extent necessary to support the essential services included in the programs. The FCC should perform periodic reviews of these standards and adjust them as needed to assure that changes in requirements are reflected in the program. All such FCC determinations should be done in consultation with the other relevant Federal agencies, such as those involved with workforce development, healthcare, and education.

While we advocate for standardization, we also note that the experience of educators during the COVID–19 crisis suggests that with the LifelineEd program in particular, there should be a level of flexibility that builds on the long-standing E-Rate relationship between schools and providers, and the flexibility of various technologies, such as mobile hotspots, to provide broadband for educational purposes. Not only can such solutions be deployed quickly, they also provide an important “pack-and-go” Internet to a student who may need service in a temporary new location or in multiple family locations. Granting flexibility in the distribution of the benefits by the school system or municipality can produce an efficient and focused use of funding to achieve digital learning objectives.

5.4.5.3. Establish standard protocols for transferring benefits.

The benefits in Lifeline+ should be granted directly to beneficiaries through a reloadable prepaid debit card, otherwise known as an Electronic Benefit Transfer (EBT) card. Ideally it would be a branded card (for example, Visa or MasterCard) which virtually all ISPs accept for payment. The cards should be coded with a Merchant Category Code that ensures funds in the card account are only used to make payments to certified providers. The program would enroll consumers, activate their card accounts, and distribute the cards and manage the monthly benefits.

Participating consumers would then use the funds in the card account to pay for, or help pay for, the home Internet service of their choice from certified providers. The consumer would be responsible for any monthly charges not covered by the benefit, such as additional video services from the provider. Participating providers would provide the service and accept payment, but not be otherwise involved in program administration, similar to SNAP. This safeguards consumer privacy and dignity, minimizes provider administrative burdens, and encourages the widest possible participation by ISPs. Providing benefits directly to beneficiaries avoids operational challenges that arise if the government were to contract directly with providers on behalf of individual consumers. For example, the government would avoid the need to contract with multiple service providers to ensure coverage for all bene-

ficiaries and to adjust service arrangements as beneficiaries relocate, a particular challenge in transient housing situations.

5.4.5.4. Assure lowest possible price through volume discounts.

For both devices and broadband services, the government should negotiate discounts for equipment and service providers' retail prices to achieve the highest quality products and services at the lowest possible cost to participating consumers. These discounts would be and should be implemented in ways similar to those that providers offer in connection with sales to large volume commercial purchasers. Similar "master contracts" are used today by wireless carriers and state/local governmental entities, for example. Participating consumers would then be charged for devices and monthly service that reflect negotiated retail discounts. In all events, participating consumers should remain free to use their electronic benefit to purchase any generally available retail broadband product in the market from any participating provider, and not be limited to the products and rates established pursuant to the master contract.

5.4.5.5. Assure individual choice.

As noted above, while the Federal government should negotiate reduced program rates with eligible providers, program beneficiaries should have the final choice over the specific service provider they use. Beneficiaries should also choose the specific equipment they use, within guidelines established through the program. For devices, the guidelines should establish minimal requirements for memory, storage, display resolution, connectivity, and capabilities for upgrades. Purchases of the device and the service can be facilitated through a voucher or some other form of electronic payment. The exception to individual choice would be for the LifelineEd program, where school districts may have identified specific devices they need the students to use to facilitate administrative efficiency and coordination of curriculum.

5.4.5.6. Assure security and transparency.

In setting standards for the equipment and the service, the program should maximize user security and data transparency. This has been an issue, for example, in the FCC's current Lifeline program. According to *Malwarebytes Labs*, at least one such provider—Assurance Wireless by Virgin Mobile—offered a \$35 smartphone with pre-installed apps to collect user data, create backdoors for future access, and enable auto-installers for other apps. These activities were undertaken without customer knowledge or consent, introducing the potential for malware to be installed when an app update becomes available. The program should prohibit any company from offering free or reduced-cost equipment that come with undisclosed or non-optional applications. Additionally, the program should require that providers whose devices include pre-installed apps report how they screen apps and updates, including disclosure of what user information is being collected and how it is being used. Customers should have access to this disclosure to ensure informed consent.

5.4.5.7. Work in partnership with the ISPs and other stakeholders.

The new program should build on existing public, private, and public/private partnership programs aimed at expanding digital equity and inclusion, which generally involve working in partnership with ISPs. The forms of partnership may differ somewhat between the different services. For example, with the general approach, the FCC should work with the ISPs offering low-income programs to assure efficiency and wide distribution.

With the Lifeline+ approach, the approach will differ with the specific service. With LifelineEd, ISPs should provide data that school districts need to help identify which students lack at-home broadband, and the ISPs and school districts should work together to standardize procedures and minimize administrative costs for connection and on-going operation. The COVID-19 experience has already produced these kinds of partnerships. For example, ChiefsforChange, a coalition of leaders of school districts, has documented several examples of *school districts* that have been working to quickly connect students in light of closings caused by COVID-19. One particularly notable example is the *Connected Chicago initiative*, a partnership of the City of Chicago, the Chicago Public School system, community-based organizations, and several philanthropic entities and leading Internet Service Providers. The initiative has created a *detailed toolkit* aimed at connecting 100,000 currently offline school children.

Another example is the *K-12 Bridge to Broadband* program. The program arose as a partnership between local school districts, ISPs, local governments, and various philanthropic groups in the wake of the COVID-19 crisis, to facilitate home connectivity for low-income students. The program is developing a set of best practices for providing the kind of connectivity that LifelineEd would scale nationally.

It recommends, for example, that as a starting point, ISPs should confidentially identify students that lack broadband at home, and work with school districts to standardize procedures and minimize administrative costs for getting these households connected. In allocating funds, the program could use formulas similar to those used for the ESEA and E-Rate programs, both of which are designed to assist similar population groups. In addition, the program should leverage the results of FCC E-Rate pilots in 2011–2012 that allowed funding for off-premises connectivity and devices.

For the LifelineMed program, designers should note *the success of the City of Liverpool* in improving health outcomes and cost savings through the provision of devices and broadband services to covered persons. Liverpool conducted a “Health and Social Care Testbed,” which used 5G connectivity to support health care delivery use cases. The study found that, cumulatively, implementation of use cases could potentially result in cost savings to the Health and Social Care services of an estimated £247,688 per hundred users per year.⁷ These Internet-enabled interventions reduced hospital admissions, physician visits, medication costs, caretaker hours, and patient loneliness; and, increased health outcomes, medication adherence, the ability to manage one’s own health, comfort with using technology, and quality of life.

5.4.5.8. Improving awareness of the program.

Awareness of the current Lifeline program is very low, evidenced by the fact that as of January 2021, only 8.7 million of an estimated 33.2 million eligible households participate in the program. Congress should require the FCC and other relevant Federal agencies to coordinate in marketing and outreach efforts to help ensure that all Americans, including those suffering from recent unemployment due to the COVID–19 crisis, those newly eligible for the Supplemental Nutritional Assistance Program, and those eligible for Medicaid, are informed of their eligibility for broadband support.

5.4.6. ADMINISTRATIVE RECOMMENDATIONS SPECIFIC TO THE LIFELINE+ PROGRAM.

5.4.6.1. Lifeline+ should be administered jointly by the FCC and the Federal agencies responsible for each substantive area.

The administration of LifelineJobs, LifelineMed, and LifelineEd services should be a co-responsibility of the FCC and the relevant Federal agencies who currently support the respective services. LifelineJobs would be coordinated by the FCC and the Department of Labor, with the broadband subsidy provided as part of unemployment benefits. LifelineMed would be coordinated by the FCC and the Departments of Health and Human Services and Veterans Affairs, with the broadband subsidy provided as part of the benefits package to qualifying persons covered by Medicare, Medicaid, or Veterans Health Administration Insurance. LifelineEd would be coordinated by the FCC, the Department of Education, and the Bureau of Indian Education (BIE), with the funds distributed to local school systems, similar to programs like E-Rate, ESEA, and IDEA, with the local school systems then connecting qualifying students in ways similar to how local school districts are already using Federal funds to connect their students on a temporary basis. Further, to the extent that Congress augments the E-Rate program as part of pending COVID–19 relief legislation, the FCC’s administration of the LifelineEd program should be based on lessons learned in the implementation of that effort.

5.4.6.2. Lifeline+ should be administratively coordinated, adhere to similar standards, and be designed to facilitate ease of consumers obtaining the service, protect consumers, and optimize the benefits.

In administering the program, the FCC and other Federal agencies should consider the following recommendations:

5.4.6.2.1. Set national standards for eligibility and program operations in ways that reduce start-up and ongoing costs.

To the extent feasible, the standards for eligibility for LifelineJobs, LifelineMed, and LifelineEd should use similar criteria and administrative mechanisms to lower costs of signup, communicating about the programs to eligible families, and on-going operations. Doing so requires that key elements of the programs be consistent across agencies and across the country. For example, while schools, state unemployment and government health care agencies would assist in enrolling consumers in the services and distribute and activate Electronic Benefit Transfer (EBT) card accounts, the FCC should establish a single type of card and account, determine benefit levels, and certify providers for the programs.

5.4.6.2.2. Enable family use for all broadband services.

To maximize benefits, the devices and the broadband subscriptions offered as part of the broadband at home Lifeline+ services should not be restricted solely to specified essential services, so that the other benefits of broadband adoption, including but not limited to education, job training, health care, access to other government services, and civic engagement, may be available to everyone in a participating household.

5.4.6.2.3. Coordinate and prioritize to minimize wasteful expenditures or duplicative payments.

Beneficiaries of LifelineHome may meet the qualifications for more than one broadband at home service, but should only be eligible to receive one benefit. LifelineHome should be coordinated through a national verification system, to assure that there are not duplicate payments to multiple persons in the same home. This can be accomplished through a national database (the “Duplicates Database”) to identify households receiving benefits, with program personnel authorized to access this database to enter participating household data and confirm no duplication of benefits. The existing National Lifeline Accountability Database (NLAD), managed by USAC, can serve as a model for the Duplicates Database and should continue to be used to ensure that households participating in Lifeline+ receive no more than one mobile and one broadband at home benefit per household.

Congress or the FCC should determine rules for prioritizing the source of funds for a broadband at home benefit where the person or family qualifies for more than one in-home benefit. As noted in Section 5.3.8, which discussed how a LifelineMed benefit would cover approximately 70 percent of those needing a LifelineEd benefit, it may be advantageous to prioritize funding sources for which broadband would generate near-term savings.

5.4.6.2.4. Allow bundling of mobile and broadband at home benefits.

The program should encourage providers to create service offerings that maximize the value of the services to the customer. Some providers, for example, could develop plans that serve the needs of both the LifelineMobile and one of the at home services. In that light, the program should allow the bundling of the LifelineMobile benefit and any one of the three broadband at home benefits.

5.4.6.2.5. The Lifeline+ program design should include mechanisms that makes it easy for applicants to learn about, apply for and, if qualified, obtain the benefits.

Each service should adopt mechanisms that build on related public programs such as SNAP, Medicare, Medicaid, and unemployment insurance. The goal should be to maximize the ease with which eligible beneficiaries learn about Lifeline+ and its benefits, apply for the programs for which they qualify, and, if approved, receive the benefits.

- For *LifelineMobile*, the FCC would coordinate with USDA and HUD to ensure that recipients of SNAP and other qualifying programs are proactively notified about their eligibility for LifelineMobile.
- For *LifelineJobs*, the Department of Labor would work with state unemployment offices to proactively inform those applying for unemployment of their eligibility.
- For *LifelineMed*, the administrators of government insurance policies would proactively advise covered persons of eligibility requirements and the potential benefits if they qualify.
- For *LifelineEd*, local schools would notify the parents of students qualifying for the free school lunch programs of their eligibility.

5.4.7. THE FUNDING MECHANISM FOR EACH PROGRAM SHOULD ALIGN WITH CURRENT PRACTICES, INSTITUTIONAL INCENTIVES, AND THE NEED FOR A SUSTAINABLE FUNDING MECHANISM.

In terms of funding a general or a functional approach to closing the affordability gap, we have the following recommendations.

5.4.7.1. Congress and the FCC should not wait for contribution reform to begin to create a new program.

As discussed in several chapters, the current mechanism for funding Universal Service is not sustainable, nor is it capable of providing the new funding necessary to close the affordability gap. Several alternatives have been proposed to replace the current system for financing USF. These alternatives include assessing fees based on each telephone number in service, the purchase of Internet connected devices,

ISP revenues, or a fee attached to some broader revenue stream, such as all revenues collected by communications providers and not just those currently counted in the contribution factor, as well as the revenues of companies engaged in a broad set of Internet-related activities. We express no view here on the policy merits or tradeoffs of any of specific method. We do, however, note that contribution reform is likely to take the FCC several years, and will likely be the subject of considerable political controversy and legal challenges. As we believe the need for digital equity and inclusion is urgent, we propose alternative means for funding the new programs that are more certain legally and can be done more quickly.

5.4.7.2. The FCC should reexamine the subsidy for the mobile service.

As noted above, many critics of the current Lifeline subsidy argue that the subsidy amount is too low. That criticism is generally premised on the need for the subsidy to enable eligible persons to subscribe to broadband at home. In developing the new program, the FCC should re-examine the subsidy level for the new mobile service but do so in light of the other components of it adopts.

5.4.7.3. Congress should directly fund Lifeline+ while also providing additional funding, as necessary, and authorizing existing programs to utilize savings to offer broadband benefits.

5.4.7.3.1. Direct appropriations.

In lieu of the current contribution system or any of the proposed reforms to it, Congress should instead appropriate funds for the Lifeline+ program from the following sources:

- First, to the extent that Congress appropriates funds to subsidize rural deployment (as discussed in Chapter 3), any allocated funds not disbursed through a reverse auction or other competitive mechanism should be repurposed to a fund whose assets should be used to support the Lifeline+ program.
- Second, Congress should dedicate all or at least some of the proceeds of any future spectrum auctions to a fund whose assets should be used to support the Lifeline+ program.
- Third, Congress should appropriate at least five years of the necessary funding to fully support the Lifeline+ program with funding sources to revert to the existing USF contribution factor, or such methodology as Congress may authorize and as the FCC may adopt, if Congress does not renew appropriations at any time after the first five years.

The legal basis of some of these mechanisms is discussed in Appendix 5A.

5.4.7.3.2. Congress should mandate that existing government health insurance programs provide LifelineMed benefits.

Congress has, on various occasions, enlarged the benefits that government health insurance programs provide. For example, in 2003, Congress voted to add Part D to the Medicare program to cover various prescription drugs. Given that in-home broadband is an increasingly vital social determinant of health (see Appendix 9D), Congress should mandate that Federal government health insurance policies, including Medicare, Medicaid, and veteran's medical support, provide subsidies for the LifelineMed service to enable the covered persons to take advantage of the full range of telehealth services, while also improving the effectiveness and efficiency of the programs.

5.4.7.3.2.1 As an initial step, the Center for Medicare and Medicaid Innovation (CMMI) should run a demonstration to determine the level of savings that could be achieved if all covered persons had in-home broadband and how to best structure the programs to take advantage of universal connectivity of the covered persons. As discussed in greater detail in Chapter 9 and Appendix 9B, there is already significant evidence that telehealth services can save significant funds for a health care system. For example, in 2012, the VA *ran a program providing telehealth services* to over 150,000 beneficiaries which resulted in average annual savings of \$6,500 per patient, compared to \$1,600 in annual costs. These savings come through a variety of means, including by enabling targeting and monitoring specific conditions, reducing transport costs, reducing emergency care costs, and increasing the ability to keep patients in the home instead of more expensive medical facilities.

As also discussed in Chapter 9, the Federal government has already recognized, albeit on a smaller scale than we propose here, the need for Federal investment in patient connectivity to improve health care outcomes in current programs. There is no doubt that the need and urgency has increased in light of trends that were accelerated due to COVID-19. However, there is not an authoritative analysis of the cost savings across a broader spectrum of the population or an analysis of how the sys-

tems could, if they assume in-home broadband in the home of every covered person, both save funds and produce better outcomes. The institution best suited to do such an analysis is CMMI, which is charged with testing various payment and service delivery models for the purpose of achieving better care for patients, better health for communities, and lower costs through improvement in the health care system. As a starting point, CMMI should evaluate how universal adoption of broadband by persons covered by Medicare and Medicaid could lead to improvement in health care quality and a reduction in health care costs through, among others, expanded and unified access to affordable care, population health management (earlier detection of infectious diseases, chronic disease management, preventative medicine, etc.), increased administrative efficiencies, decreased paperwork, higher patient satisfaction, utilization of AI and other emerging technologies, and consistent and near real-time evaluations of health care effectiveness.

To be clear, we are not suggesting that providing the broadband benefits discussed herein should be dependent on or delayed while the analysis is undertaken. As an initial matter, there will likely have to be some additional funding to cover the benefits. The analysis, however, is critical to understanding how to account for the savings over time that the benefits will bring and how to redesign certain aspects of the program to take advantage of the universal connectivity.

We note that there are anecdotal reports that the increased use of telehealth resulting from COVID-19 has increased some costs due to increased utilization. However, as discussed in Chapter 9, this telehealth utilization was not driven by persons of color; racial and ethnic minorities experienced a decline in access to care during the pandemic. While we can understand that such increased use could have occurred, we are skeptical that over the long term, connectivity increases costs. As noted above, the VA study and other similar efforts suggest otherwise. It is more likely that easier access led to visits that enabled preventive care, leading to lower costs over time. Further, we note that the general trend of business addressing customer concerns—and health care is different in many ways but is still about addressing customer concerns—is to use connectivity and a variety of mechanisms enabled by connectivity to improve intake, diagnosis, and treatment much more quickly and efficiently than they could without connectivity. Thus, the experience with both health care and in businesses generally suggest that designing systems in light of connectivity that result in improved outcomes and reduced costs.

5.4.7.3.2.2 The Administration and Congress should create a new matchable administrative expense in Medicaid for States to provide in-home broadband to Medicaid enrollees. Medicaid, which because of its focus on low-income persons, is likely to be the program to offer the broadband at home benefit to the greatest number of persons. It is a Federal program administered and partially funded by the states. Due to the federal-state partnership model, programmatic changes are generally done at the state, rather than federal, level.

It is possible, however, for the Federal government to incentivize and/or empower the states to act in preferred ways in their administration of Medicaid. Traditionally, the Federal government only allows Medicaid to cover medical services. The question of when or whether a state Medicaid program can cover non-medical services is not novel. In light of the fact that medical care is not the only factor driving health outcomes, there has been a recognition that for low-income people, in particular, spending money on medical services alone—without a coordinated, effective strategy for addressing a range of socio-economic issues and social determinants of health—can result in inefficient use of health care dollars. As a result, there are numerous examples of government health insurance programs funding services that, while not strictly involving a medical diagnosis or treatment, nonetheless improve health outcomes and/or lower health care costs. Some of these are discussed in Appendix 5B, entitled “Funding Non-Medical Services Through Medicaid.”

Our understanding of the program suggests that the most effective way to connect unconnected Medicaid recipients in the current framework would be through the Health Information Technology/Health Information Exchange (HIT/HIE) program. The Federal government has in the past appropriated funds to increase the effectiveness of the Medicaid program through the utilization of information technology. It was done, for example, with *HIT/HIE expenses under ARRA*, where the Federal government legislation offered a 90/10 Federal match for the specified technology costs. Here, we believe the easiest way to provide a broadband subsidy to connect low-income persons and families would be through that program. That same framework could be used here, with the Federal government providing the funds and the states then distributing the benefit to unconnected covered persons, which effectively would serve as a means of increasing the efficacy of their health information technology systems, and therefore meet the definition of “activities that are proper and efficient for the administration of the Medicaid Electronic Health Records

(EHR) Incentive Program.”. While we would support the Federal government subsidizing 100 percent of the necessary amount, we note that states have demonstrated their recognition of the need to connect low-income persons, with many states using CARES Act funding to connect students and also having their own Lifeline like plans. In that light, we believe a 90 percent Federal share, which is the current match for IT, could be sufficient.

5.4.7.3.2.2 The Administration and Congress should mandate that Medicare and the Veterans Health Administration provide a broadband benefit to unconnected recipients of the program. Medicare and VA health insurance programs are federally administered so the mechanics of offering the broadband benefits are simpler. Congress and the Administration can adjust the Federal policy so that the programs fund broadband at home for eligible beneficiaries.

5.4.7.4.3. Congress should mandate that existing government unemployment insurance programs provide LifelineJobs benefits.

Congress, as we have seen most recently in temporary enlargement of unemployment benefits in the wake of the COVID-19 crisis, has enhanced the benefits to which unemployed persons covered by unemployment insurance are entitled. Likewise, Congress should mandate that Federal unemployment insurance policies include as a benefit for persons who previously were employed in a job paying less than a threshold to be set by Congress, a new benefit for broadband at home as described above.

5.4.8. THE ETC REQUIREMENT SHOULD BE ELIMINATED AND REPLACED WITH MORE APPROPRIATE ELIGIBILITY CRITERIA TO ENCOURAGE MORE PARTICIPANTS.

ETC requirements should be eliminated as eligibility criteria for participation in the new program. Instead, any provider that voluntarily offers broadband service sufficient to utilize the essential services described above should be deemed eligible, and indeed encouraged, to participate. In Chapter 3, we proposed alternative and more appropriate requirements for participating ISPs to be eligible for receiving funds for network deployment, which would replace the ETC requirements. The same criteria should be adopted for a permanent EBB program or Lifeline+. To ensure that beneficiaries purchase services only from qualified providers, the FCC should administer a simple annual recertification process. Once the certification process is established, beneficiaries should be able to use their benefit to purchase service from any qualified provider. Like other consumers, beneficiaries should be free to choose among qualified providers, similar to choosing medical services under preferred provider health insurance plans.

5.4.9. TO ACCELERATE THE AVAILABILITY OF, AND LOWER COST FOR, DEVICES, THE FEDERAL GOVERNMENT SHOULD CONSIDER RUNNING A PROCUREMENT PROCESS.

In this chapter, we have proposed significant new expenditures on broadband services and on devices. We have no doubt about the capacity of existing broadband service providers to immediately meet the demands of potentially millions of new customers. Obtaining millions of new devices quickly, however, is another issue.

An increase in competition to obtain devices could expand rather than close the adoption and affordability gaps. Indeed, as a recent *New York Times* story reported “A surge in worldwide demand by educators for low-cost laptops has created shipment delays and pitted desperate schools against one another. Districts with deep pockets often win out.” That surge of worldwide demand by educators for low-cost laptops and similar devices of up to 41 percent higher than pre-pandemic numbers has created months-long shipment delays. The story further reported that those delays have “frustrated students around the country, especially in rural areas and communities of color, which also often lack high-speed Internet access and are most likely to be on the losing end of the *digital divide* That gap, with much of the country still learning remotely, could now be crippling.”

There are many factors driving the shortage of entry-level devices. The margins on low-end PC sales are close to zero, and with total PC sales flat or declining for a decade, manufacturing capacity is focused on higher-end machines. Another factor is a shortage of low-end chips. A third factor is the logistics and costs of shipping from China.

Given the current situation, and what we believe is the need for significantly greater supply of low-cost devices, the Federal government should consider a national procurement RFP for what could be millions of appropriate devices, with pre-determined specifications, that could be manufactured in large part in the U.S. These would then be offered at wholesale price to institutions, such as school districts, charged with administering the broadband benefits. This could not only help

with accelerating the availability of the devices for a permanent EBB or Lifeline+ program, but could also lower the overall cost of the program and promote job creation and advanced manufacturing in America.

5.4.10. SUPPORT RESEARCH INTO HOW ADDRESSING CREDIT ISSUES MIGHT CLOSE THE AFFORDABILITY GAP FOR BROADBAND AT HOME.

While most of the recommendations in this chapter relate to erasing affordability as a factor in broadband adoption for essential services, some non-qualifying households may still experience affordability issues in subscribing to and maintaining home broadband service. As part of an agenda to increase adoption, the government should work with providers of pre-paid services to examine the extent to which credit issues are keeping a significant number of persons from adopting broadband, and if so whether there are technologies, such as a router synched to a payment system, a financial mechanism perhaps assisted by philanthropic efforts, marketing efforts that make the availability of existing options more widely known, or other approaches that could provide a replicable model that does for broadband at home what prepaid wireless did to expand the adoption of mobile services, particularly for persons not eligible for the broadband at home programs described in this chapter. NTIA should fund a research program, and perhaps a demonstration project, to determine the dimensions of the problem and develop potential solutions for increasing the utilization of the prepaid model for currently unconnected persons.

CHAPTER 6.

CLOSING THE ACCESS TO ECONOMIC OPPORTUNITY
AND PARTICIPATION GAP

6.1. PROBLEM STATEMENT

Several decades ago, famed venture capitalist John Doerr said the personal computer industry's growth from zero to \$100 billion in 10 years was "the greatest legal accumulation of wealth in history." As the Internet soon dwarfed the PC revolution, growing from zero to \$400 billion in just five years, Doerr was forced to update that claim. In Doerr's words, "There are waves and then there is a tsunami." Today, the top five American companies by market cap (Microsoft, Apple, Amazon, Alphabet, and Facebook) all rode the tsunami Doerr described.

Early tech optimists touted this tsunami as having the potential to be the great equalizer of society. Instead, it has exacerbated the historic divisions between the haves and have nots, leaving minority communities with fewer avenues to participate and develop economic opportunities in the Internet economy. The National Urban League's 2018 State of Black America Report found that of almost forty thousand employees working for just four major Silicon Valley technology companies, fewer than one thousand were Black American. Latinx employees are similarly underrepresented. Moreover, as the technology sector has increased in size and profitability, Black and Latinx entrepreneurs have continued to be left behind.

If anything, the pandemic has worsened these trends. While other industries reeled from lockdowns and abrupt changes in patterns of consumption, COVID-19 catalyzed enormous growth for many technology firms.⁸ Revenues soared as consumers and businesses turned to digital solutions to access the basics of life—work (e.g., Zoom, Teams, and other video conferencing services), social interaction (e.g., Facebook and Twitter), entertainment (e.g., Netflix, HBO Max, Amazon Prime Video), food (e.g., GrubHub and UberEats), goods (e.g., Amazon and Instacart), and healthcare (e.g., TeleDoc).

Many of these enterprises saw the ranks of their workforce swell, even as unemployment climbed in other sectors.⁹ In particular, employment among women and communities of color plummeted in 2020. Black and Latinx unemployment at the end of 2020 were 9.9 percent and 9.3 percent, respectively, while employment had recovered from 14.2 percent unemployment in April 2020 to only 6.0 percent by December.¹⁰ Wealth among communities of color has likewise diminished. Sixty percent of Black households, 72 percent of Latinx households, and 55 percent of Native American households reported having serious financial problems during the pandemic, compared to just 36 percent of white households.¹¹

As the U.S. wrestles with another economic recession, we must be proactive to ensure that Black and Latinx communities—who face declining median wealth and who have still not recovered their pre-2008 recession incomes—do not continue to bear a disproportionate burden of financial hardship in the coming years.¹²

Stagnant wage growth for Black and Latinx workers over the past decade is a major reason for the slow recovery, due, in part, to their underrepresentation in high-paying jobs in the technology and information services sectors. And minority

exclusion from the technology sectors is hardly a new problem. In 2002, Blacks accounted for nearly eleven percent of the workforce, but only eight percent of computer and mathematical jobs. Those numbers remained almost the same in 2016. While the percent of Latinx workforce has grown from 12.6 percent of the overall workforce in 2002 to 16.7 percent in 2016, the percent in the computer and mathematical professions only increased from 5.5 percent to 6.8 percent.¹³

Lewis Latimer, the person for whom this Plan is named, illustrates the longstanding problem of Black and Latinx participation in the tech sector. A free Black patent-holder and the son of slaves, his inventions and contributions were critical to the success of his employers, Thomas Edison, and Alexander Graham Bell. Yet, unfortunately and all-too-predictably, he had no opportunity to take ownership or accumulate generational wealth from the vast businesses those inventions spawned.

6.2 VISION STATEMENT

We need to break these historic patterns. But the sad realities of today's economic opportunity and participation gaps should not discourage us from recognizing technology's essential role in building a more inclusive future. Much of this Latimer Plan is devoted to making sure that broadband is available, affordable, and deeply relevant to the lives of all Americans, regardless of where they live, the color of their skin, or how much money they have. It is motivated by the idea that broadband is a necessity, not a convenience, for living in a post-pandemic world.

Technology cannot be the great equalizer, however, if opportunities for wealth accumulation are not equitably distributed throughout society. While many of the proposals throughout the Plan are focused on assuring that all Americans have the tools and skills to participate fully in 21st century society and the digital economy, we also want to close gaps that limit opportunities to participate meaningfully and create value in the industry as broadband and broadband-enabled enterprises continue to innovate, grow, and prosper.

We must ensure that job opportunities are available for the country's growing Black and Latinx communities at every level in technology and technology-related industries. Entrepreneurs of color deserve a place in the governance of these companies. They should have equal access as vendors and collaborators in the building and utilization of new digital infrastructures and the prolific wealth creating ecosystem that controls it.

Protests for racial justice across the country have placed the onus not only on legislators and government regulators, but also on business leaders and private enterprises, to address with deliberateness and vigor these historic inequities. Communities of color are not simply hapless consumers of products marketed by brand-name companies. These communities have become emboldened and now fearlessly demand corporate acknowledgement and respect. Americans at large are beginning to understand that we cannot continue a "business as usual" approach to eliminating racism embedded in our social, political, and economic systems in both the public and private sectors.

With public and private intention, the gaps of economic opportunity and participation can be closed, and our Nation will be stronger, more equitable and more prosperous because of it. We must together attack these problems in an intentional way, rather than passively awaiting the tide to lift high all boats. Now is a time for action. We wholeheartedly agree with the principles set forth by the Business Roundtable in 2019, outlining a new standard of corporate responsibility that benefits all stakeholders—consumers, employees, suppliers, communities, and shareholders. Much of the private sector has accepted accountability in ingraining diversity, equity, and inclusion into their corporate DNA, including creating racially and gender diverse corporate boards, staffing, C-suites, procurement, philanthropy, and community investment.

For many years, civil rights organizations have put pressure on private enterprise to improve diversity, equity, and inclusion practices. Yet, as Marc Morial, President and CEO of the National Urban League, observed, "these gains lacked systems and structures to ensure certain things like continued growth and personal accountability for corporations. Thus, what we saw when we looked long and hard at the corporations with which we had worked were diversity programs that were more often than not catch-as-catch-can systems, that is, no systems at all. Many treated it as a compliance issue only."¹⁴

There has been particular progress in the companies that build and operate the digital infrastructure. To create more sustainable improvements in economic opportunity and participation, civil rights organizations, led by the National Urban League, have pioneered the adoption of written memoranda of understanding with several communication companies, setting forth comprehensive strategic plans with goals, timetables, and metrics to measure progress toward diversity. Areas covered

by such MOUs include governance, which includes the company's board; personnel, which includes the company's C-suite; procurement, which includes the company's spending on goods and services, and in philanthropy and community investment.

These voluntary commitments to civil rights organizations and the constituents they represent have been widely heralded. It is, however, cumbersome to approach hundreds of companies one at a time. We are interested in activating government resources and leadership to organize and accelerate this process, providing incentives, improving and tracking private sector engagement and collaboration on diversity, equity, and inclusion initiatives.

Communities of color have been waiting nearly sixty years since the passage of the Civil Rights Act of 1964 for corporations to implement and abide by anti-discriminatory policies. But only when companies move beyond anti-discrimination principles to embrace anti-racist principles can we hope to achieve sustainable and meaningful equity.

6.3 GOALS

- By the end of 2021, the Department of Commerce, the FCC, the Small Business Administration, and the Department of Labor should invite a broad coalition of civil rights organizations and industry stakeholders to form a task force to develop best practices, guidelines, and standards for Internet and communication service providers, device and equipment manufacturers, software companies, and related service providers, to promote more diverse and inclusive corporate leadership, workforce, and supplier practices;
- By the end of 2022, the Department of Commerce, the FCC, the Small Business Administration, and the Department of Labor should, in cooperation with civil rights organizations and industry stakeholders, publish and promote these best practices, guidelines, and standards;
- By the end of 2022, the Department of Commerce should publish a report identifying policies to incentivize private entities to adopt initiatives promoting more diverse and inclusive corporate leadership, workforce, and supplier practices; and
- By the end of 2025, the Department of Labor should publish a report tracking trends in the demographics of individuals employed in jobs associated with the digital economy, and in the governance of the companies that build, operate, and utilize digital infrastructure.

6.4 THE CURRENT SITUATION

Working with outside multicultural civil rights organizations like the NAACP, the National Action Network, UnidosUS, LULAC, AAJC, and OCA, the National Urban League has organized active external advisory boards and committees to advise companies in their efforts to adopt sustainable accountability measures to ingrain diversity, equity, and inclusion into their corporate DNA. These measures include commitments to racial equity in corporate board membership, staffing, the C-suite, procurement, philanthropy, and community investment.

To date, these measures have yielded promising results in the quality of the products these companies produce and in the building of trust with the communities they serve. Since entering its MOU in 2016, Charter Communications has deepened its efforts to advance diversity and inclusion (D&I), focused on programming, procurement, corporate governance, workforce representation and philanthropic and community investments. The company subsequently adopted a holistic D&I strategy in 2018, anchored on providing high-quality products and services to its diverse customer base. This includes serving 21 of the top 25 Black American television markets and 20 of the top 25 Hispanic television markets in the United States. Charter has also expanded programming offerings, including enhanced and expanded carriage of Black American owned and Latinx-targeted networks. The company exceeded \$1 billion in diverse spend in 2018, 2019 and 2020, diversified its board, and took steps to both increase diversity in its talent pipeline and foster an inclusive environment where all employees, regardless of their background or experience, have equitable access to opportunities. Today, 48 percent of Charter's workforce are people of color.

Since Comcast entered into its MOU, supplier spending with minority-owned enterprises increased from less than \$1 billion to almost \$3 billion. The MOU also included a commitment for the company to offer programming owned by people of color, selected through a competitive process. Today, consumers see more diverse anchorpeople, programming, and channels at NBC, bringing much needed visual representation to mainstream media. In addition to bringing diversity into its supply chain and programming practices, Comcast committed to increasing the level of diversity on its corporate board, in its hiring practices, and in its lauded philan-

thropic efforts. The MOU approach, which moves beyond the ad hoc verbal agreements of yesteryear, has yielded measurable progress.

Similarly, other telecommunications providers and many of the Nation's largest companies have seized this moment to reimagine corporate responsibility, working to address historic inequities that exist in their own businesses and industries. For example, AT&T recently announced that it has spent over \$3.1 billion with Black-owned suppliers over the last two years.

In June of 2020, for example, PayPal pledged \$530 million in short-term, medium-term, and long-term investments to support Black and minority-owned businesses and communities in the U.S., especially those hit hardest by the pandemic.

That month, PepsiCo unveiled a \$450 million, three-pronged plan to address systemic racial inequality at the community, business, and individual level through greater workforce diversity, investment and procurement from minority-owned businesses, and philanthropic contributions to racial justice social and community programs and organizations.

This past September, Citi and the Citi Foundation committed over \$1 billion towards strategic initiatives targeted to help close the racial wealth gap and increase economic mobility in the United States, including greater access to banking and credit in communities of color, increasing investment in Black-owned businesses, expanding homeownership among Black Americans, and advancing anti-racist practices in the financial services industry.

6.5 RECOMMENDATIONS

These efforts, though encouraging, are only the beginning. To close the economic opportunity and inclusion gap, it is imperative that industry, government, and community organizations work together to improve and increase commitments to racial equity in corporate board membership, staffing, the C-suite, procurement, philanthropy, and community investment within the entire digital ecosystem.

The Plan's recommendations include:

- *Infrastructure.* Congress must include mandates in any infrastructure legislation for companies that will directly benefit from increased Federal investment to enhance their performance in providing access to economic opportunity and participation throughout the digital ecosystem.
- *Measure Diversity.* The Department of Commerce, the FCC, and the Small Business Administration should collect information that allows the government and the public to understand and evaluate how the private sector, and particularly the technology and related sectors, are improving diversity, equity, and inclusion in the categories noted above.
- *Incentivize Diversity.* The Department of Commerce, the FCC, and the Small Business Administration should evaluate and report to Congress annually on measures to incentivize the participation of private enterprises in improving diversity, equity, and inclusion throughout the digital ecosystem.
- *Highlight Sustainable Success.* The Department of Commerce, the FCC, and the Small Business Administration should publish an annual report on best practices for enhancing the performance of private enterprise in improving diversity, equity and inclusion throughout the digital ecosystem.

CHAPTER 7.

CLOSING THE UTILIZATION GAP

In the more than two decades since then NTIA Administrator Larry Irving coined the phrase “digital divide,” nearly all the public discussion of both meaning and the consequence of the idea has involved either the availability gap, the adoption gap, or the affordability gap. Often, the terms are used interchangeably, or combined unhelpfully and referred to simply as a lack of “access.”

To be sure, all three of these gaps are foundational. Unless there are networks everywhere and everyone is on them and can afford to use them, failings of digital equity and inclusion will persist, creating more inequality and exclusion. As noted in Chapter One, a recent Executive Order calls for every Federal agency to assure that all persons, but particularly those in historically marginalized communities, have equal access to the benefits and services those agencies provide. Given the trends in how services are now delivered, it will be difficult to achieve such a goal without closing the gaps discussed in the Plan.

But there is another, less obvious gap that is increasingly relevant to how we use the tools of the information age to create a more equitable and inclusive economy and society. That is the utilization gap.

That utilization gap describes the difference between how our communications networks are being used today and how they could already be used to improve outcomes across industries and in the public sector, particularly for applications identified by the National Broadband Plan as strategic. In particular, as many commentators have noted, *government services* have not digitized fast enough. Nor have government service providers taken full advantage of the availability of broadband to improve customer service, capacity, resiliency, adaptability, transparency, or security.

The COVID-19 crisis has not only brought the availability, adoption, and affordability gaps to the forefront, it has also demonstrated that, despite the capacity and capability of our networks, we are suffering from a utilization *diffusion lag*, similar to that which accompanied electrification in the 1900s. Learnings from this unprecedented experience, however, could illuminate a better path forward. As author Nassim Taleb wrote in his book *Antifragile*, “The excess energy released from overreaction to setbacks is what innovates.” This crisis is likely to unleash that kind of innovation, particularly with telehealth, telecommuting, online education, and public services.

But we need to make sure that, in the process, this next wave of innovation also drives a more equitable and inclusive economy and society.

Yes, we need all unemployed persons on-line to be able to train, search and apply for jobs. But, as discussed in Chapter Eight on workforce development, we also need to be smarter about how we develop online training, particularly in tying such training to apprenticeship programs and orienting such programs to attract persons from communities of color.

Yes, we need all persons on-line to be able to take advantage of the improved outcomes and lower costs of telehealth, but we also need, as discussed in Chapter Nine on health care, to take steps so that telehealth will reduce disparities in access to care, quality of care and patient experience, including by enhancing digital health literacy among low-income persons and persons of color, and disseminating evidence-based research on improving care equity for communities of color.

Yes, we need all students on-line to be able to engage in virtual classes and educational work outside the classroom, but we also need, as discussed in Chapters Ten and Eleven on K-12 and Higher Education, equitable access to the tools and content of digital learning, to assist students wherever they are developmentally and personally, accelerating and supporting them to learn in ways that represent their diverse needs, and at a depth of mastery that is required to succeed in the modern economic and social context. We also need to provide teachers with the support they need to enable students to maximize the use of digital content, and allow them to foster a future where the vast expanse of opportunities available are truly open to all students. We face a huge challenge in helping students overcome the damage to their education done by COVID-19, but, as *McKinsey reports*, there are ways, many dependent on better utilization of technology, to reduce that learning loss.

Even with everyone on-line, we need our government institutions to improve their online services, and offer solutions on par with the best private sector actors, where competition drives continuous innovation. But, as discussed in Chapter 12 on government services, we also need service providers to make it easier for all persons, but particularly those from low-income households and communities of color, to understand and benefit from the full range of available information and benefits, and to interact with those services, such as in making or receiving payments, and in enabling non-government organizations to assist Americans in receiving the help they need using government data.

Even with everyone on-line, the Internet ecosystem will not reach its full potential unless it becomes a healthy, self-sustaining environment, with effective mechanisms for quickly identifying and countering dangerous misinformation and toxic behavior. As discussed in Chapter 13, we can do so by reducing the amount, and negative impact, of dangerous misinformation and hate speech on the Internet, increasing the amount of content that addresses the concerns and needs of low-income communities and communities of color, promoting authoritative information relevant to these communities, and improving the tools available for low-income persons and persons of color to engage in civic discussions, giving them a stronger voice both off-line and online.

In short, even as we close the availability, adoption, and affordability gaps, we need to address the utilization gap as well. The remaining chapters propose ways to do so.

WORKFORCE DEVELOPMENT

8.1. PROBLEM STATEMENT

Closing the gaps in broadband availability and adoption will provide an essential foundation for equity and inclusion. But to fully use the Internet ecosystem to improve economic and social prospects for persons from communities of color and low-income communities, we must go beyond those steps. Not enough is currently being done to ensure that the tools of the Information Age facilitate greater opportunities for our Nation's labor force. These tools have enormous potential to bridge workforce gaps by:

- Connecting the unemployed with companies and industries that have unfilled positions;
- Enabling workers in every job type and industry to upgrade their skills and to search and apply for jobs; and
- Ensuring that new and small businesses can use available tools from both public and private sources to improve their prospects, spurring further opportunities and growth in and for low-income communities and communities of color.

Today, U.S. industry and policymakers do not adequately use data to identify in-demand jobs, particularly jobs aligned with the skills needed to fill them; provide easy access to online programs to help people develop the skills these positions require; or provide low-or no-cost cost certifications or other job-seeking tools to help those who develop new skills pursue new jobs. Policymakers also do not adequately fund research or other means to help persons holding jobs with a high risk of being eliminated, such as jobs with repetitive manual tasks, to develop the skills needed to qualify for the jobs of the future, particularly given the drop-off in employer-based training investments over the past two decades.

Broadband can be the major driver for solutions to these problems. Through federal, state, private, and public sector action, we can create and improve programs that facilitate online access to general workforce development, training, skills building, Registered Apprenticeships, and specific workforce development in critical and growing fields of such as health care, technology, and transportation.

8.2. VISION

We envision a fully connected nation where, through federal, state, public, private, and hybrid initiatives, everyone has access to the tools and resources necessary to upskill, reskill, and earn certifications to fill workforce gaps. These programs will provide new, small, and industry-leading businesses with access to a larger talent pool of trained, capable, skilled workers, enabling businesses to fill positions more quickly and cost-effectively. Taken together, these actions will lead to new and increased investment in at-risk communities, as businesses and their employees flourish.

8.3. GOALS

We must first better understand where the greatest workforce gaps and disparities exist, and then use this information to develop models, best practices, and toolkits, improve existing programs, and create new programs. As noted in Chapter 3, efforts are underway to close the broadband availability gap. With new Congressional funding, the FCC is in the process of addressing the inaccurate and incomplete broadband mapping which has resulted in uncertainty about which areas need buildout and what the costs associated with fully connecting everyone will be.

Similarly, accurate data is necessary to address and fix workforce gaps. Here, we propose a two-pronged approach, where targeted research and data are first gathered, and then used to create effective programs, initiatives, and Federal legislation that will provide funding to help address workforce utilization gaps in the most efficient manner.

The specific goals in achieving this vision are:

8.3.1. DATA COLLECTION AND RESEARCH GOALS.

- Increase funding support, through Federal agencies and Congressional legislation, for new research, data collection, and data aggregation on workforce trends, and impacts and successes in various sectors. Data should particularly focus on race, economic status, and rural versus urban areas, with the goal of aiding in the creation, capacity-building, and scaling of new state-based workforce development and digital skills training programs during 2021.

- Conduct ongoing outcomes-focused data collection, data aggregation, and research on workforce trends, federal, private, and nonprofit workforce development programs, public-private partnerships, and programmatic impacts and successes, with a particular focus on reporting training outcomes by race, analyses of best practices, and the development of best practices toolkits for replicating successful programs, with a new report released by the end of 2021.
- Use impact studies to implement widespread programmatic and rule changes that increase the effectiveness and impact of existing Federal agency programs, such as DOL, SBA, and EDA workforce initiatives, by the end of 2022.

8.3.2. PROGRAM DEVELOPMENT AND IMPACT GOALS.

- Adopt the Lifeline+ program proposed in Chapter 5, which includes LifelineJobs, a service that would support the unemployed through a broadband subsidy provided as part of unemployment benefits, empowering the unemployed to use online programs to upgrade their skills, as well as search and apply for jobs.
- Use aggregated data to develop best practices and toolkits to aid federal, state, municipal, public, and private entities in the creation, development, scaling, and expansion of new and existing workforce development programs by 2021.
- Deploy at least three new national and ten new state workforce development and digital skills training pilot programs by 2022, with planned expansion to other states by 2025.
- Increase enrollment and diversity in state and nationwide upskilling, workforce readiness, workforce development, digital skills, and other training programs by 2023, redesigning programs and prioritizing programmatic changes around new, diversity-focused data, setting goals and benchmarks, and implementing diversity and inclusion training.
- Identify, develop, test, and deploy applications of digital technologies that could foster economic and social mobility.
- Develop optional online components to in-person Related Technical Instruction required for Registered Apprenticeship certification, and all other Registered Apprenticeship-related trainings that do not require a hands-on component.¹⁵
- Develop online components for local career centers and other workforce-related community services, including American Job Centers under the U.S. Department of Labor, to supplement their in-person training programs and other offerings, which are largely unavailable at present due to the COVID-19 pandemic.

8.4. THE CURRENT SITUATION: UNDERSTANDING THE WORKFORCE GAP

The United States is currently experiencing high unemployment, but it is, ironically, also experiencing significant and growing unmet demand for labor. By Deloitte Insights' estimate, as many as half of all open jobs could go unfilled in certain industries in 2028.¹⁶ For now, millions remain out of work as a result of the COVID-19 pandemic, including workers from sectors that could take five or more years to recover, if they fully recover at all.¹⁷ This phenomenon is known as the "workforce gap," where some industries, sectors, and occupations face a dearth of qualified workers to fill vacancies, but where the existing unemployed labor force lacks the skills needed to fill them.

To fill the skills and workforce gaps, it is necessary for us to grow, scale, and modernize our national and state workforce training programs—yet we are severely underutilizing broadband, arguably the most powerful tool at our disposal, as a solution to train our labor force. Traditional approaches to filling the skills and workforce gaps do not scale well, and they are unlikely to fully bridge the gap between potential employers and potential employees. Meanwhile, increases in the availability and utilization of online tools to upskill, search, and apply for jobs underscore the importance of broadband connectivity as an essential means of closing the workforce gap quickly and efficiently.

America already is shifting to online environments for higher education. Training institutes, community colleges, and universities now offer a wide range of online certifications and degrees, enabling students to learn from anywhere. The Best Colleges 2020 Online Education Trends Report finds that 77 percent of online students enroll in these programs to help them reach career and employment goals, while 71 percent of institutions decide to offer a new online program primarily based on perceived demand from employers, and 94 percent of students of online learning programs say their programs have a positive return on investment. Demand for online programs continues to be high, with 99 percent of administrators saying they saw an increase last year or that demand has stayed the same in the past few years.¹⁸

Job searches, too, are increasingly performed online. National and global job search and recruiting sites host millions of job postings and visitors every month, with about 60 percent of job seekers using online job boards to search for new employment opportunities.¹⁹ For example, online job search platform Glassdoor has over 9 million jobs listed and 50 million unique visitors each month.²⁰ Job search platform Indeed reports over 250 million monthly visitors and about 10 jobs added per second globally.²¹ LinkedIn, the social network for professionals, is currently the 57th highest ranked website in the world in terms of global engagement, with over 722 million members as of Q3 2020.²² LinkedIn, too, has seen steady increases in quarterly usage, with increases ranging from 22 percent to 31 percent from Q1 2020 to Q1 2021.²³ Job seekers also apply for jobs through these tools, with online listing services boards accounting for almost half of job applications in 2018.²⁴

These trends coincide with a widespread shift of company recruitment and application processes to Internet-based platforms and services. The next logical step is to modernize our Nation's workforce development programs, including Registered Apprenticeship Programs and American Job Centers, by shifting them online. Currently, federal, state, and local training programs still require an upgrade of their online components, and brick-and-mortar career centers are largely closed for the duration of the COVID-19 pandemic.

The national shift to more online opportunities for job searches, applications, and training programs will expand more opportunities to more people, but it also is likely to isolate and exclude the digitally disconnected from opportunities for advancement and economic empowerment. Achieving digital equity and inclusion is increasingly vital for connecting unemployed and underemployed populations to workforce development and job search opportunities, particularly communities of color, low-income, and rural communities—all of which are facing long-term unemployment in jobs and industries that are shrinking due to the combination of natural market shifts and the COVID-19 pandemic. A top priority, therefore, is to ensure the unemployed have access to the Internet, and that upskilling, certification, and training programs are easily available online.

8.4.1. SECTORS HARDEST HIT BY COVID-19 PANDEMIC.

Prior to the COVID-19 pandemic, the United States already faced a workforce gap. In some traditional industries such as construction and manufacturing, Baby Boomers are retiring without enough skilled workers to replace them.²⁵ In new and evolving industries, such as the information and communications technology (ICT) sector, new jobs are being created that require specialized skills and training. The global economic impact of COVID-19 has exacerbated these issues, forcing businesses to cut back or shutter altogether, while also fostering new development in other areas such as broadband deployment and increased demand for online services from technology companies.

According to a McKinsey & Company analysis, "If the economic recovery from COVID-19 is muted . . . some industries will take years to get back to their pre-pandemic normal." Industries including arts, entertainment, and recreation, hospitality, and food services, educational services, transportation and warehousing, travel and tourism, and manufacturing, could take five years or more to get back to 2019-level contributions to GDP.²⁶ Other hard-hit sectors could take two to three years to recover, including administrative and other support services and construction.

As a result, millions of people are out of work in occupations that are not expected to recover any time soon, yet lack the skills needed to qualify for occupations in sectors that are growing or need to replace their retiring workforce.

8.4.2. STATE AND NATIONAL INITIATIVES IN FACILITATING JOB REENTRY, UPSKILLING, AND WORKFORCE DEVELOPMENT.

Federal, state, and local authorities have long worked to bridge workforce gaps through programs that connect the unemployed with the skills they need to fill available jobs. Federal and state action has shifted in 2020 to address increasing unemployment resulting from the COVID-19 pandemic, of course, but many of the Congressional and administrative efforts are temporary, with most measures already having expired or due to expire by the end of the year. States are slowly rolling out a patchwork of solutions for their populations. In-person workforce development programs also are largely out of reach as social distancing measures are in effect for the foreseeable future. Facilities remain closed, and many programs are unavailable online, rendering most services inaccessible for the unemployed people who need them most urgently.

None of the Congressional directives or Federal programs, such as the Workforce Innovation Opportunity Act, Work Opportunity Tax Credit, Registered Apprenticeship

ship Programs, Career One-Stops, or other programs outlined below,²⁷ has any requirements to include online training components.²⁸ In fact, many government training programs lack sufficient virtual support, have antiquated websites and online tools, and consist of resources and training centers that are largely unavailable online.²⁹ With the majority of in-person programs and services temporarily suspended or closed, this poses a tremendous barrier to addressing emergency needs, let alone the longer-term goal of upskilling America's workforce.

8.4.2.1. Pre-COVID-19 Efforts.

Registered Apprenticeship Programs. The U.S. Department of Labor is working to meet the shifting demand for labor through Registered Apprenticeship Programs (RAPs), a formalized, government-credentialed approach that prepares workers for jobs using an employer-driven, “earn-while-you-learn” model. This model was formalized in 1937, when U.S. leaders recognized the benefits of apprenticeships for individuals and industry, and passed the National Apprenticeship Act.

Today, there are more than 23,000 RAPs across the nation,³⁰ covering over 1,000 occupations across industries that include information technology, health care, cybersecurity, energy, advanced manufacturing, construction, engineering, hospitality, transportation, and financial services.³¹ The U.S. DOL has trained more than 812,000 new apprentices since 2017, with an average starting salary of \$70,000 and a lifetime earning potential of over \$300,000 more than their peers. RAPs include structured on-the-job training and classroom-based Related Technical Instruction. The COVID-19 pandemic, however, has caused significant disruption to education and training systems nationwide. The Department of Labor's Employment and Training Administration has recognized COVID-19's potential impact on RAPs, which require an individual to be employed while in the program.³²

Workforce Innovation and Opportunity Act. In 2014, Congress passed the Workforce Innovation and Opportunity Act (WIOA), which replaced the 1998 Workforce Investment Act (WIA), as the primary Federal legislation that supports workforce development.³³ WIOA covers several areas, including workforce development activities, adult education and literacy, and amendments to the Wagner-Peyser Act of 1933 and Rehabilitation Act of 1973, which provide employment support for jobs seekers. The WIOA authorizes job training and related services to unemployed or underemployed individuals and establishes a governance and performance accountability system for WIOA. Additionally, the WIOA system provides central points of service through its system of about 3,000 One-Stop Centers nationwide. Services include state and local WIOA employment and training activities, as well as partner programs.³⁴

American Job Centers and Career One-Stops. The Workforce Investment Act, adopted in 1998 and superseded in 2014 by WIOA, established the American Job Centers (AJCs) system to provide job seekers and employers streamlined access to an array of education, training, and employment services.³⁵ WIOA emphasizes the importance of integrated intake, case management, reporting systems, and fiscal and management accountability systems. Services are delivered via a national network of One-Stop centers (sometimes branded as CareerOneStops). Each local area must have at least one comprehensive One-Stop center that provides access to the services of all associated partners.

In 2016, the U.S. Department of Labor Employment and Training Administration (ETA), in coordination with the Department of Education, established the American Job Center network under WIOA. WIOA Section 121(e)(4) requires each one-stop delivery system to include in the identification of products, programs, activities, services, facilities, and related property and materials, a common one-stop delivery system identifier, in addition to using any state-or locally developed identifier.

Today, there are over 2,548 AJCs nationwide, but the majority are listed as “closed to the public; available by phone and e-mail,” “operating at limited capacity to ensure social distancing due to COVID-19,” or “closed until further notice due to COVID-19 health concerns.”³⁶ While the AJCs are largely closed, the CareerOneStop does offer a set of mobile apps for job seekers, including Find an American Job Center, Find a Job, Veterans Job Search, Salary Finder, Training Finder, and Unemployment Insurance.³⁷ The app is useful for research on jobs, industry, and wage trends, as well as providing information such as where to find local training programs for specific jobs. The app, however, remains difficult to navigate, and offers no information specifically targeting virtual training programs.

National Association of State Workforce Agencies (NASWA). The National Association of State Workforce Agencies (NASWA) is the national organization representing all 50 state workforce agencies, as well as those in D.C. and U.S. territories. These agencies deliver training, employment, career, and business services, in addition to administering unemployment insurance, veteran reemployment, and labor market

information programs. NASWA provides policy expertise, shares promising state practices, and promotes state innovation and leadership in workforce development.³⁸

In March 2020, NASWA released the first annual State of the Workforce Report, a first-of-its-kind compilation of data from the Nation's state workforce agencies into one comprehensive report, showcasing key innovations from across the country that are enhancing the Nation's workforce.³⁹ The report also presents a workforce profile for each state, the District of Columbia, and Puerto Rico, highlighting labor force data such as unemployment rates and wage growth, educational attainment data, key workforce industries, programs and services within each state's Department of Labor, total individuals served, unemployment data, number of local American Job Centers, and state workforce innovations such as apprenticeship programs and prisoner reentry initiatives.

Work Opportunity Tax Credit. The Work Opportunity Tax Credit (WOTC) is a Federal tax credit jointly administered by the U.S. DOL and U.S. Department of Treasury through the Internal Revenue Service (IRS). WOTC is available to employers for hiring individuals from certain targeted groups who have consistently faced significant barriers to employment. WOTC-targeted groups include: (1) qualified Temporary Assistance for Needy Families (TANF) recipients;⁴⁰ (2) qualified veterans; (3) qualified ex-felons; (4) designated community residents; (5) vocational rehabilitation referrals; (6) SNAP benefits (food stamps) recipients; (7) Supplemental Security Income (SSI) recipients; (8) long-term family assistance recipients; and (9) qualified long-term unemployment recipients.⁴¹ Employers receive a tax credit for \$2,400 to \$9,600 per year, per employee. The WOTC was authorized until December 31, 2020, and is generally renewed annually, although some lapses have occurred before the credit was retroactively reauthorized.⁴²

Opportunity Zones. In December 2017, the Tax Cuts and Jobs Act created the Opportunity Zone program, designed to provide tax incentives to companies for investing in economically distressed communities that have been designated as Qualified Opportunity Zones (QOZ).⁴³ QOZs are designed to spur economic development by providing tax incentives for investors who supply new capital to businesses operating in one or more QOZs. While the program is still maturing, it has faced some criticism, and progress stalled as a result of the COVID-19 pandemic. An Urban Institute report found that "although OZs were designed to spur job creation, the vast majority of capital appears to be flowing into real estate, not into operating businesses, because of various program design constraints and the undesirability of selling equity from both the business owners' and the investors' perspective."⁴⁴ The Brookings Institution has called it a "tax cut for gentrification."⁴⁵ Further, waivers allowing benefits to flow into zip codes adjacent to the originally-targeted zip codes have had the effect of subsidizing luxury apartments and office buildings in wealthy zip codes.⁴⁶

Municipal Efforts and Public-Private Partnerships. Public-private partnerships have been used across the country to build programs that benefit communities, provide jobs, and stimulate economic development. For example, in 2015, Seattle created a Priority Hire program for city public works construction projects of \$5 million or more, and, in 2017, expanded the program to public/private partnership projects with significant city investment. Using city-funded and public/private partnership projects, the Priority Hire Program prioritizes the hiring of residents that live in economically distressed areas, particularly in Seattle and King County. In addition, city projects and public/private partnership projects have apprentice utilization requirements and aspirational goals for women and people of color.⁴⁷

8.4.2.2. Post-COVID-19 Efforts.

There are numerous state and national efforts that have arisen in response to the severe unemployment and economic downturn resulting from the COVID-19 pandemic. Congress quickly passed legislation appropriating stimulus funding and extending unemployment benefits, and has extended benefits and created new waivers of taxes on unemployment benefits through the American Rescue Plan. Industry, state, municipal, and nonprofit efforts have filled some gaps, but many remain.

CARES Act Unemployment Insurance. In response to the COVID-19 pandemic, Congress has taken various actions, in the CARES Act and in the American Rescue Plan, to authorize states to provide additional weeks of federally funded Pandemic Emergency Unemployment Compensation (PEUC) benefits to people who exhaust their regular state benefits, followed by additional weeks of federally funded extended benefits (EB) in states with high unemployment.

Examples of State, Industry, and Nonprofit Virtual Training Initiatives. The pandemic has led to several innovative efforts to provide job training using broadband. In Maine, the Governor signed an executive order that provided flexibility to the Maine Community College System to quickly expand online training offered by the

Maine Quality Centers (MQC) Program, in response to workforce demands and economic effects of COVID-19. MQCs are working closely with workforce training professionals at all seven of Maine's community colleges across the state to develop and implement free online training programs. MQC is coordinating its efforts with the state's Department of Labor and other workforce agencies for the recruitment and screening of participants for the new online programs.⁴⁸

In Connecticut, Governor Ned Lamont launched the SkillUp CT program, a state-wide, free online job training program for unemployment claimants, including those who have been impacted by the economic fallout of the COVID-19 public health crisis. The program, coordinated by the Connecticut Workforce Development Council (CWDC) in collaboration with the Connecticut Governor's Workforce Council (GWC) and the Connecticut Department of Labor (CTDOL), significantly expands access to comprehensive online course work from Metrix Learning, a global provider of web-based learning management systems, for thousands of Connecticut residents. Eligible Connecticut residents receive e-mail instructions on obtaining a license to access the Metrix Learning program, which provides access to about 5,000 online Skillsoft courses in areas such as information technology, business analysis, customer service, project management, and digital literacy, among others. The courses are available to anyone with an Internet connection and a computer. SkillUp CT also offers training tracks leading to over 100 industry certifications, and will provide career coaching through the workforce boards.⁴⁹

In 2015, Seattle created a Priority Hire program for city public works construction projects of \$5 million or more and, in 2017, expanded the program to public/private partnership projects with significant city investment. Using city-funded and public/private partnership projects, the Priority Hire Program prioritizes the hiring of residents that live in economically distressed areas, particularly in Seattle and King County. In addition, city projects and public/private partnership projects have apprentice utilization requirements and aspirational goals for women and people of color.⁵⁰

Each of these initiatives can serve as a model to other states, Federal agencies, and the private sector in developing and expanding programs to help train displaced workers in industries that have not been as significantly impacted or which may be experiencing labor shortages as a result of COVID-19.

Private companies are also responding to the emergency. Microsoft is launching a global skills initiative aimed at bringing more digital skills to 25 million people worldwide by the end of the year. This initiative will combine existing and new resources from Microsoft, as well as subsidiaries including LinkedIn and GitHub. It will be grounded in three areas of activity: (1) the use of data to identify in-demand jobs and the skills needed to fill them; (2) free access to learning paths and content to help people develop the skills these positions require; and (3) low-cost certifications and free job-seeking tools to help people who develop these skills pursue new jobs.⁵¹

Comcast has launched the Comcast RISE (Representation, Investment, Strength, and Empowerment) program to provide support for businesses owned by Black Americans, Indigenous Americans, and People of Color.⁵² Qualified small businesses can receive one or more of several services through Effectv, the advertising sales division of Comcast, and Comcast Business. These include local marketing consulting, a 90-day TV media campaign, a 30-second TV commercial, a "technology makeover" including computer equipment and Internet, voice and cybersecurity services for up to a 12-month, and grants of up to \$10,000 for businesses that have been in operations for three to five years.

Several organizations and companies, including Charter Communications, Focus on Rural America, Family Business Coalition, Natural Rural Education Association, League of Rural Voters, and Schools, Health & Libraries Coalition, have partnered to create the Connect the Future coalition, focused on quickly connecting millions of unconnected Americans to high-speed Internet. The coalition plans to "shine a light on the barriers to Internet access, show the solutions to expand access to more homes and businesses, and shift the national conversation to enact those solutions—soon."⁵³

CompTIA (the Computing Technology Industry Association) is *responding* to COVID-19 by conducting live, virtual training for unemployed and underemployed during the crisis. CompTIA also provides WIOA-approved training programs.

8.4.3. THE WORKFORCE GAP AND COVID-19'S IMPACT ON PEOPLE OF COLOR, LOW-INCOME, AND RURAL COMMUNITIES.

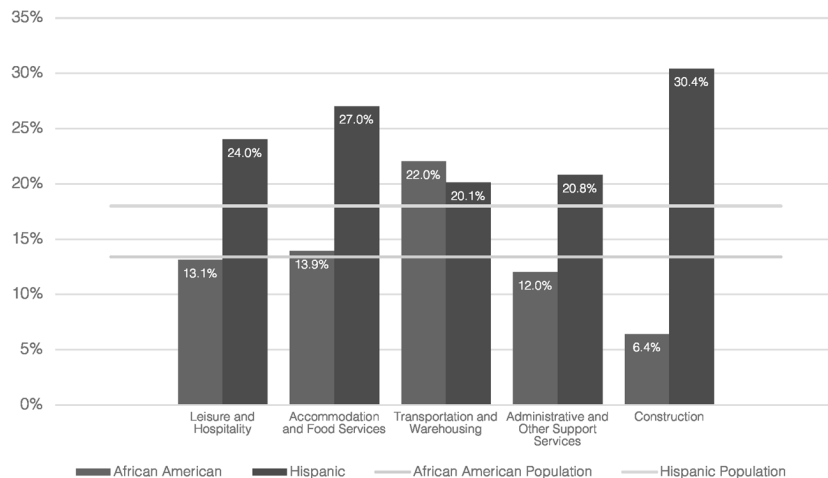
Despite these and other programs available across the nation, closing the workforce gap is complicated by several factors. As discussed in prior chapters, millions of Americans lack any available options for broadband service. More have access to

broadband but cannot or choose not to subscribe. For those who are not online, brick-and-mortar government services designed to assist individuals with signing up for unemployment benefits or with workforce development programs are only open in limited capacity or closed for the foreseeable future.⁵⁴ Additional workforce development programs, such as the Registered Apprenticeship Programs, offered through industry and the U.S. Department of Labor, include on-the-job learning and Related Technical Instruction components that are not available online.⁵⁵

The combination of these factors has had a significant impact on the overall U.S. unemployment rate, with a predictably outsized impact on communities of color. According to the Bureau of Labor Statistics, the national unemployment rate for Q3 2020 is 8.9 percent, compared with 3.7 percent for Q3 2019.⁵⁶ The unemployment rate for whites is somewhat lower at 7.9 percent, while the rate is several percentage points higher for Black Americans and Latinxs at 13.2 percent and 11.2 percent, respectively. Further, Black Americans and Latinxs are disproportionately represented in many of the hardest-hit sectors and subsectors, as shown in Figure 1.

FIGURE 1

HARDEST-HIT SECTORS AND SUBSECTORS DISPROPORTIONATELY REPRESENTED BY BLACK AMERICANS AND LATINXS



Hardest-Hit Sectors and Subsectors Disproportionately Represented by Black Americans and Latinxs Source: Bureau of Labor Statistics 2019 "Labor Force Statistics from the Current Population Survey" and McKinsey Global Institute "COVID-19 in Hardest-Hit Sectors" analysis

Communities of color and other marginalized groups, such as low-income and rural communities, are further harmed by the disproportionate impact of the COVID-19 pandemic itself. According to the Centers for Disease Control and Prevention (CDC), people of color are at increased risk of getting sick and dying from COVID-19 due to "[inequities] in the social determinants of health, such as poverty and health care access, [which] are interrelated and influence a wide range of health and quality-of-life outcomes and risks," as well as "higher rates of some medical conditions that increase one's risk of severe illness from COVID-19."⁵⁷ Further, "community strategies to slow the spread of COVID-19 may cause unintentional harm, such as lost wages, reduced access to services, and increased stress, for some racial and ethnic minority groups."⁵⁸

These groups also disproportionately work in sectors that lack the ability to work remotely, such as hospitality, food service, and transportation, and have consequently been hit hardest by COVID-19-related layoffs. For these populations, leaving their homes to work or seek employment puts them at much greater risk of contracting, falling seriously ill, and dying from COVID-19. Further, these populations are relatively lower-income and face significant financial hardship from the inability to work, hardships from which they are relatively ill-positioned to recover.

In this environment, it is essential that these groups have the tools and resources they need to reskill through virtual online training programs. Unfortunately, while numerous programs and initiatives exist, they are largely unavailable online.

8.4.4. IMPACT OF BROADBAND ADOPTION ON WORKFORCE DEVELOPMENT.

Persons out of work indefinitely should have the opportunity to enter workforce development programs and reskill. However, as outlined above, many workforce programs and local job centers are currently closed, operating at limited capacity, available by appointment only, or only available by phone or e-mail.⁵⁹ In cases where opportunities are available virtually, access to online training is difficult or impossible without home broadband access and without overcoming digital literacy barriers.

As discussed in Chapter 4, Black Americans, Latinxs, and Tribal groups historically have adopted broadband at lower rates compared to white Americans. Rural and low-income Americans face similar discrepancies. These factors lead to a perpetuating cycle: without access to meaningful employment, households cannot afford broadband, and without broadband, they cannot upskill or search for jobs, training programs, and other opportunities. By establishing online workforce development and training programs, Federal and state governments can close the broadband utilization gap, connect underrepresented groups to employment opportunities, and achieve digital equity and inclusion.

The key challenges to overcome to close the broadband utilization gap through workforce development in the United States include:

- *Data Gaps.* More data is necessary to identify, predict, and fill workforce gaps. Additionally, few training programs report outcomes by race.⁶⁰ These data can have numerous applications, including improving existing programs, building out and expanding successful programs, and developing best practices and standards from existing programs.
- *Low Federal Investment Where Needed.* The Federal government makes significant investments to harness science and technology to achieve some goals (national security, health, energy, space, basic science), but not others (education, workforce development, economic and social mobility, racial disparities). Agencies such as HUD, Education, Labor, and the human service components of HHS have little or no capacity to engage with researchers and entrepreneurs to develop and deploy breakthrough applications of technology that would advance equity and inclusion.⁶¹
- *Existing Workforce Development Programs Largely Lack Virtual Service and Training Support.* Existing programs such as Registered Apprenticeship Programs, Career One-Stops, and other offerings with classroom instruction components and brick-and-mortar service locations are largely paused, closed, or open with limited capacity in the wake of COVID-19.⁶² Prior to (and following) the pandemic, traveling to these locations placed burdens on low-income and other disadvantaged groups that needed additional supportive services such as transportation and childcare.⁶³ Virtual support and training programs would significantly improve ease of access for the groups that need them most.
- *Social Spending Not Currently Organized to Support the Development of Tech-Enabled Interventions.* Currently, funding for workforce-related and other social spending is generally provided through a block grant or a formula grant, based on several factors relating to local unemployment figures, to the states. While there are policy rationales for allocating funds in this way, it runs counter to key features of most technology-driven applications, which are characterized by high fixed start-up costs and very low marginal costs to train each additional participant. Under existing formulae for WIOA funding, for example, state funding allotment can only increase to 130 percent of prior-year budgets,⁶⁴ which is not enough to incentivize states to invest in the development of tech-enabled solutions that scale nationally.
- *Digital Literacy Gaps.* Despite strides to close the broadband availability, adoption, and affordability gaps, as well as changing perceptions of the opportunities afforded by broadband use, many Americans still lack the digital literacy skills necessary to take advantage of online offerings, as discussed in greater detail in Chapter Four.

8.6. RECOMMENDATIONS

8.6.1. *WORKFORCE DEVELOPMENT-RELATED RECOMMENDATIONS IN OTHER CHAPTERS.*

There are several workforce-related recommendations in other chapters that we cross-reference here. These include:

- Creating a workforce of “Digital Navigators” to assist individuals and small businesses, particularly in communities of color and low-income communities, with obtaining digital readiness and literacy skills, as discussed in Chapter 4;
- Creating a broadband benefit for unemployed persons so that they can get and stay online to train, search, and apply for jobs, as discussed in Chapter 5;
- Creating a workforce of on-line tutors to focus on improving basic reading and math skills, particularly for students in communities of color and low-income communities, as discussed in Chapter 10; and
- Engaging in research relating to using AI for job training, as discussed in Chapter 11.

8.6.2. *CONGRESS SHOULD DIRECT FEDERAL AGENCIES TO INCREASE DATA COLLECTION RELATED TO WORKFORCE DEVELOPMENT.*

Congress should direct Federal agencies to increase data collection, data aggregation, and research on workforce development program trends and programmatic impacts and successes, with a particular focus on reporting training program outcomes by race.

We also need to aggregate data on national, state, municipal, and public-private hybrid workforce programs, focusing on diversity, placement, virtual training elements, the prevalence and impact of such programs in growing and shrinking sectors, and other measures of programmatic impact and success. The data, when gathered, should be used by Congress and Federal agencies to develop and promote best practices, guidelines, and standards to build new programs, improve existing programs, and standardize virtual learning components.

To this end, Congress should pass legislation directing the Bureau of Labor Statistics, the Department of Labor, and the Small Business Administration to collect and apply this data. These agencies should work with State Workforce Agencies, through the National Association of State Workforce Agencies, to aggregate state-level data, and determine the factors that make up the most successful programs, particularly when it comes to diversity and job placement.

8.6.3. *CONGRESS SHOULD INCENTIVIZE COMPANIES, STATES, MUNICIPALITIES, NONPROFIT ORGANIZATIONS, AND HYBRID ENTITIES TO CREATE, BUILD CAPACITY, AND SCALE NEW WORKFORCE DEVELOPMENT AND DIGITAL SKILLS TRAINING PROGRAMS.*

Armed with the data collected by the BLS, DOL, and SBA, Congress can assess the funding needs and requirements for successful national, state, and local programs. Congress should use these data and recommendations to pass legislation that increases investment in innovation, including implementing virtual training tools to new and existing programs, as well as scaling up existing programs.

8.6.3.1. Congress should appropriate funding for the U.S. Department of Labor to dramatically scale up Registered Apprenticeship Programs.

The U.S. Department of Labor invests \$200 million per year in Registered Apprenticeship Programs. This represents just 2.1 percent of the agency’s \$9.4 billion discretionary budget authority.⁶⁵ Congress should increase the amount it appropriates to apprenticeship programs. This increased investment would allow the U.S. Department of Labor to vastly expand its efforts to improve and modernize training programs; increase apprenticeship opportunities through partnerships between companies, community colleges, technical schools, universities, nonprofit organizations, states, municipalities, and other entities; and add new, 21st-century components to its Registered Apprenticeship Programs, including robust online training support.

8.6.3.2. Congress should direct the U.S. Department of Labor to institute new sectoral training programs.

Congress should establish new sectoral training programs to align training with local job markets, leverage the community college system, and, by designing training based on an entire sector, ensure that workers gain skills that are transferable across employers. This model already exists in several states and cities, with studies finding that participants in sectoral programs earned 18 percent more than control group participants and were more likely to work in jobs that offered benefits such

as health insurance or paid leave, among other results.⁶⁶ Sectoral training would, in particular, assist low-income communities and communities of color.

8.6.3.3. Congress should direct the U.S. Department of Labor to formally implement integrated online training components in Registered Apprenticeship Programs.

The Department of Labor's Employment and Training Administration has acknowledged the potential impact of the COVID-19 pandemic on RAPs, which require an individual to be employed while in the program.⁶⁷ Congress should direct the Department of Labor to develop standards and tools for companies to support online learning options for the Related Technical Instruction portions of their Registered Apprenticeship Programs (*e.g.*, any parts of the training that do not require hands-on training). Additional funding support for the development of online training components would enable widespread development and adoption of virtual training programs. Further, the investment would have a positive ROI, as entities would save on funds currently spent to provide supportive services such as transportation to training facilities, freeing up capital to improve the performance and outcomes of the training programs themselves.

8.6.3.4. Congress should direct WIOA to implement support for virtual trainings under its core programs Federal funding.

Under the Workforce Innovation and Opportunity Act of 2014, the Federal government distributes funding to states for six core programs, including the U.S. Department of Labor's Adult Services, Dislocated Workers, and Youth Services programs (for employment and training activities, including the American Job Center and Career One-Stop systems); Wagner-Peyser programs (employment services for job seekers); and the U.S. Department of Education's Division of Adult Education and Literacy (for basic skills) and its rehabilitation services programs (for employment services for individuals with disabilities). In 2017, the Federal government distributed over \$7 billion in funding under WIOA. Congress should direct WIOA to include funding earmarked to develop and implement virtual training components for each of its core programs.

In addition, the Department of Labor should call out digital literacy as a priority activity or otherwise incentivize applicants to address this issue in their responses to existing Federal discretionary Solicitations for Grant Applications, such as those for apprenticeship grants. Further, The Department of Labor should also issue a Training and Employment Guidance Letter (TEGL) that clarifies how and when digital literacy activities can be paid for by WIOA Title I dollars (*e.g.*, as part of technical training for an Integrated Education and Training [IET] program)

8.6.3.5. Congress should provide additional funds to State Workforce Agencies to support the development of state and municipal efforts and public-private partnerships.

Congress should direct the U.S. Department of Labor to work with the NASWA and individual State Workforce Agencies to develop public-private partnerships. There are numerous examples of public-private partnerships between municipalities, companies, nonprofit organizations, and other groups that focus on economically depressed and historically underrepresented and marginalized groups. But these types of partnerships and programs do not exist in every area.

The U.S. Department of Labor and State Workforce Agencies can use the best practices and standards developed from the data collection efforts listed in 8.6.1 to encourage the development and scaling of new partnerships across additional states and municipalities, which can learn from and replicate strategies from existing successful programs.

8.6.3.6. The Federal Government should ramp up efforts working with the private sector to provide apprenticeship opportunities and other efforts to address the labor shortfall in deploying next generation broadband networks.

The U.S. currently lacks a sufficiently trained workforce to meet the demand for deploying 5G and other next generation broadband networks. As additional Federal investment is introduced to build broadband networks, it will create more demand on a workforce that is already under-supplied with the proper skills. Expanding and upskilling this workforce provides opportunities for diversification so those building the networks reflects the diversity of broadband consumers.

One way to address this need is through apprenticeships that provide paid work experience, classroom instruction, and a nationally recognized credential. The Department of Labor has mechanisms in place to immediately implement support for employers that seek to diversify and develop their workforce for deploying broadband networks. According to the Wireless Infrastructure Association (WIA), more than 50,000 new jobs through 2024 will be in occupations that have existing

or planned apprenticeships—including 5G small-cell technician, tower installers, supervisors, engineers, project managers, and cybersecurity professionals. In that light:

- Congress should fund the Department of Labor to expand communications and 5G apprenticeships, directly support employers to provide apprentices with technical instruction, fund institutes of higher education to develop programs of study on broadband and 5G training and build pre-apprentice solutions.
- The FCC should lead an interagency working group that, in consultation with the Department of Labor (DOL) and other Federal and non-federal stakeholders, undertakes developing recommendations to address the workforce needs of the communications industry.
- The FCC, in consultation with DOL, should issue guidance on how states can address the workforce shortage in the communications industry by identifying all of the Federal resources currently available to states for workforce development efforts.
- The Government Accountability Office should conduct a study to determine the specific number of skilled communications workers the United States needs to build and maintain broadband infrastructure, including in rural areas, and the 5G wireless infrastructure needed to support 5G wireless technology.
- As part of this effort the communications industry should continue in its current efforts to develop partnerships with institutions of higher education, including Historically Black Colleges and Universities (HBCUs) and Tribal Colleges and Universities (TCUs) to translate job requirements from employers during the curriculum development process.

8.6.3.7. Congress should fund public outreach campaigns to publicize online training programs and initiatives.

One key to closing the broadband utilization gap through workforce development is ensuring that the general public is aware of these opportunities. Congress should provide funding, and direct agencies such as the Department of Labor, Department of Education, Department of Commerce, and Small Business Administration to launch nationwide publicity and outreach programs to inform populations on available programs. Additional funding should also be dispensed to State Workforce Agencies to publicize programs within their respective states.

8.6.4. *THE WHITE HOUSE AND CONGRESS SHOULD EXPAND ACCESS TO ADDITIONAL RESOURCES AND TECHNICAL ASSISTANCE FOR ENTERPRISES LOCATED IN RURAL AREAS AND COMMUNITIES OF COLOR.*

The White House and Congress should support competitive grants fueling the private creation of urban and rural business incubators, technology campuses from dormant industrial sites, and other measures intended to foster targeted and localized small business growth.⁶⁸ This would help with digital equity and inclusion by expanding the technical skills of those in communities that to date have been largely excluded by the changes in technology. For example, one such initiative could support the development of a national network of small business incubators and innovation hubs on the grounds of Small Business Development Centers, public libraries, community colleges, Historically Black Colleges and Universities (HBCUs), Tribal Colleges and Universities (TCUs), and Minority Serving Institutions (MSIs). Such an initiative would provide essential support for needed services such as business coaching, opportunities to partner with national laboratories and commercialize federally funded research, and legal, human resources, accounting, regulatory compliance, and information technology services to aspiring entrepreneurs.

The initiative also would specifically emphasize the importance of establishing the digital footprint of small businesses and include coaching and training opportunities for digital engagement with businesses' communities, jobseekers, and staff. Such an initiative should direct upskilling resources to small and mid-sized companies, which are more likely to employ workers with digital skill gaps, and often the least able to mount ambitious in-house upskilling efforts.

8.6.4.1. The White House should reform the Opportunity Zone program in order to meet its economic and community development goals.

As discussed earlier in this chapter, the Opportunity Zone program has largely fallen short of meeting its stated goals, with investors tending to favor high-return projects such as luxury apartments rather than efforts focused on economic empowerment, such as affordable housing and local businesses. We propose several reforms to the Opportunity Zone program, including:

- Incentivizing Opportunity Funds to partner with nonprofit or community-oriented organizations, and jointly producing a community-benefit plan for each investment, with a focus on creating jobs for low-income residents and otherwise providing a direct financial impact to households within the Opportunity Zones.
- Directing that Opportunity Zone benefits be reviewed by the Department of Treasury to ensure these tax benefits are only being allowed where there are clear economic, social, and environmental benefits to a community, and not just high returns—like those from luxury apartments or luxury hotels—to investors.
- Introducing transparency by requiring recipients of the Opportunity Zone tax break to provide detailed reporting and public disclosure on their Opportunity Zone investments, and their impact on local residents, including poverty status, housing affordability, and job creation.

In addition to the emphasis on affordable housing and local businesses, investors should be encouraged to invest in training centers that focus on digital skills training and workforce development programs. These centers can serve as technology hubs in the community where workforce and business development programs can rent space and community members can go for digital literacy and workforce development programs.

These actions, coupled with the research, investment, and online workforce development program efforts outlined above, could create opportunities for disenfranchised communities of color in urban and rural areas.

8.6.4.2. Support Federal Software Preference for Places Left Behind in the United States.

Congress should incentivize contractors who sell software to the Federal government to locate part of their workforce in America, and specifically in rural areas and communities of color. By incentivizing relocation of work, there could be a move by government contractors to open software development locations in areas left behind and create good paying tech jobs.

8.6.5. *STATES SHOULD MODERNIZE THEIR UNEMPLOYMENT BENEFITS SYSTEMS, TO ENABLE THE NEWLY UNEMPLOYED TO ACCESS BENEFITS AND OPPORTUNITIES FOR FUTURE EMPLOYMENT MORE EFFECTIVELY.*

Chapter 12 discusses a number of steps governments should take to modernize and improve the delivery of general services in ways that benefit the public, and which would especially benefit persons in low-income communities and communities of color. Here, we focus on the specific need to modernize and improve the unemployment benefits system. A 2020 study by The Century Foundation, National Unemployment Law Project, and Philadelphia Legal Assistance reported that fewer than half of states have modernized their unemployment benefits systems. Many claimants have found systems that were touted as convenient and accessible to be in actuality challenging and counterintuitive.⁶⁹ We agree with the study and believe efforts at modernization should prioritize the following principles:

- Unemployed workers should have 24/7 access to online and mobile services.
- Unemployment websites and applications should be optimized for mobile devices. As discussed throughout this Plan, low-wage workers and workers of color are particularly likely to rely on their phones for Internet access.
- Call-back and chat technology should be used to deal with the large surges on incoming calls and be implemented as part of a permanent solution. Such technology would improve access while saving money for the government.
- All websites and applications should be translated into Spanish and other commonly spoken languages. Translating online materials would not only ensure equal access, but also be more efficient for those needing assistance who may never get through to a person on the phone or who get stuck on hold for hours.

8.6.7. *CONGRESS SHOULD INCREASE HEALTH CARE WORKFORCE DIVERSITY.*

As discussed in Chapter Nine on Health Care, greater diversity in the health care workforce can help address racial and ethnic health care disparities. Health care professionals who identify as racial or ethnic minorities are more likely to provide care to lower-income, minority, and uninsured populations. Only 23 percent of Black Americans, 26 percent of Latinxs and 39 percent of Asian Americans have a physician who shares their race or ethnicity, compared to 82 percent of white Americans. Racial concordance between the health care provider and patient correlates with improved health outcomes, patient satisfaction, and communication. It can help over-

come harmful racial or cultural biases in the provision of health care, mistrust of the medical community, as well as cultural attitudes and beliefs about health care.

Although the overall health care workforce is becoming more diverse, the majority of people of color remain in entry-level and often lower-paying jobs with little opportunity for advancement. Further, BLS reports that 6 of the 10 fastest-growing occupations are related to health care,⁷⁰ presenting opportunities for people of color to seek stable, high-wage jobs in these fields. More investment in programs that combine social, academic, and financial support are needed to address the financial challenges, disconnected pipelines, unclear career pathways, and lack of academic and social supports hindering workforce diversity.

8.6.7.1. Congress should pass legislation increasing education support for workforce diversity in health care.

Congress should authorize assistance for increasing workforce diversity in underrepresented professions (*e.g.*, allied health care fields including physical and occupational therapy, audiology, and speech-language pathology). This assistance might take the form of grants to education programs to provide scholarships, or support for recruitment and retention efforts for students of color.⁷¹

8.6.7.2. Congress should increase funding for workforce development of underrepresented groups in health care.

The Department of Health and Human Services (HHS) should increase funding to support the development, recruitment, and retention of health care professionals from underrepresented groups. Funding should augment student training, internships, fellowships, and mentoring programs, as well as ongoing professional development. HHS should ensure coordination among efforts across agencies (*e.g.*, HRSA, CDC's Office of Minority Health and Health Equity (OMHHE), Office of Minority Health, etc.).

CHAPTER 9.

HEALTH CARE

“OF ALL THE FORMS OF INEQUALITY, INJUSTICE IN HEALTH IS THE MOST SHOCKING AND THE MOST INHUMAN”—DR. MARTIN LUTHER KING, JR., CHICAGO, 1966

9.1. PROBLEM STATEMENT

The failure to achieve digital equity and inclusion drives up health care costs for all Americans because it deprives the system of the full cost savings these technologies can generate. It particularly harms those with lower incomes and communities of color who cannot receive health care services that are increasingly provided online. Even when the tools to take advantage of online health care are available, members of these communities often lack the knowledge and skills to use them.

Instead of closing gaps in access, quality of care, and patient experience, ironically, digital technologies are exacerbating long-standing disparities, resulting in declining health outcomes for at-risk populations, as well as higher costs system-wide. In part, these problems are a function of existing regulations, which unintentionally hinder adoption of online health care services by patients, providers, and insurers.

9.2. VISION

We need a health care system that empowers everyone to attain their best possible health outcomes. Every American should be able to get the right care, at the right time, wherever they are. A zip code should no longer be a strong predictor of health outcome, as it is today. To do so, all persons should have access to user-friendly health-enabling tools and technologies that connect them to high-quality, affordable health care services and information they can understand.

9.3. GOALS

The key goals for the digital equity and inclusion agenda in health care are directed at improving health outcomes while lowering costs:

- Reduce disparities in access to care, quality of care, and patient experience.
- Ensure all individuals benefit from technology-driven advances in health technology—including broadband-based service delivery—independent of race, income level, or location.
- Enable individuals receiving government-supported health care benefits (including Medicare, Medicaid, and state-level assistance) to enjoy the benefits of telehealth services to the same extent as other patients.

- Enhance digital health literacy among low-income persons and persons of color.
- Engage in and disseminate evidence-based research on improving care equity for communities of color.

9.4. CURRENT SITUATION

Low-income communities and communities of color face profound disparities in health status. They experience higher incidence or prevalence of disease, earlier onset or faster progression of disease, poorer daily functioning and quality of life, premature or excessive mortality, and greater global burden of disease.⁷² In particular, these communities suffer higher rates of heart disease, high blood pressure, diabetes, asthma, HIV/AIDS, and infant mortality. Infant mortality for Black Americans, a key indicator of a population's health, is almost twice the national average.⁷³ (Please see Appendix 9A—Health Disparities). As the National Broadband Plan noted a decade ago:

A significant problem plaguing the nation's health care system is the fact that there are health disparities across different ethnic groups. Black Americans, for example, experience the highest rates of mortality from heart disease, cancer, cerebrovascular disease, and HIV/AIDS than any other U.S. racial or ethnic group. Hispanic Americans are almost twice as likely as non-Hispanic whites to die from diabetes. Some Asian Americans experience rates of stomach, liver and cervical cancers that are well above national averages.⁷⁴ Further exacerbating this problem, members of ethnic groups are less likely than whites to have health insurance, have more difficulty getting health care and have fewer choices in where to receive care.

Challenges accessing care contribute to these disparities. Longitudinal research comparing quality measures across racial/ethnic minorities and lower income groups shows that while overall quality is improving for these groups, their access is worse and there has been no progress in lessening disparities.⁷⁴ A study in the greater Rochester, NY area showed that introducing telehealth to impoverished inner-city children redressed socioeconomic disparities in acute care access, thus contributing to a more equitable community.⁷⁵

Broadband has the potential to address many of the key failings of the health care system that contribute to disparities, including inadequate access to care, inconsistent quality of care, and variations in patient experience due to location. Because the Internet is indifferent to time, distance, location, and technology, it has great potential to erase many inequities. However, this is only possible if everyone is connected, and only if the tools for utilizing health care are usable by everyone, not just the tech savvy. Again, as noted in the National Broadband Plan, "Broadband is not a panacea. However, there is a developing set of broadband-enabled solutions that can play an important role in the transformation required to address these issues."

Internet-based health care delivery is generally referred to as telehealth. The defining feature of telehealth is that the clinician and patient are not physically in the same room. Telehealth technologies today already include live video conferencing, mobile health (mHealth) apps, text messages, "store and forward" electronic transmission, and Internet-enabled and wearable devices for remote patient monitoring (RPM) that are used to provide care. The future, no doubt, will see many more exciting innovations in this area.

Telehealth is not a separate form of health care, but rather a means for health care professionals to provide care that is more convenient and less expensive for patients, to connect patients in rural and urban areas that are underserved in terms of specialists (such as cardiologists and neonatologists) who would be otherwise inaccessible, and to engage individuals in managing their health and wellness. It expands the reach of health care professionals so people can obtain linguistically and culturally appropriate care. (Please see Appendix 9B—Benefits of Telehealth).

It is important to recognize that access to and utilization of telehealth by at-risk communities is a rural *and* urban issue, not a rural versus urban solution. However, the Medicare statute, which was waived during the pandemic, generally restricts telehealth eligibility to beneficiaries in rural areas. Further, setting up and maintaining telehealth infrastructure is expensive and most large health systems that would do so are located in urban areas. The private capital investment in telehealth infrastructure needed for rural areas is more likely to be financed if it can be leveraged to also care for local urban populations who suffer similar access challenges.⁷⁶

Telehealth is proving that it can improve health outcomes. It can also lower costs. (Please see Appendix 9B—Benefits of Telehealth). But a lack of digital equity and inclusion is making it more difficult to achieve potential cost savings in providing health care. The need to reduce costs is urgent, as the Department of Health and

Human Services (HHS) projects health costs will grow to a staggering \$6 trillion by 2027,⁷⁷ and Medicare's Trustees warn that the Medicare system will go bankrupt in 2026.⁷⁸

Although comprehensive, population-wide analysis is needed and should be undertaken by the Center for Medicare and Medicaid Innovation (as recommended and discussed in Chapter 5), there are numerous examples of Internet-enabled health care lowering costs.

- Research shows that telehealth could potentially save companies more than \$6 billion a year, for example, by keeping employees healthier and more productive.⁷⁹
- Goldman Sachs estimates that connected devices could reduce health costs by \$300 billion, by increasing access to diagnostic treatments, preventative care, and chronic disease management.⁸⁰
- Digital therapeutics, which are technology-based solutions that have a clinical impact on disease comparable to that of a drug, have the potential to provide effective, low-cost ways to prevent and treat chronic diseases and their consequences.⁸¹ (Please see Appendix 9C—Digital Therapeutics).
- One study estimated average savings of \$97 to \$145 per patient per month when digital therapeutics were used for type 2 diabetes and hypertension.⁸²
- For its Diabetes Telehealth Network, Mississippi became the first state to pay mobile connectivity fees for telehealth and projected Medicaid savings of \$189 million a year.⁸³
- A *more recent study* of a tele-video health care program found that “the majority of health concerns could be resolved in a single consultation and new utilization was infrequent. Synchronous audio-video telemedicine consults resulted in short-term cost savings by diverting patients from more expensive care settings,” with the net cost savings per telemedicine visit “calculated to range from \$19–\$121 per visit.”
- In recognition of the ability to improve outcomes and lower costs, Kaiser Permanente, one of the Nation's largest not-for-profit health plans, makes telehealth a key component of its integrated approach to high-quality care delivery.⁸⁴

Even a decade ago, it was clear that health care provided over communications technology could help reduce U.S. health care costs. As the National Broadband Plan noted:

The Veterans Health Administration (VHA) coordinates the care of 32,000 veteran patients with chronic conditions through a national program called Care Coordination/Home Telehealth (CCHT). CCHT involves the systematic use of health informatics, e-care, and disease management technologies to avoid unnecessary admission to long-term institutional care. Technologies include videophones, messaging devices, biometric devices, digital cameras, and remote monitoring devices. CCHT led to a 25% reduction in the number of bed days of care and a 19% drop in hospital admissions. At \$1,600 per patient per year, it costs far less than the VHA's home-based primary care services (\$13,121 per year) and nursing home care rates (\$77,745 on average per patient per year). Based on the VHA's experience, e-care is an appropriate and cost-effective way to manage chronic care patients in urban and rural settings. Most importantly, it enables patients to live independently at home.

In 2012, telehealth services provided to over 150,000 beneficiaries resulted in average annual savings of \$6,500 per patient, which equated to nearly one billion in annual savings for the VHA.⁸⁵

Although telehealth has been available for decades, the pandemic has greatly accelerated its adoption across all patient and provider populations.⁸⁶ The Centers for Medicare and Medicaid Services (CMS) reported unprecedented increases in telehealth, with 1.7 million beneficiaries receiving services in the last week of April, 2020, versus only 13,000 a week before the pandemic.⁸⁷ Early CMS data show telehealth to be an effective way for people to access health care safely during the COVID-19 pandemic, whether it is getting a prescription refilled, managing chronic conditions, or obtaining mental health counseling.⁸⁸

However, early signs of disparities in access to care via telehealth are emerging. COVID-19 both highlighted and added to these disparities, as the pandemic disproportionately impacts communities of color. Federal data show that Black American and Latinx individuals are nearly three times more likely than Whites to contract COVID-19, almost five times more likely to be hospitalized, and twice as likely

to die from it.⁸⁹ Furthermore, vaccine appointments are largely made online, leaving persons of color that lack Internet access unable to sign up. The effects of missing care and having diseases go undiagnosed and/or untreated since the onset of the pandemic are disproportionately harming persons of color. According to the CDC, excess deaths increased nearly 15 percent for Whites, but almost 45 percent for Latinx and over 28 percent for Black populations last year.⁹⁰

Large primary care practices have found that patients identifying as Non-Hispanic White represent a higher proportion of provider visits once telehealth was scaled up; whereas, communities of color and those with a non-English language preference saw decreases in provider visits.⁹¹ Similarly, a study in the *Journal of the American Medical Informatics Association* shows that Black and Latinx patients in New York City during the early peak of the crisis had lower odds of using telehealth instead of the emergency room or an office visit compared to Whites or Asians.⁹² Another recent study found that 60 percent of Black and over 70 percent of Hispanic adults age 65+ are incapable, for different reasons, of conducting video visits.⁹³ These trends, coupled with excess-death data, are concerning as they suggest declines in primary care, inadequate chronic disease management, and increased mortality long-term due to lack of detection and treatment among marginalized populations.

A reliance on digital technology to accomplish essential tasks, including disseminating health information and monitoring conditions, as well as communicating with and engaging patients in their health care, has the unfortunate potential to add to, rather than erase, current health disparities for patients without access to or the skills to use these technologies.⁹⁴ COVID-19 has brought new attention to some of the key challenges to achieving digital equity and inclusion in health care. These include the availability and adoption of home broadband (which includes, by definition, reliable and affordable service) and Internet-enabled devices; eligibility to receive telehealth services and corresponding reimbursement; limitations in digital literacy and workforce diversity, which affect interactions with providers; and limited research and data specific to telehealth and communities of color.

Further, there are few national standards for telehealth, and reimbursement for eligible services and type of technology used varies by state and insurer. These inconsistencies hinder broader telehealth adoption, especially for Medicaid beneficiaries, the majority of whom are people of color.

9.6. RECOMMENDATIONS

There are enormous disparities in health and health care. Telehealth is part of the solution to reduce them, but it can only be successful if low-income communities and communities of color are connected, have connected devices, and know how to use them for health care purposes (*e.g.*, find and download a health care app, log into it using an e-mail address, and comprehend the language on the screen). There is a confluence of factors that adds to the urgency of driving telehealth adoption among communities of color. First, telehealth is growing and will remain a feature of service delivery even post pandemic. Second, telehealth is a path for achieving more equitable health outcomes while still containing costs. The recommendations below outline steps that Congress and the Administration should take to advance digital equity and inclusion in health care.

9.6.1. LEVERAGE THE FEDERAL ROLE IN FUNDING HEALTH INSURANCE TO CLOSE THE HEALTH CARE BROADBAND GAP FOR INDIVIDUALS

As discussed throughout this Chapter, Americans seeking health care rely increasingly on broadband services for essential services. Some of that increase is driven by COVID-19. Unfortunately, the benefits of telehealth have not been experienced by those without access to broadband, a population group that could most benefit from access to telehealth. As discussed in Chapter 4, broadband adoption is lowest among low-income communities and communities of color.

There are many reasons non-adopters would benefit significantly from telehealth. They are more likely to work in hourly jobs, so saving the time that would be taken up traveling to and from a doctors' office results in increased wages. They are less likely to have cars, and therefore being able to visit with a health care professional without having to resort to the use of public transportation, which may not be convenient to the doctors' office, or an expensive taxi ride, is also a significant benefit. Finally, non-adopters are more likely to lack affordable childcare, and might otherwise skip or delay necessary doctor visits if they are unable to access care from their homes.

But without access to broadband, such benefits are unlikely to be realized. The *Federal Health IT Strategic Plan* calls for advancing "equitable access to technology and broadband for individuals, families, and communities."⁹⁵ Policymakers must

now proactively promote and support broadband at home, both to improve health outcomes, and to achieve needed cost savings for its covered population. As described in Chapter 5, the way to do so is through the proposed LifelineMed program, which would mandate that Federal government health insurance programs support broadband adoption by covered persons who are not connected and who are below a set income level, ensuring they have the necessary devices, training, and other tools needed to take advantage of the full range of expanding telehealth services.

9.6.1.1. Conduct a Large-Scale Study of Paying for Patient Connectivity.

As the Nation's largest payer, and henceforth beneficiary of telehealth cost savings, CMS should explore creative approaches to ensuring communities of color can receive care via telehealth. Either as a step in designing the LifelineMed program described in Chapter 5, or in piloting it before a full-scale roll-out, CMS, in conjunction with the Federal Communications Commission (FCC), should create a scalable demonstration program to test the effect of providing patient connectivity and corresponding digital health education on health outcomes and the cost of care for communities of color.

Broadband access has been shown to be a crucial determinant in the use of digital health tools.⁹⁶ There is also growing consensus that broadband access is a social determinant of health generally (please see Appendix 9D—Social Determinants of Health), and disparities in access should be treated as a public health issue.⁹⁷ As such, participation in this demonstration program must purposefully target racial and ethnic minorities. Medicare beneficiaries are approximately 10 percent Black, 9 percent Hispanic, 4 percent Asian/Native Hawaiian/Pacific Islander, and less than 1 percent American Indian/Alaskan Native.⁹⁸ Conversely, nearly 60 percent of Medicaid and half of the 10.9 million dual eligible beneficiaries are from communities of color.

Aligned incentives, particularly the accrual of financial benefits to the payer, contribute to the feasibility and success of the VHA program. The demonstration program needs to recognize that the telehealth experience in fee-for-service may vary from that of alternative payment models, in which added incentive payments are given for providing high-quality and cost-efficient care. Program findings may help accelerate the transition to value-based care.

Such a program would require case management workers and coordinators to ensure that participating individuals receive the necessary education and support to take full advantage of telehealth. A large component of their role would be providing technical assistance and digital health literacy tools.

9.6.2. REMOVE REGULATORY OBSTACLES TO FULL TELEHEALTH EQUITY AND INCLUSION

Numerous existing policies and regulations unintentionally hinder telehealth equity and inclusion. We have the opportunity to elevate equity and inclusion as priorities in policymaking and revisit decisions ranging from funding and administration to reimbursement and eligibility through this lens.

9.6.2.1. Fund Broadband Networks for Eligible Health Care Providers and Ensure Programs are Accessible to Those Serving Communities of Color.

As discussed in Chapter 3, Congress should provide robust funding to close the Availability Gap, making it possible for telehealth services to be utilized nationwide. Many of the health centers, clinics and long-term care facilities that serve communities of color do not have adequate and/or affordable broadband connectivity to serve those populations. We should ensure that all such providers are able to offer a full spectrum of telehealth services. One way to do so would be to build on the FCC effort to help rural health care providers by broadening support to include non-rural providers and certain for-profit entities (which are currently excluded as the Communications Act limits eligibility to public or nonprofit entities) that cannot afford adequate broadband services to serve their populations. Results of the FCC's Connected Care Pilot Program (discussed below), which is open to non-rural clinics, should inform policy decisions. In allocating funds for underserved areas, the FCC should consider eligibility measures that focus on economically depressed areas, instead of population density alone.

The FCC, in conjunction with USAC, should review administration of the Rural Health Care Program and health care pilot programs, and make any modifications necessary to ensure that those who stand to benefit most from funding programs are able to use them. They should assess the complexity of application processes, ease of navigating online systems, speed and duration of processes, ability to meet application requirements (*e.g.*, procuring competitive bids), etc. The FCC should aim to simplify and streamline administrative aspects and reduce uncertainty (for example, surrounding subsidy amounts from year-to-year). The FCC should ensure USAC

has adequate internal health care expertise to effectively manage infrastructure deployment and subsidy programs serving the health care industry.

9.6.2.2. Drive Consistency Across Medicaid Programs to Reduce Disparities in Access.

State laws, regulations and Medicaid program policies differ significantly. Telehealth policy on Medicaid reimbursement, private payer reimbursement laws, coverage parity, payment parity, covered modalities (*e.g.*, audiovisual, audio only, store and forward, remote patient monitoring), establishing clinician-patient relationships, and professional requirements around interstate licensing compacts and informed consent also varies by state. For example, only 23 states reimburse for remote patient monitoring, and only 19 allow service to a patient's home under certain circumstances. Some laws require reimbursement be equal to in-person coverage, while others only require parity in covered services. And some states require in-person visits before telehealth can be used.⁹⁹ This creates a complex administrative landscape for health care providers to navigate, diminishes access to care, and reinforces disparities in health care and health outcomes. Some of these disparities among states are exacerbated by differences in Medicaid expansion, with state borders creating Medicaid haves and have-nots. HHS should work with state legislatures and the National Governors Association to increase consistency across Medicaid programs and ensure that state-based policies do not unintentionally discriminate against communities of color in accessing telehealth services.

9.6.2.3. Remove Geographic and Originating Site Restrictions.

The ability to connect clinicians and patients without regard to their respective locations is one of the most compelling benefits of telehealth.¹⁰⁰ Current Medicare rules generally allow telehealth services only for beneficiaries in rural areas and specify the type of facility (known as originating site) where a patient must be located at the time of service. An unintended consequence of these geographic and originating site restrictions is the exclusion of the majority of members of communities of color from using telehealth, as these individuals live predominantly in non-rural areas.¹⁰¹ This can hinder linguistically and culturally appropriate access to mental health, specialty, and general care. Congress should remove both geographic restrictions on where a patient must be located to utilize telehealth services and originating site restrictions that limit access from home and other locations. The latter is particularly important for rural and Tribal residents who will rely increasingly on telehealth to access health care services.

9.6.2.4. Remove Limitations on Eligible Providers and Services.

Congress should remove the remaining statutory restrictions on practitioners eligible to provide services via telehealth, including licensed respiratory therapists, physical therapists, occupational therapists, and speech language pathologists, and allow these practitioners to provide telehealth services from their homes without updating their Medicare enrollment.

9.6.2.5. Remove Limitations on FQHCs and RHCs.

Federally Qualified Health Centers (FQHCs) and Rural Health Clinics (RHCs) serve highly vulnerable populations. Prior to the pandemic, FQHCs and RHCs were not eligible to furnish "distant site" (where the physician is located) telehealth services. Given the increasingly important role of telehealth in supporting low-income communities and communities of color, Congress should permanently authorize FQHCs and RHCs to provide distant site telehealth services.

9.6.2.6. Adjust State Licensure Requirements to Enable Greater Access to Care.

State laws vary, and clinicians may not be able to treat patients across state lines, thereby hindering access to care. Notably, the VA telehealth program enables VA practitioners to treat veterans no matter where the veteran or physician are located.¹⁰² Progress is being made through the Interstate Medical Licensure Compact, an agreement among states (currently 29 and the District of Columbia)¹⁰³ to streamline the licensing process for physicians who want to practice in multiple states, the Nurse Licensure Compact, the Psychology Interjurisdictional Compact (PSYPACT), and a handful of reciprocity arrangements. CMS should work with the Federation of State Medical Boards, the National Governors Association and the National Conference of State Legislatures to ensure that Medicare, Medicaid, and CHIP beneficiaries are not denied the benefits of telehealth because of the state in which they reside.

9.6.2.7. Augment Organizational Resources to Reflect Equity and Inclusion Concerns Beyond Rural.

Recognizing that telehealth is a vital aspect of health care delivery, and that its application and current limits are not limited to rural areas, the Office for the Advancement of Telehealth (OAT) should be elevated within the Health Resources and Services Administration (HRSA.) Rather than house OAT under the Federal Office of Rural Health Policy (FORHP), OAT should be on par organizationally. It would then more easily coordinate with both FORHP and the Office of Health Equity (OHE), as well as other agencies.

9.6.3. *LEVERAGE FCC CONNECTED CARE PILOT PROGRAM TO BROADEN IMPACT ON LOW-INCOME COMMUNITIES AND COMMUNITIES OF COLOR.*

The current FCC pilot program makes available up to \$100 million over three years to support the provision of telehealth, in particular to low-income individuals and veterans. It differs from the current Rural Health Care Program in two important aspects: (1) it is open to eligible health care providers in non-rural areas and, (2) it allows funding for patient connectivity. Like the FCC COVID-19 Telehealth Program (please see below), this presents an opportunity to address broadband affordability, a major telehealth barrier for communities of color.

The FCC should work with the HRSA to solicit applications from appropriate non-rural providers (especially those unfamiliar with FCC programs) and assist them with the application process. The FCC should prioritize selection of eligible health care providers that serve low-income communities of color and request support for patient connectivity. The FCC should coordinate with CMS to (1) ensure that patients covered by the pilot are deemed eligible for telehealth services, and (2) evaluate the pilot results. The FCC and CMS should analyze the effects of providing patient connectivity on the provision of care (including types of services, providers, modalities, and locations), total cost of care (including savings and avoided costs), and health outcomes. The learnings from this pilot could substantively inform future policy recommendations for ensuring low-income communities and communities of color benefit from telehealth.

9.6.4. *GENERATE TELEHEALTH RESEARCH & DATA SPECIFIC TO COMMUNITIES OF COLOR.*

An important objective in the Federal Health IT Strategic Plan is to support research and analysis using health IT and data at the individual and population levels. It calls for research conducted to reflect the Nation's diversity so that findings can be applied across populations. For too long, racial and ethnic minorities have been underrepresented in clinical research. There needs to be prospective research focused on the potential of and limitations to telehealth in improving care equity for communities of color. Collecting and reporting accurate race, ethnicity, and language (REAL) data is essential to advancing granular understanding of the impact of telehealth on communities of color. Data capture must be emphasized at the point of care and electronic health records updated accordingly.

9.6.4.1. Evaluate FCC COVID-19 Telehealth Program with Specific Focus on Impact on and Lessons for Communities of Color.

The FCC should conduct an ongoing assessment of and reporting on the results of the COVID-19 Telehealth Program. Understanding the composition of funding recipients, how recipients used the funds, and the corresponding outcomes on populations served, will inform future policies. As this program includes funding for patient connectivity and devices necessary to provide telehealth services, evaluation findings will be useful in designing future program parameters. In the interests of promoting digital equity and inclusion, the FCC should seek a granular understanding of the populations served via telehealth and the health impact on end-user beneficiaries. The FCC should also evaluate the operational aspects of the program and apply those learnings to other programs as appropriate. For example, factors that may have simplified and/or streamlined the application process, reduced processing timelines, aided prospective awardees in navigating the system, helped target specific populations, etc.

9.6.4.2. Evaluate COVID-19 Telehealth Experience with Specific Focus on Communities of Color.

In light of the increase in telehealth usage stimulated by COVID-19, HHS should specifically collect and analyze data on telehealth and communities of color. Evaluation of utilization, outcomes, cost, patient/provider satisfaction, and other data, would help build an evidence base. Analyses should inform the work of several agencies within HHS, including CDC, CMS, HRSA, NIMHD (National Institute on

Minority Health and Health Disparities), and AHRQ (Agency for Health care Research and Quality), as well as the VHA.

9.6.5. FUND TELEHEALTH INFRASTRUCTURE AND TECHNICAL ASSISTANCE WITH THE STRATEGIC INTENT OF REDUCING DISPARITIES.

Congress should provide funding to HHS for telehealth infrastructure and technical assistance. Funds would support clinician training in technologies, investment in telehealth infrastructure, and development of tools and resources to improve health-related digital literacy.

HRSA, specifically, should receive increased funding for the existing 12 Regional and two National Telehealth Resource Centers (TRCs), which provide real-time assistance to states, providers, and communities. TRC funding stands at \$29 million a year and has seen relatively modest increases over the last decade, despite explosive growth in telehealth. Increasing the budget to \$50 million a year would improve TRC's ability to support members of communities of color in benefiting from telehealth.

9.6.6. ENHANCE DIGITAL HEALTH LITERACY.

As discussed in Chapter 4, digital readiness is a major barrier to broadband adoption and the need to improve digital literacy is urgent. In the health care context, lacking digital health literacy can adversely impact health outcomes. For example, many elderly persons of color, who are at greatest risk for COVID-19, are unable to sign up for vaccines without help from family or friends. The Federal government states that "improving access to electronic health information—especially for populations in rural areas, persons with disabilities, racial and ethnic minorities, and those with low socioeconomic status—should be prioritized if we are to achieve equitable care outcomes for all. In addition, patients and caregivers should have access to resources that allow for improved health IT literacy so they understand how their health data may be used, how to choose safe and secure health apps, and how to set their privacy preferences." Digital health literacy requires: (1) basic reading and writing skills; (2) working knowledge of using smartphones, laptops, computers, and other Internet-enabled devices; and (3) an understanding of how, why, and when online health information is created, shared, and received.¹⁰⁴ These skills are applied when using tools such as health apps, live video consults, online patient portals, and remote monitoring devices. Without these skills, low-income communities and communities of color will be unable to take advantage of telehealth. The Office of the National Coordinator for Health IT, in conjunction with the Federal organizations that contributed to the Federal Health IT Strategic Plan and the proposed Office of Digital Equity, should ensure that its objective to improve individual access, particularly for those in low-income communities and communities of color, to usable health information is met.

9.6.6.1. Increase Support for Practitioners Promoting Digital Health Literacy to Their Patients.

HHS should support practitioners at the point of care in promoting digital health literacy.

First, HHS should work with organizations and professionals to make the health information and services that they provide more understandable and actionable and help develop education and training to teach patients digital skills to conduct video visits and navigate apps and portals. Second, HHS should collaborate with adult basic education programs to simultaneously meet the goals of providing relevant instruction while offering adult learners the chance to improve their health outcomes by building their digital health literacy. Third, HHS should increase the dissemination and use of evidence-based health literacy practices and interventions. Leveraging community health workers, faith-based organizations and schools can help reach those individuals most in need.

9.6.7. INCREASE HEALTH CARE WORKFORCE DIVERSITY TO IMPROVE ACCESS, QUALITY AND PATIENT EXPERIENCE FOR COMMUNITIES OF COLOR.

Greater diversity in the health care workforce can help address racial and ethnic health care disparities. Health care professionals who identify as racial or ethnic minorities are more likely to provide care to lower-income, minority and uninsured populations.¹⁰⁵ Only 23 percent of Black Americans, 26 percent of Latinxs and 39 percent of Asian Americans have a physician that shares their race or ethnicity, compared to 82 percent of White Americans.¹⁰⁶ Racial concordance between the health care provider and patient correlates with improved health outcomes, patient satisfaction and communication.¹⁰⁷ It can also help overcome harmful racial or cultural biases in the provision of health care, mistrust of the medical community, as

well as cultural attitudes and beliefs about health care. Although the overall health care workforce is becoming more diverse, the majority of people of color remain in entry-level and often lower-paying jobs with little opportunity for advancement.¹⁰⁸ As discussed in greater detail in Chapter 8 on Workforce Development, Congress needs to appropriate more funds for programs that combine social, academic and financial support to address the financial challenges, disconnected pipelines and unclear career pathways, and lack of academic and social supports hindering workforce diversity. A lack of workforce diversity should not be allowed to persist as a barrier to communities of color benefiting from telehealth.

9.6.7.1. Pass Legislation Increasing Education Support for Workforce Diversity in Health Care.

Congress should pass legislation, such as that proposed to authorize assistance for increasing workforce diversity in underrepresented professions (*e.g.*, allied health care fields including physical and occupational therapy, audiology, and speech-language pathology). This assistance might take the form of grants to education programs to provide scholarships or support recruitment and retention efforts for students of color. As allied health services are increasingly provided online, it is important that individuals be able to receive linguistically and culturally appropriate care.

9.6.7.2. Increase Funding for Workforce Development of Underrepresented Groups in Health Care.

HHS should increase funding to support the development, recruitment, and retention of health care professionals from underrepresented groups. Funding should augment student training, internship, fellowship, and mentoring programs, as well as ongoing professional development. HHS should ensure coordination among efforts across agencies (*e.g.*, HRSA, CDC's Office of Minority Health and Health Equity (OMHHE), Office of Minority Health, etc.).

HRSA should receive increased funding for programs within the Bureau of Health Workforce that advance diversity among health professions. These include the Centers of Excellence (COE) Program, Scholarships for Disadvantaged Students (SDS) Program, Area Health Education Centers (AHEC) Program, and National Health Careers Opportunity Program (HCOP) Academies. FY 2020 funding for these programs stands at \$131.4 million; the President's FY 2021 budget proposes continued funding only for the COE (\$23.7 million a year). The Bureau of Health Workforce should help further develop professional pathways for entry-level health professionals to advance in their careers and explore the impact of recruiting and hiring diverse faculty in higher education.

CHAPTER 10.

REIMAGINING CONNECTED EDUCATION

"IT IS REQUIRED IN THE PERFORMANCE OF OUR MOST BASIC PUBLIC RESPONSIBILITIES, EVEN SERVICE IN THE ARMED FORCES. IT IS THE VERY FOUNDATION OF GOOD CITIZENSHIP. TODAY IT IS A PRINCIPAL INSTRUMENT IN AWAKENING THE CHILD TO CULTURAL VALUES, IN PREPARING HIM FOR LATER PROFESSIONAL TRAINING, AND IN HELPING HIM TO ADJUST NORMALLY TO HIS ENVIRONMENT. IN THESE DAYS, IT IS DOUBTFUL THAT ANY CHILD MAY REASONABLY BE EXPECTED TO SUCCEED IN LIFE IF HE IS DENIED THE OPPORTUNITY OF AN EDUCATION. SUCH AN OPPORTUNITY, WHERE THE STATE HAS UNDERTAKEN TO PROVIDE IT, IS A RIGHT WHICH MUST BE MADE AVAILABLE TO ALL ON EQUAL TERMS."—*BROWN V. BOARD OF EDUCATION*

10.1. PROBLEM STATEMENT

Almost seventy years after the *Brown v. Board of Education* decision, America still does not provide all children with an equal opportunity to receive a high-quality education. Disparate educations lead to disparate achievements and opportunities to become fully engaged, active, and successful citizens.

Since the beginnings of public education, the level of investment made for each individual student has depended primarily on their zip code. Today, districts serving the greatest proportion of students of color spend \$1,800 less per student than districts serving the fewest students of color.¹⁰⁹ This disparity in funding creates a vicious cycle of disparity in opportunity. Under-resourced, low-income school districts are unable to attract and retain well-qualified teachers, provide rigorous curricula and assessments, or meet even basic needs such as safe and adequate facilities. Investments in state-of-the art technology solutions are even more unlikely.

Yet, for students in these districts, digital technology offers a tremendous opportunity to break free of barriers imposed by traditional models of instruction, where teaching was confined to the four walls of a classroom.

Unfortunately for many students, the opportunities offered by technologies including the World Wide Web and video conferencing, let alone self-paced learning tools with adaptive algorithms, digital curricula and classroom materials, and augmented and virtual reality, are little more than additional opportunities that remain out of reach. Education Superhighway estimates that 9.7million K–12 students do not have reliable Internet at home. Students who lack home Internet risk falling behind, as well as being unable to learn the technology skills that are needed for many jobs.

This digital education gap has long been referred to, somewhat inaccurately, as the “homework gap.” But the problem goes far beyond an inability for some students to complete assignments that require broadband service at home, forcing them to use libraries and other public buildings or even fast-food parking lots to connect to free Wi-Fi networks, often with inadequate devices such as smartphones. As digital tools have become more deeply embedded in the education process, the homework gap has continued to increase, and now extends far beyond homework to every facet of learning.

The COVID–19 pandemic has turned the “homework gap” into a full-fledged classroom gap for students systemwide, as many schools are forced to offer virtual-only learning. Computing devices and broadband service instantly mutated from helpful learning tools to necessities, essential for all in and out of classroom and school related learning. And while some schools are returning to more normal classrooms, most are still using virtual mechanisms in a hybrid manner. There is no certainty as to how long this will last or whether other health situations will cause a similar shut down of physical classrooms.

Digital inequity and exclusion in education, moreover, does not just manifest itself solely through lack of broadband services and devices in the home. We also see it in digital literacy skill gaps; the inability of curricula authors to keep up with evolving technologies; a dearth of research and development, leading to curricula which itself enables increased digital inequity and exclusion, a lack of access to respectful and culturally responsive content; the lack of evolving teacher training and support; the challenges faced by working parents (particularly in sectors not conducive to telecommuting) in supervising and assisting their kids’ remote learning throughout the school day; and the absence of a coherent strategy across all levels of education to address these issues.

10.2. VISION

We should develop a new educational infrastructure that supports all students, that provides equitable access to the tools and content of fast-evolving digital learning, that uses those tools to assist them wherever they are developmentally and personally, that accelerates and supports them to learn in ways that represent their diverse needs and at a depth of mastery that is required to succeed in the modern economic and social context, that provides teachers the support they need to enable students to maximize the use of digital content, and provides a future where the vast expanse of opportunities available are truly open to all students.

10.3. GOALS

1. By the end of 2023, every K–12 student and teacher in America should have broadband service at home, Internet-connected devices that support basic and advanced learning applications, and the offline support they need to engage securely in effective remote or online learning.
2. All policymakers should fully embrace education as a national strategic priority and fund a robust research and development agenda focused on advancing models of digital teaching and learning to promote equity, and advance outcomes for all students.
3. Governments at the federal, state, and local levels should provide funding sufficient for adequate and equitable education outcomes, ensuring that the most vulnerable students have access to the resources they need for digital learning.
4. By the end of 2024, every K–12 student in America should have access to culturally responsive and relevant curricula for their core subjects in a form usable for online learning.
5. By the end of 2023, every K–12 teacher should have the tools, training, infrastructure, resources, and support they need to deliver effective online or remote learning experiences for their students.
6. Federal and state education agencies should employ executive level technology leaders (CTO/CIO) to advance policy and program initiatives designed to unlock the value of technology safely and securely and infrastructure.

All students have valuable and unique perspectives, skills, and knowledge, as well as an innate drive to learn more, gain greater expertise, and contribute to a future where the full range of opportunities are truly available to them. Yet not all students are given equal opportunities and support to develop themselves in these ways.

Inequities in education continue to create a gap between students in well-funded, well-supported public and private educational systems, and those students who attend schools that are poorly funded and inadequately organized. The gap in funding and organization in educational systems correlates strongly along racial, ethnic, and income lines. These long-standing problems are much broader than the issues of educational technology and infrastructure, but gaps in education technology are accelerating the growth of an increasingly steep divide for students of color and/or poverty.

Despite valiant efforts to address achievement gaps in public education over several decades, the pattern of disproportionality in academic achievement and attainment remains stubbornly resistant to correction. Students of color read on average at 2 to 3 grade levels below their white peers. They drop out of high school at twice the rate and are four times more likely to attend a low performing school.

Poverty accounts for some of this difference, but not all. Only in the last 20 years have researchers begun to understand the many factors contributing to these gaps. They have found that students of color are significantly more likely to be:

- Learning in a significantly *under-resourced school*.
- Taught by *underprepared teachers*.
- Enrolled in a school with few, if any, rigorous courses like *Advanced Placement* or International Baccalaureate.
- Taught by adults who are teaching across cultural divides, with little understanding or appreciation for the culture of the *students they serve*.
- *Disciplined, even suspended*, for minor infractions that would not lead to a similar response if the student were white.

The combination of these and related factors result in a school system that, by default, rations the quality of education to students of color and other minorities. That rationing has only been increasing during the COVID-19 crisis.

The COVID-19 crisis has made abundantly clear that few if any American schools were prepared for a sudden transition to online learning.¹¹⁰ In a May 2020 survey, more than 70 percent of teachers did not feel their schools were prepared for the pandemic. Students also lacked the digital literacy needed for the transition to remote learning.

That lack of preparation made life more difficult for almost everyone involved in the educational ecosystem—students, parents, teachers, administrators, vendors, and others have all been scrambling to catch up and adapt to the new normal, with little time or opportunity to figure out the best approach. An April 2020 survey of over 5,600 teaching professionals from across the United States found that 55 percent of teachers said that less than half of their students were attending remote classes. Thirty-four percent of respondents reported that only 25 percent of their students or fewer were attending remote classes.¹¹¹

The most vulnerable students have clearly suffered the most. More affluent learners with home broadband, digital devices, and support have been afforded alternative opportunities and choice. Students without access to these resources, whether through a lack of connectivity or lack of tools/resources or devices, are either denied learning or have to do additional work just to gain their previous level of access, introducing additional barriers that set them further back in their learning. Furthermore, the parents of Black and Hispanic students are less likely to work jobs that allow for telecommuting, and so are less likely to be present at home to assist their kids with remote learning throughout the school day.

When mandatory COVID-19-driven remote learning is lifted, schools are likely to continue relying on technology and digital forms of learning to a much greater degree than ever before. Having seen the potential of technology-supported learning in a crisis, learning will never go back to exclusively happening within school walls for most students. Additionally, since technology and digital learning are constantly evolving, inequities for lower income communities, Black, indigenous, people of color (BIPOC), English learners (ELs), and students with special needs will become increasingly pronounced.

The global pandemic has uncovered how unprepared educational systems nationwide were to respond to evolving and quickly changing situations. So, we must also focus on reorganizing education systems at all levels to ensure that they can evolve with and achieve maximum benefit from continued improvements in technology, in-

cluding analysis of costs and benefits to allocate resources where they are most needed. The risk in not evolving is that the system will continue to enable those who already have access and will further exclude those who do not, ensuring that they will be left further behind.

10.5. KEY CHALLENGES TO OVERCOME

The key challenges to overcome to create a more equitable and inclusive digital learning environment in the United States include:

- Funding for connections, devices, and support, both in schools and at home, is inadequate, especially for schools and students with the greatest need.
- Lack of a holistic long-term national strategy to use technology to enhance educational outcomes in an equitable and inclusive manner.
- Pervasive systemic and structural racism that impedes equitable distribution of resources to educational systems that enable them to provide a high-quality education to communities of color and poverty. These include:
 - Local funding disparities.
 - Structurally enforced biases.
 - Market incentives against creating solutions for all students.
 - Learning content is not designed for diverse learners, and when developed with public funds, is not released or shared freely often enough.
 - Training for LEAs, teachers, students, and families around online learning is often ineffective or unavailable.
 - Technical standards and platforms do not do enough to enable and secure data privacy, security, or interoperability of learning systems and data.

10.6. RECOMMENDATIONS

To overcome these challenges and to meet our goals, students, educators, and families first need to be connected to broadband services and have access to devices for learning in and out of the classroom. We must invest in a national research and development agenda to learn and act on solutions that create measurably more equitable and inclusive digital learning for the most vulnerable populations of students. These solutions should be shared and implemented with funding assistance as needed so that students, educators, and families will have ongoing and evolving access to improved content, aligned tools, and more comprehensive support. Additionally, all solutions should be implemented in a way that appropriate and actionable data are gathered to inform additional research and development activities and that the privacy and security of students, educators, and families are guaranteed.

10.6.1. PROVIDE FEDERAL FUNDING TO ASSURE THAT ALL K–12 STUDENTS AND TEACHERS HAVE THE CONNECTIVITY AND DEVICES THEY NEED TO CONTINUE LEARNING OUTSIDE THE CLASSROOM.

As discussed in greater detail in Chapter 5, the Federal government has long-supported local schools in situations where it is clear that a Federal commitment is necessary to create a more equitable and inclusive education system. That is at the heart of U.S. Department of Education's programs that provide funds to elementary and secondary school with economically disadvantaged students (the Elementary and Secondary Education Act (ESEA or "Title I") and to support children with disabilities (*Individuals with Disabilities Education Act (IDEA)*). The same principle should be applied to the increasing importance of digital learning and assuring that all students have access to that learning platform. In that light, Congress should fund the LifelineEd program described in Chapter 5 to guarantee that every K–12 student and teacher, regardless of their financial circumstances, has access to broadband and Internet connected devices needed for basic and advanced schoolwork and teaching.

10.6.2. REVISE FUNDING SYSTEMS TO ENSURE ADEQUATE AND EQUITABLE DISTRIBUTION OF RESOURCES, PARTICULARLY THOSE THAT WILL ADVANCE DIGITAL LEARNING.

Ensuring equal access to education is at the core of the Department of Education's mission, and has been since the Elementary and Secondary Education Act of 1965 (ESEA). The ESEA has been amended and reauthorized many times, but with every iteration, Title I, the section that earmarks Federal funding for poor children, remains at the heart of the legislation and accounts for the lion's share of the funds authorized under the Act.¹¹² When President Johnson signed ESEA, along with several other complementary measures such as the Head Start and the Higher Edu-

cation Act, he hoped, “to bridge the gap between helplessness and hope for more than 5 million educationally deprived children.”¹¹³

Johnson’s vision has yet to materialize for many reasons, including lack of commitment to policy choices outside the sphere of education that were meant to complement ESEA. Funding problems, some associated directly with ESEA and its progeny, are chief among them. Overall, school districts that serve predominantly nonwhite students receive \$23 billion less per year than school districts with predominantly white student bodies based on the total amount of funding per student from Federal and local funding sources.¹¹⁴ While the challenges facing educators have only increased since the great recession, Federal support has not kept pace. Authorized funding for Title I, Part A programs has decreased from \$26 billion in 2002 to \$16.3 billion for the Fiscal Year ended September 30, 2020.¹¹⁵ These funds are distributed through four separate programs, and inefficiencies and poor design result in drastically more money going to help rich school districts or kids not living in poverty, rather than focusing investments on the students the program was intended to help in the first place.

Not only is money failing to reach the poorest districts or helping the poorest children in those districts, but it is also not necessarily being spent effectively or strategically. Those districts most in need and most severely underfunded may have to spend all their funding solely on teacher salaries or basic needs like textbooks, rather than being able to invest in digital learning resources or methods, innovative curricula, or other improvements that may be considered luxuries rather than necessities when operating on shoe-string budgets heavily dependent on local tax revenue, especially in times of severe economic downturns.

10.6.2.1. Target funding on areas of need based on quantifiable technology deficits.

To advance the use of digital learning to further equitable outcomes, Congress should appropriate additional Title I funding in the form of formula grants targeted for school districts in areas with quantifiable technology deficits. Areas with the highest barriers to online learning will need more funding, so additional appropriations should be based on criteria associated with computer ownership, home Internet adoption and affordability, etc. This funding should be in addition to any funding associated with ensuring students and teachers have home broadband connections and appropriate devices (Recommendation 10.6.1.1), because areas with quantifiable technology deficits are likely to face serious challenges in taking advantage of digital learning. Use of funds should be flexible, so long as funding is used to promote online learning.

In addition, the U.S. Department of Education should:

- Require states to produce Ed Tech plans to access Federal funding/technical assistance, even for non-technology related funding streams;
- Ensure solutions focused on cultural and linguistic equity also consider students with special needs and vice versa; and
- Require procurement processes to identify open-source solutions, where possible, before opening procurement to proprietary alternatives (similar to the Department of Defense’s *policy on open source procurement*).

10.6.3. INVEST IN A ROBUST FEDERAL RESEARCH AND DEVELOPMENT (R&D) AGENDA FOCUSED ON ADVANCING MODELS OF TECHNOLOGY-EMPOWERED TEACHING AND LEARNING THAT PROMOTE EQUITY AND ADVANCE OUTCOMES FOR ALL STUDENTS.

Though not a cabinet level agency until 1980, the Federal Department of Education’s goal of helping states establish effective school systems by collecting information on schools and teaching has been a core part of its mission since the first incarnation of the Department in 1867.

That mission took on heightened significance in 1958, when Congress passed the first comprehensive Federal education legislation, the National Defense Education Act, in response to the Cold War.¹¹⁶ In doing so, Congress explicitly recognized the vital role that education plays in national defense and in global competitiveness. The mission evolved further during the 1960s with the passage of civil rights legislation that expanded the role of the Department of Education to ensure all students had equal access to education.

Despite the critical significance of education and the persistent inequality, however, the U.S. has never invested meaningfully in a holistic national strategy or in R&D efforts aimed specifically at improving educational outcomes and increasing equity the way that it has invested in other national strategic priorities.

The result is an extremely fragmented and ad-hoc approach to advancing digital learning across the country. While state education agencies have made some

progress in adopting digital learning tools, as evidenced by posted state-level education technology plans and the presence of digital literacy guidelines or standards in most states, there is still a fundamental disconnect between the plans and the equitable use of technology envisioned in this chapter. Evidence also suggests that even though states are investing in new technologies, they aren't necessarily investing wisely or efficiently. Roughly 14,000 school districts across the country spend more than \$13.2 billion on over 6,000 ed-tech tools each year, but surveys suggest that only 15 percent is spent on tools that are a good fit and implemented correctly.¹¹⁷

Several independent groups like *Ed Tech Evidence Exchange* or *Learning Policy Institute* are stepping in, with philanthropic or nominal government support, to provide guidance or highlight best practices for certain aspects of advancing schools' use of ed-tech tools or strategies. But they cannot compensate for the lack of a national, coordinated effort that can:

- Shape policy more directly, including by working with other parts of government;
- Ensure diverse voices are involved in both shaping and implementing policies;
- Make large scale strategic investments; and
- Effectively share information at scale

To address chronic underinvestment at the national level, there should be a comprehensive National Educational Technology and R&D Strategic Plan, focused on ensuring efforts across all levels of government are complementary and on technological breakthroughs that have the power to transform education and promote equity.

10.6.3.1. The Department of Education should increase its in-house technical expertise and encourage state and local education agencies to do the same.

The U.S. Department of Education should create a CTO role, reporting to the Secretary, to work alongside the Education Technology Director, to advance policy and program initiatives around technology infrastructure, such as broadband access, device utilization, information security, data privacy, and data and systems interoperability.

Congress and the Department of Education should incentivize states and districts to create education specific CIO/CTO roles to develop strategy and coherent systems for equitable and inclusive technology access, adoption, and systems innovation, in addition to Education Technology Directors to set policies to increase utilization.

10.6.3.2. Develop a National Strategic Plan for Education Technology Research & Development.

The U.S. Department of Education should:

- Oversee the creation of a strategic plan for education technology research and development, and work closely with key partners to ensure that equity remains a central theme of that plan. The Department should seek input from the White House Initiative on Educational Excellence for Black Americans, the White House Initiative on Educational Excellence for Latinxs, the White House Initiative on American Indian and Alaskan Native Education, state and local leaders, and interested members of the public. In developing the strategic plan, the Department of Education may also consider input from other Federal partners, such as Institute of Education Sciences, National Telecommunications and Information Administration, National Science Foundation, Department of Defense, National Institutes of Health, and the Bureau of Indian Affairs, who may have overlapping areas of interest, as well as private industry.
- Establish the plan's research agenda by identifying priorities coordinated across all areas of Federal education technology R&D investments, particularly in the areas of basic and applied research, and directed development efforts focused on specific problems and needs in K–12 education. The plan should also include estimated levels of investment, a description of the mechanisms that will be used to implement and oversee the recommended portfolio of R&D initiatives, and an explanation for how the proposed initiatives will advance equity.
- As part of the implementation of the plan, research and promote innovations across the spectrum of digital and equitable learning needs including content, features, tools, instructional approaches, etc. to create increased and more equitable student motivation, efficacy, and learning. Update this agenda regularly to account for progress.

10.6.3.3. Establish technical expertise and organizational infrastructure necessary to implement the education technology R&D Strategic Plan.

Congress should consider investing \$1B over 10 years in a major educational R&D effort to strengthen the state of educational innovation and capability.

The Department of Education should provide executive oversight and implementation leadership for the R&D Strategic Plan, and Congress should invest in building additional organizational capacity and technical expertise necessary to operationalize a visionary and robust R&D agenda expected from this Strategic Plan. For example, Congress could authorize the Department of Education to sponsor one or more Federally Funded Research and Development Centers (FFRDC),¹¹⁸ or a separate initiative within the Department of Education, similar to either the Advanced Distributed Learning Initiative in the Department of Defense or Advanced Research Project Agency—Energy (ARPA-E), could be established within the Department of Education.

Historically Black Colleges and Universities (HBCU), Hispanic-serving Institutions (HSI), Minority Serving Institutions (MSI), or other universities with established expertise and programs focused specifically on using technology to meet the educational needs of minority students should be selected as partner laboratories or FFRDCs.¹¹⁹

The Department of Education and any federally funded research partners should also seek to leverage other sources of funding from private philanthropic organizations, with oversight by the government.

The Department of Education and partner institutions should pursue a comprehensive approach towards promoting the R&D agenda by:

1. Providing strategic and technical assistance for content and tool development funded through Federal funding.
2. Supporting and funding product and design level work, through seminars, workshops, and multi-vendor/stakeholder design sprints to advance the innovation agenda.
3. Procuring or developing practical solutions to address specific ed-tech and equity problems, where the market is not meeting specific needs.
4. Incorporating agile approaches to curriculum development and authoring to speed up curriculum development, so that curricula can more quickly and easily evolve as technology evolves.
5. Recognizing that open educational resources (OER) can be a driver for creating more agile curriculum development, and encouraging the development of additional OER curricular products.
6. Recognizing that funding or developing open source, open standards, open APIs, and open data can speed up and improve the quality of technology innovation in education.
7. Promoting and convening “plugfests” to show how curriculum and technology tools can interoperate and create complete learning solutions that work for targeted student populations, creating coherence between curricula and delivery tools. Plugfests are events where creators and designers come together to demonstrate how their content and products can work with other content products from other creators and designers.

10.6.4. *INVEST IN COHERENT, CULTURALLY RESPONSIVE, AND RELEVANT ONLINE LEARNING CONTENT AND TOOLS.*

There has been a curriculum renaissance¹²⁰ over the last five years. The introduction of new standards in most states, an influx of cognitive science research into the educational landscape, which emphasizes the importance of building knowledge and conceptual understanding, and the proliferation of open educational resources (OER) have all contributed to an explosion in new materials. Several private and non-profit organizations have engaged in efforts to provide free or reduced cost learning content and tools, which are widely available to educators, families, and students. Some of those resources are also openly licensed and available digitally, so that educators and other organizations can improve on them and redistribute them for increased access.

Despite increased access, teachers do not always use those materials with all students. Teachers are expected to fill many roles in the lives of their students and tackle all kinds of issues, while also teaching rigorous, standards-aligned content. They are more often than not asked to do that with pieces of disconnected content that are not always optimized for digital learning, a handful of digital tools that are not integrated and which don’t work with the content they have available to them, and limited support to make it all work together to provide a positive and coherent

learning experience for students. Add to this the obstacle of having to do all of this remotely, and it is not surprising that the learning gaps for students are increasing during the COVID-19 pandemic.¹²¹

The TNTP, Inc. report, *"The Opportunity Myth,"*¹²² describes a pernicious issue in K-12 education: Students believe they are getting an education that will prepare them for life after high school, but the quality of education many of them receive fails woefully to deliver on that promise. Without the effective knowledge, skills, funding, access, and support to set up coherent and integrated digital learning systems (e.g., structures, environments, learning management processes), and access to and support in using high-quality instructional materials that promote learning experiences which communicate that all students belong and can be successful ("identity safe" learning experiences), teachers are set up to perpetuate the opportunity myth.

Additionally, there is significant and ongoing research that has shown that learning environments which focus on identity safety,¹²³ cultural responsiveness (the sense that a student's unique identity and culture is seen and embraced as an asset rather than an obstacle), and a growth mindset can lead to greater self-efficacy and increased motivation, engagement, and learning outcomes.¹²⁴ Relatedly, culturally responsive teaching has been shown to raise expectations for all students and create cultural competence.¹²⁵ Research has also shown that having a coherent curriculum from which to teach has contributed to improved learning.¹²⁶ However, there has never been a national investment in creating curricula that actualizes the findings of research in identity safety, culturally responsive teaching practices, mindset, and curriculum effectiveness.

10.6.4.1. Establish Curriculum Innovation Centers Specifically Focused on Equitable Online Learning.

Curriculum developments continue to lag technology developments. This became obvious during the COVID-19 pandemic as curriculum vendors, including several private and non-profit vendors developing open educational resources, scrambled to redesign their content. Given the lack of time, they resorted to putting out written guidance and relying on teachers to do the heavy lifting of actually revising the content and putting it into a technology delivery platform.

Learning content is often integrated into learning systems in haphazard or inadequate ways, resulting in learning experiences that fall far short of what the content and the learning systems are actually capable of delivering. In addition, digital learning content is often designed for use in printed or PDF formats, and when it is adapted into interactive learning systems, its usefulness is impaired, often significantly.

Less well-resourced schools often have to make do with assembled curriculum and material, manually adapting those resources into whatever digital learning systems are accessible. If more learning content (especially openly licensed educational resources) were designed to work well within a variety of learning systems, more disadvantaged students could be engaged with content that works well for them.

To satisfy the need for continued research in what makes curricula effective in ensuring improved learning outcomes for students in lower income communities, communities of color, ELs, and students with special needs, the U.S. Department of Education should create centers of excellence for curriculum innovation, which exist to research and find solutions to specific problems of practice for learning content and curriculum.

The focus of the centers should be on product innovation research, and development of student-interactive curriculum delivery systems and tools that enable the use of digital educational content that promotes equitable and inclusive technology use and identity safe learning environments. That may include prototyping various online learning platforms and features to determine which ones provide equitable access for all students, or on what features most support educators in implementing a culturally responsive curriculum with integrity. These centers may use openly licensed content and tools from the private and non-profit organizations to jumpstart the work.

In light of the above, the U.S. Department of Education should:

- Establish Curriculum Innovation Centers to catalog and demonstrate best practices, and create and share OER Professional Development materials for supporting teachers around digital learning. Set up these Curriculum Innovation Centers either within the organizational capacity set up through the R&D Strategic Plan, through existing FFRDC, or through State-run consortia.
- Convene a series of learning content design workshops to advance the state of the art on how to design and author content for digital platforms.

- Convene an ongoing series of learning content and systems plugfests conferences to demonstrate and explore how content can be effectively embedded into learning systems.
- Fund the development, adoption, use, and advancement of data standards for integrating learning content more usefully into learning systems and transferring content between content management and among learning systems.
- Develop and publish standards and best practices for content/platforms/teaching practices for technology-enabled learning environments.
- Disseminate information and make innovations from the curriculum innovation centers widely available, and tie them to competitive grant programs for communities interested in adopting methods.

10.6.4.2. Build Digital Curricula Designed for Equitable Use.

There is an enormous, untapped opportunity to push the creation of curricula which connects high quality, coherent digital content with advances in developing growth mindsets and in creating identity safe learning environments that are culturally responsive. Additionally, the digital curricula should promote the equitable and inclusive use of technology platforms, tools, etc. for content delivery and implementation.

In creating that curricula, the solutions should be developed by those in the communities who are most affected by digital inequities.¹²⁷ Those working with students most directly should be empowered with the best research in content, product, and learning design from the curriculum innovation centers, the support of experts in digital curriculum design and development and historically black colleges and universities (HBCUs), Hispanic-Serving Institutions (HSIs), minority-serving institutions (MSIs), and the Bureau of Indian Affairs to create, distribute, and support the implementation of high-quality, coherent digital instructional materials which can be used flexibly for different tech-enabled learning environments and which are targeted at improving learning outcomes for students from lower income communities, communities of color, ELs, and students with special needs.

Additionally, to ensure that the curricula created are able to be widely distributed and used, those authoring the content will need to have increased access to culturally relevant texts and the rights to share those texts for educational use. To create such curricula, the U.S. Department of Education should establish a competitive grant program to award funding to States or a consortium of states to create, distribute, and support the implementation of high-quality, coherent digital instructional materials which can be used flexibly for in-person, remote, and hybrid learning, and which are targeted at improving learning outcomes for students from lower income communities, and black, indigenous, and students of color. Pursuant to this program:

- Grantees should create design and authoring committees of individuals from communities most affected by digital inequities, and work with the curriculum innovation centers and other curriculum and/or education technology vendors, as appropriate, to create, distribute, and support the digital curricula, which may include the creation of supporting digital products (*e.g.*, websites, delivery platforms, applications, software). The materials developed should reflect the needs and cultures of the populations who use them.
- Grantees should demonstrate how they will maintain and continuously improve their digital curricula rapidly and efficiently, drawing on continued research and development in how to make the digital instructional materials more equitable and inclusive.
- Grantees should demonstrate to the Department of Education how they will fund the maintenance and continued use of the digital instructional materials after they are released.

Also, Congress should consider taking legislative action to encourage copyright holders to grant educational digital rights of use for texts, without prejudicing their other rights.

10.6.4.3. Promote Collaboration and Sharing of Research to Improve Digital Curricula.

To encourage collaboration and sharing of research, best practices in content, product, and learning design, and open-source technology for wider use, there should be a yearly convening of grantees, researchers, education technology specialists, and others involved in the work of the competitive grants. During this time, grantees will get the opportunity to collaborate with other grantees and experts to improve their products. There should also be a focus throughout the competitive

grants and the yearly convenings on studying the impact of the grant and whether it is creating more equitable and inclusive technology use, and whether and how more equitable and inclusive technology impacts learning outcomes for students from lower income communities, communities of color, ELs, and students with special needs.

While additional research is necessary and can be accomplished through the development of curriculum innovation centers, there is a need to make that research practical in the service of providing solutions for educators. As curricula are created and implemented, educators who work with students in lower income communities, communities of color, ELs, and students with special needs can provide much needed feedback on what works and does not in light of the research and then the curricula can be improved accordingly. This kind of information should be emphasized and made available as part of the yearly convening. The Department of Education should host an annual convening of grantees, researchers, education technology specialists that will focus on collaborating and sharing research, best practices, content, and digital tools developed as part of the competitive grant to improve the curricular products and ensure they reflect the needs and cultures of the populations who use them.

10.6.4.4. Create Coherent Digital Tools that Support the Use of Digital Curricula Designed for Equitable Use.

With the global pandemic, educators and families are having to provide instruction flexibly in different types of technology-enabled learning environments. Digital tools that educators are using must be integrated into the digital learning systems within schools, and they must work with the content teachers are using. Additionally, given that students are often learning at school and at home, students, educators, and families need consistently easy and open access to the digital products and tools (*e.g.*, digital texts, websites, delivery platforms, applications, software) that enable the effective distribution and implementation of the high-quality, coherent digital instructional materials produced through the competitive grant. Without that access, the curricula go unused.

Some of those digital products and tools will be designed and created as part of the competitive grant process and should be done using open-source technology. Some digital products and tools will likely already exist, and states will select them for the distribution and/or implementation of their high-quality, coherent digital instructional materials. In these cases, it is important that the digital products and tools are built with open-source technology so that they can be accessed for educational use or the product owners should be encouraged to make the product openly available for educational use. Equitable and inclusive use of the technology should be promoted by having:

- The U.S. Department of Education require all digital content, online learning systems, tools, and resources produced under Federal funding be openly licensed as the default, with exceptions granted only with publicly released justification.
- Congress appropriating funding incentives for video companies to open their infrastructure to educational systems (whiteboards, classroom management, process, etc.).

10.6.5. ENSURE STUDENTS HAVE SUPPORT FROM TEACHERS AND OTHER APPROPRIATELY TRAINED ADULTS.

As research has begun to show how much curriculum matters for learning, there has also been a shift in where to focus training and support for educators and families.¹²⁸ There is now a shift from training and support in creating content to training and support in implementing content, so that all students realize the intended outcomes of the curriculum.

The job of the teacher is to get really good at teaching, and the job of the family is to get really good at supporting students in their learning. However, this assumes that educators have access to a high-quality, coherent digital instructional materials which can be used flexibly for different tech-enabled learning environments, and which are targeted at improving learning outcomes for students from lower income communities, communities of color, ELs, and students with special needs, the necessary digital texts that are used with that curriculum, and the aligned digital products and tools needed to distribute and deliver that curriculum. If these assumptions are true, then they will be better equipped to create an equitable and inclusive learning environment.

However, that is just one part of the job of educators and families. Educators must also have the knowledge, skills, funding, access, and support to set up coherent and integrated digital learning systems (*e.g.*, structures, environments, learning management processes) that promote equitable and inclusive technology use and

promote identity safe learning experiences. Furthermore, educators must have the knowledge, skills, and support to use technology to prepare and deliver curricula and support all students equitably. If an educator has a high-quality curriculum and is expected to teach that curriculum digitally with no training on how to use the curriculum or the associated digital tools, then the likelihood that educator will be effective in implementing that curriculum is low.

10.6.5.1. Support educators during their transition to digital and remote learning.

Professional development and training for K-12 public school teachers has led to uneven and unreliable outcomes, despite the billions of dollars invested in it.¹²⁹ Additionally, training and support often focus on classroom management or superficial details (*e.g.*, strategies for grouping, questioning techniques, etc.) which can be boiled down into hour-long PowerPoint presentations. This kind of training doesn't advance teacher knowledge or skill enough to make a difference for student learning. Educators need training on how to set up identity safe and equitable learning environments and structures, and how to implement content using aligned tools in a variety of tech-enabled learning environments. While this needs to happen for current educators, there is a real need to ensure that those entering the teaching profession are equally as equipped.

- The U.S. Department of Education should provide funding to allow states to extend the development of equitable, technology-enhanced teaching and learning standards.
- The U.S. Department of Education should provide additional funding to states to develop and provide openly licensed professional learning materials and training programs specifically organized to help teachers work with minority and disadvantaged groups.
- The U.S. Department of Education should provide funding to state consortia to develop and provide openly licensed professional learning resources and training programs that are specifically aligned to the open educational digital curriculum used by those States.
- The U.S. Department of Education should establish a program to fund year-long digital learning residency programs for preservice teachers with a trained mentor teacher, focused on providing digital learning for schools in lower income communities and schools which serve a majority of communities of color, ELs, and students with special needs. Preference for funding should be given to HBCUs and HSIs.
- The U.S. Department of Education should provide additional funding, advocacy, and support for its *"Future Ready Leaders"* initiative, to train school and state education leaders to be more knowledgeable about and effective with technology.

10.6.5.2. Support families and educators in establishing partnerships that enable greater coherence between learning digitally at home and school.

As we have seen with the global pandemic, families and other adults in communities also play an important and expanded role in the learning experience of students. As students were no longer able to go to school regularly, their homes and their communities became their classrooms. As such, there must be a dynamic partnership among families, educators, schools, and educational support organizations with a focus on supporting student learning. There should be increased interaction and coherence across in-school and at-home learning (*e.g.*, technologies, tools, learning systems, content) led by educators and supported by families. Students should be able to access and use digital tools both in school and at home easily. Features like single sign-on can support this.

Additionally, families should also have the access, knowledge, and support to help students leverage technology outside of school, promoting equitable and inclusive technology use. Families need clear and actionable guidance on what technologies and digital tools are needed for learning, how to access them, and how to support students in using them. States should accordingly develop and/or update digital literacy content for students and families. Whether through SMS messaging or other familiar and easily accessible communication methods, families need consistent, clear, and open access to the guidance and information in how to support their learners outside of school.

- The U.S. Department Education should provide funding to states to provide greater coherence between the technologies and digital tools used at school and at home.

- State education systems should update digital literacy standards to incorporate a focus on supporting families and digital learning happening outside of the school building.
- State education and local education systems should develop communication systems and relevant content, so that they can easily and consistently share guidance and information with families about the digital learning content students are receiving in school and how to support student learning at home.
- The U.S. Department of Education should provide funding to develop digital resources for parents and educators around Transitional Kindergarten.

10.6.5.3. Support the development and adoption of online platforms that connect at-risk students with college students, recent graduates, and others willing to act as tutors, coaches, or other supports.

Digital platforms can support students far beyond the day-to-day activities associated with distance learning or online activities associated specifically with classroom instruction. Services such as one-on-one tutoring, supplemental small-group instruction, and personalized coaching to encourage students to plan for life after high school can play an important role in helping students succeed.

Individualized tutoring is a proven intervention that improves children's educational competencies and increases their self-confidence.¹³⁰ Online platforms that deliver a tutoring curriculum addressing the concepts with which students need additional time and support can make it easier for qualified tutors to provide students with support during school and after hours. Other philanthropically funded groups at the state level like the *Tennessee Tutoring Corps* were created specifically to help stave off the "COVID slide" of learning loss likely to occur as a result of the educational disruption caused by the pandemic.

In addition to tutoring, organizations like *Beyond12* rely on mobile applications to connect students with personal coaches, and track progress towards transitioning from high school to college and beyond.

While the technology is novel, the value of all these services depends primarily upon their ability to connect individuals who are willing and able, and who have access to high-quality tutoring content to help students who need assistance. Many of the organizations closest to at-risk students may lack funding or the technical expertise needed to develop those sorts of solutions. Groups with funding and technical expertise, similarly, may lack the access to high-quality tutoring content or cultural connections to communities or individuals most likely to connect well with at-risk students to attract individual users that make the service valuable.

The Federal government can help bridge these gaps by promoting existing applications that serve at-risk students or funding the development of new services aimed at at-risk students or groups whose needs are not being met by existing solutions. The government can also encourage participation from existing government employees, offer additional financial assistance to the organizations operating these platforms to attract individuals who can serve as tutors, coaches, or offer other individual support to students.

The Department of Education should support the creation and development of platforms that can connect at-risk K–12 students to supplementary services like individualized tutoring or coaching by:

- Providing financial support to grantees who are willing to make these platforms available to at-risk students free of charge, and who have the organizational capacity to attract tutors and students in need of the services.
- Investing in the development of open-source platforms that local organizations can easily white-label to create platforms of their own.
- Hosting an online platform to help students, teachers, parents, or interested volunteers identify resources such as local organizations that provide additional support, including individualized tutoring and coaching.

10.6.6. FUND EDUCATIONAL-FOCUSED TECHNOLOGY STANDARDIZATION AND INNOVATION ACTIVITIES FOCUSED ON DATA USE, INTEROPERABILITY OF CONTENT, AND DIGITAL PRIVACY AND SECURITY.

With the immediate disruption of in-person instruction, vendors, educators, and families have been scrambling to figure out how to navigate remote learning. One approach that has been used is to make non-educational digital tools and applications available for free educational use for a limited amount of time. While this has helped solve immediate access problems, these kinds of practices risk creating longer term issues that could further perpetuate inequities in technology use.

For example, if educators build lessons based on short-term access to a digital application and then that application is no longer offered for free, will educators and

families be able to afford the costs to continue using the application, or will teachers have to locate another tool and rebuild their content? Additionally, if the applications and tools educators and families are using were not built for educational use, do those applications and tools have the appropriate data use, privacy, and security needed by law for student data? Can the data gathered through those tools and applications be accessed by educators and families?

The security of students' data as well as the schools' infrastructure are an important but generally overlooked and underfunded area of Education Technology. To start, schools, educational support organizations (*e.g.*, nonprofits that offer educational programming, tutoring organizations), educators, students, and families need to be confident in the reliability and security of the technology they are using for digital learning in school and at home.

Inequities in student access and progress are often hidden in areas where data are not collected, or not used effectively. The lack of systems interoperability, data access, and needed standards and innovation tools often impede the ability to serve all students, and particularly to ensure that each student receives the support they need.

Accurate, timely data about every student is vital for providing effective services, especially in large urban school systems, where struggling students or students with special needs are more easily overlooked.

10.6.6.1. Unlock the underutilized value of data.

Data have the potential not only to help us better understand how and why technology systems are helping students learn, but can themselves act as an intervention, targeting resources where need is greatest, the discontinuation of strategies that are not proving fruitful, and the acceleration of those that are. But to serve this powerful role, several critical revisions must be made to create better alignment and focus, to strengthen the data infrastructure, and to build necessary transparency.

According to the Committee on Developing Indicators of Educational Equity from The National Academies of Sciences and Engineering and Medicine, "To be useful to policy makers, educators, and other stakeholders, two types of equity indicators are needed: (1) indicators that measure disparities in students' academic achievement and attainment outcomes and engagement in schooling; and (2) indicators that measure equitable access to resources and opportunities, including the structural aspects of school systems that may impact opportunity and exacerbate existing disparities in family and community contexts and contribute to unequal outcomes for students."¹³¹

Measuring success against the goals above will require investment in significant capacities in data collection and data integration. Understanding the benefits of the investments recommended here will require multivariate analysis and multi-modal data collection, which should include the lived experiences of teachers, students, and parents whose capacity we are looking to expand. As a baseline, there is a need to track change in the following rates over time:

- Percent of students powerfully and persistently connected to digital learning opportunities (by state, race, gender, class, grade level, school type, community and home language, special needs, and school type).
- Average costs borne by families to connect to digital learning opportunities powerfully and persistently (by state, race, gender, class, grade level, school type, community and home language, special needs, and school type).
- Student performance variation by connection to powerful digital learning opportunities (by state, race, gender, class, grade level, school type, community, and home language, special needs, and school type).

In all of these we would be looking for the impact of equitable resourcing on the rate of growth, *i.e.*, the students furthest from success, who pay the least and who grow the most over the same period.

Once the measure of baseline success is possible, we need to understand how the learning system infrastructure changes based on the investments suggested herein:

- Percent of teachers trained to integrate tech-based, culturally responsive materials in their instruction.
- Percent of teachers effectively leveraging on-line learning as a part of their classroom instruction.
- Percent of teachers using technology to connect with parents on the learning needs of their students.

- Percent of schools and districts able to achieve and maintain 100 percent online enrollment in district sponsored platforms.
- Percent of families who are using effective tools and resources to support their children and connect with their teachers.
- Variations of these data based on the demographics of interest (by state, race, gender, class, grade level, school type, community and home language, special needs, and school type)

Lastly, we need to understand whether changes measured in the first two groupings influence patterns of achievement and attainment. In short, we need to see some of the long-standing gaps in achievement and attainment begin to close:

- Percent of students on grade level at 3rd grade in reading and, mathematics.
- Percent of students successfully passing algebra by the end of 8th grade.
- Percent of students meeting high school readiness standards by 9th grade.
- Percent of students graduating on time.
- Percent of students graduating college and career ready.
- Percent of students enrolling in 2 and/or 4-year colleges.
- Variations of these data based on the demographics of interest (by state, race, gender, class, grade level, school type, community and home language, special needs, and school type)

Additionally, to establish robust systems which will make it easier to collect these data:

- The U.S. Department of Education should provide direct, competitive grant funding for the development, adoption, use, and advancement of data standards for electronic education records. This funding should include efforts to increase the accuracy and the timeliness of electronic education records.
- The U.S. Department of Education should set specific learning record interoperability targets for schools receiving Federal funding to enable the movement of learning data securely and with explicit authorization, both between systems within a school system, and between school systems and states, where appropriate.
- The U.S. Department of Education should fund additional investments in State Longitudinal Data Systems to improve data quality/accuracy, scope, security, and timeliness of the data collected by these systems.
- The U.S. Department of Education should fund data systems upgrades to school financial and educational program systems, to enable schools to effectively track the progress and investment in educational services, cost, and progress of each individual student.
- The U.S. Department of Education should fund the development of more specialized and capable interoperability standards to ensure easier transfer of content and data across technical platforms.
- US Government entities such as the U.S. Department of Education, the Federal Communications Commission, and other Federal agencies should collate and publish data on their use of funds around technology in an easily located and navigable website hosted by the U.S. Department of Education.

10.6.6.2. Ensure learning data are secure and private.

Students deserve privacy protections to secure their information and protect it from unauthorized use. While legally mandated, information security in education is often overlooked and underfunded.

- The U.S. Department of Education and state education agencies should require schools who invest in technology using their funding to ensure the products they purchase comply with Information Security and Data Privacy Standards. While not unique solutions, the Student Data Privacy Pledge program, the Student Data Privacy Consortium, and Project Unicorn interoperability, as well as ISTE's emerging Ed Tech Product standards work, represent potential requirements that would assist schools in identifying qualifying products.
- The U.S. Department of Education should host an ongoing series of information security and privacy plugfest conferences to demonstrate and showcase products that meet information security and data privacy standards, and to encourage and educate vendors and educators on how to acquire, configure, and operate technology with effective security and privacy.

10.6.7. IMPROVE THE ACCESS OF STUDENTS OF COLOR AND OTHERS TO EDUCATIONAL EXPERIENCES THAT WILL IMPROVE THEIR ABILITY TO UTILIZE THE TECHNOLOGY.

10.6.7.1. Assure computer science is part of every student's educational experience.

We recommend amending the Elementary and Secondary Education Act to add "Computer Science" to the list of subjects for which states create academic standards. Currently, that list requires "mathematics, reading or language arts, and science" to be part of the base curriculum for all K–12 students nationwide. Computer science should be added to the list.

10.6.7.2. Revive Rural and Minority STEM Scholarship Program.

We recommend reviving and improving the now-defunct "SMART grants" which were a smaller scholarship program for students studying STEM that ended in 2010. To do so, the Department of Education should fund scholarships for students of color and students from rural communities studying STEM in undergraduate, graduate, or certificate programs.

CHAPTER 11.

HIGHER EDUCATION AND A RESEARCH AND DEVELOPMENT AGENDA

11.1. PROBLEM STATEMENT

While colleges and universities have some of the best networks and highest levels of connectivity in the world, problems persist. Some students, forced to study from home or facing greater economic difficulty due to COVID–19, risk being disconnected from an education that increasingly relies on broadband at home. A larger problem is that colleges and universities remain an underutilized resource for digital equity and inclusion. Colleges and universities that directly serve students negatively impacted by failings of digital equity and inclusion often lack the resources to assist students in developing skills to thrive in the digital economy and society. Broadband skills and resource that are in abundance in leading universities has not been tapped to reach locations where robust networks are absent. Research has failed to close the gaps in performance in our current educational system with digital solutions.

11.2. VISION

Today, some American campuses enjoy the highest performing networks, highest adoption rates, and most effective use of digital technology anywhere in the world. We should engage knowledge transfer, so that all colleges and universities, particularly those institutions educating disadvantaged students, can enjoy the same benefits, improving utilization, enhancing education, and providing equal opportunities.

11.3. GOALS

- All college and university students stay connected, regardless of their financial situation and the mode of classroom instruction.
- Existing and underutilized university and college talent is used to help those institutions educating disadvantaged students.
- Existing and underutilized university and college resources are used to help connect unserved or underserved communities.
- Greater research on digital education and how it can improve outcomes.
- The development of best practices for using digital education to build a more equitable and inclusive society.

11.4. BACKGROUND

11.4.1. THE OPPORTUNITY UNIVERSITIES AND COLLEGES TO IMPROVE DIGITAL EQUITY AND INCLUSION.

Viewed from the outside in, universities and colleges encapsulate many of the problems caused by a lack of digital equity and inclusion. Poor relationships between campuses and surrounding urban centers are hardly new and have grown to include gaps in digital access and opportunity.

Plato's academy set up shop outside the walls of the City of Athens to escape the mundane concerns of life in the city. Centers of learning moved back into the city when it was convenient to share and make common purpose of available infrastructure. Medieval Oxford University, for example, appreciated the availability of town water and early sewage systems. Dozens of Oxford scholars died during an "invasion" of the campus by local townspeople. Infighting and deteriorating relations between the university and the two led to a spin off university called Cambridge.

About 50 years ago, in some of American's great research universities, the infrastructure of what would become known as the Internet was being designed and to connect parts of the same institution in different locations, across town or across the country. These new networks, as with previous academic infrastructure, bypassed surrounding communities. The Internet opened new opportunities for the universities and surrounding research parks, as well as the campus-like settings of new Internet enterprises. But those in the urban centers surrounding the campus were left out.

The time is right for colleges and universities to re-think community service, the traditional third pillar of academic life that includes learning and research.

Universities and colleges can collaborate with city and private sector partners to help address the broadband availability, adoption, affordability, and utilization gaps. Universities are uniquely positioned to provide engineering expertise, technical support, and outreach and digital literacy support to promote adoption. Universities and community education partners also control educational content that can be leveraged to fulfill the vision of universal learning.

11.4.2. THE IMPORTANCE OF CONTINUED RESEARCH AND DEVELOPMENT FOR IMPROVING OPTIONS FOR AVAILABILITY, ADOPTION AND UTILIZATION.

Federal investments in research and development, coupled with private research and product development, have created the robust broadband ecosystem users enjoy today. In the 1970s, research funded by the Defense Advanced Research Projects Agency (DARPA), and later the National Science Foundation (NSF), played a vital role in the development of Internet protocols. In the late 20th century, likewise, American companies led in the development of nearly all of the key technologies involved in digital networks, including digital switching technologies, optical communications, cellular communications, Internet hardware and Internet applications. These investments facilitated the creation of multibillion-dollar companies that are global leaders in networking, search, and other Internet-based businesses.

As with other key technologies, R&D activity drove innovation and productivity gains, which aided economic growth. The National Research Council found that in the case of information technology (IT), "The unanticipated results of research are often as important as the anticipated results." Further, "[t]he interaction of research ideas multiplies their impact," and "[p]ast returns on Federal investment in IT research have been extraordinary for both United States society and the United States economy."

America's top research universities and laboratories continue this R&D leadership. Their efforts accelerate the pace of innovation, placing next-generation technology in the hands of individuals, investors, and entrepreneurs. The next generation of networks will undoubtedly lead to even more exciting, unanticipated discoveries that will improve how people connect, work, learn, play, and contribute online.

The broadband ecosystem—networks, devices, and applications—has benefited from research breakthroughs in a variety of areas, including networking, software, semiconductors, material sciences, applied mathematics, construction, and engineering. Continued investment and advancement in all these fields, and many others, is essential for future innovation. For U.S. companies to continue leading in the global broadband ecosystem, they must continue to generate and benefit from scientific innovation.

The gap between R&D returns for private companies, on the one hand, and those for society on the other, however, presents a challenge. Government can help fill an R&D investment gap by funding research that would yield net benefits to society, but that would not earn sufficient returns to be privately profitable, or at least not on a predictable timetable. The Federal government needs to create a clear agenda and priorities for broadband-related R&D funding in particular. The government can also promote R&D through regulatory policies that promote increased use of government resources, such as by establishing research centers of excellence, or allowing experimental access to radio spectrum to evaluate new technologies in ways that theoretical studies and simulations cannot.

11.5. RECOMMENDATIONS

11.5.1. KEEP ALL STUDENTS CONNECTED WITH FREE TECHNOLOGY LOAN PROGRAMS FOR STUDENTS.

Universities and colleges should ensure that students remain connected. Many students enrolled at American's colleges and university now live in poverty. Half of community college students and nearly half of four-year college students experience food insecurity. More than a third of college enrolled students have insecure housing, many with nowhere to live other than a car or on the street.

During the pandemic, colleges and universities, in part through funds provided by the CARES legislation, have made hundreds of thousands of laptops and hotspots available through library lending programs, keeping computing labs open, and using personalized notification systems to keep all students motivated. While these efforts are far from perfect, colleges and universities have demonstrated that it is possible to close the adoption gap through intentional policies and commitments to at-risk students and employees.

As the state of the classroom remains uncertain, future COVID-19 relief packages should ensure that all institutions of higher education have the resources they need to keep students connected.

11.5.2. USE UNIVERSITY RESOURCES TO HELP THOSE INSTITUTIONS SERVICING THOSE WHO HAVE BEEN DISADVANTAGED BY THE DIGITAL DIVIDE.

As discussed in Chapter 10, failings of digital equity and inclusion affecting K-12 students is about more than networks, devices, and other technology. There is also a need for teachers and students to utilize technology to improve educational outcomes. Institutions of higher education whose mission is to serve the disadvantaged, specifically community colleges and HBCUs, are generally those most lacking in resources to help students develop skills needed to thrive in the digital economy. Congress acknowledged and acted on this concern in its December 2020 COVID-19 relief package, appropriating \$285 million to NTIA to for a grant program for HBCUs, Tribal Colleges or Universities (TCU), a minority-serving institution, or their respective consortiums, for the purchase of broadband Internet access service, or any eligible equipment, or to hire and train information technology personnel.

That amount, however, will not be sufficient to fully address the need. Further, community colleges have not received new funding. We need to supplement Congressional efforts by applying underutilized resources in other institutions of higher education, particularly the technical expertise of faculty and students, to address unmet needs.

11.5.2.1. Create A National Urban Service Education Project (NUSEP).

NUSEP would advance a new role for America's colleges and universities, encouraging them to scale up their involvement with and commitment to assisting K-12 institutions in improving utilization of digital tools. The project would create a network of National Service Universities, and a coalition of university partners, HBCUs, community colleges and national urban organizations, working together to design, promote, and support scalable and sustainable adoption practices informed by the needs and priorities of those it serves.

The project would build on existing infrastructure that encourages students to perform public service and otherwise supports intentional and sustainable participation in community life by colleges and universities by extending their physical facilities and program offerings. For example, dental medicine students may participate in community dentistry curriculum, and provide oral health sealants to all school-aged children in a local metropolitan school district. Social work departments are co-locating in public housing facilities and mental health facilities. Engineering students and fashion design students are setting up techshops, fablabs, and hackerspaces embedded in the local community. College clubs may likewise support Girls Who Code, or offer computing classes to those living in homeless shelters to help them apply for public housing. Community service learning programs offer college students an opportunity to assist small local businesses get online and set up e-commerce sites. Business and economic students are partnering to deliver digital financial literacy to residents of senior citizen facilities.

The project would build on these efforts, but provide a national platform through which programs can be evaluated, best practices can be identified, and practitioners can come together to discuss how to continually improve on the effectiveness of their efforts. The project could be housed in the Digital Equity and Inclusion Office, discussed in Chapter 4.

11.5.3. USE UNIVERSITY RESOURCES TO HELP CONNECT COMMUNITIES WHERE CONNECTIVITY REMAINS A PROBLEM.

As discussed in Chapter 3, our country has a significant availability gap. The Plan proposes numerous methods for closing that gap.

But it may be that there are areas where neither market forces nor government support will fully close the gap. In those areas, we should consider whether, in addition to or as alternative, there are university resources that can be called upon. America's colleges and universities are among the most connected "cities" in America. When an institution acquires property around its campus for housing or other

services, the communications network is often extended beyond the traditional boundaries to connect these new assets.

Likewise, universities and colleges who are now extending Citizens Band Radio Services (CBRS) networks, using shared spectrum, to support the wireless needs of the campus and extend wireless beyond the traditional campus. Low-powered wide area radio networks (LoRa) are specifically designed to extend research, monitoring, and the burgeoning Internet of Things networks that touch both the campus and extend well beyond it. Millimeter Wave mesh wireless networks are used by campuses to support point-to-point (connecting one building to another) or multi-point (one building to more than one building) at very high speeds.

In addition, we note that the broadband service levels we expect to become ubiquitous will not serve every need. It is likely that some kinds of institutions, such as those providing STEM education or health care, may need upgraded or otherwise different kinds of connectivity.

Every major research university is using tools known as software defined networking to provision different kinds of networks for different kinds of users with different attributes across the campus. As an example, the network needs of a research lab working on high energy physics is very different from the needs of students majoring in English. Software defined networking allows providers to provide virtual “swim lanes” unique to the specific needs of different user groups.

Using these and other resources, technologically advanced, colleges and universities should partner with other public sector technology leaders along with legacy, incumbent, and new entrants in the communications marketplace, to assure that specialized needs for institutions serving low income and communities of color, including HBCUs, and community college, obtain the networks they need to advance digital equity and inclusion.

11.5.4. *FOCUS RESEARCH ON UNDERSTANDING HOW DIGITAL EDUCATION CAN IMPROVE OUTCOMES AND OVERCOME PERSISTENT PERFORMANCE GAPS.*

The pandemic forced educators across the country to flip the entire education delivery model to remote everything. Key lessons regarding availability and adoption across the education landscape were learned, often painfully. One major and largely unanticipated challenge was the absence of a 21st century pedagogy for teaching 100 million learners, based entirely on a live remote model. Once a vaccine is widely deployed, we will likely be faced with new questions regarding classroom experiences. Should we go back to the previous approach, support the continuation of 100 percent live remote offerings, or evolve a hybrid model based on the insights of educators and the preferences of families and their students? The response to that question the coming years may be as important as any development in education for the last century.

To help resolve these issues, the Administration should commission the President’s Council of Advisors on Science and Technology (PCAST) and the National Research Council to urgently assess and present the potential for 21st century, technology-enhanced, adaptive, and personalized learning opportunities, based on lessons learned from the global pandemic. It is now twenty years since the publication of Bransford et al’s *How People Learn: Brain, Mind, Experience, and School*, which presaged the need for comprehensive insights on the potential and risks of fully immersive, digitally remote learning into the 21st century. The time is right to investigate our capacity to leverage human knowledge, augmented by the Internet, and mediated through both human and machine interactions. The academic research community, in partnership with HBCUs and community colleges, working across disciplines including cognitive science and educational technology research, should be engaged in documenting, assessing, and recommending how we preserve and advance the art and science of learning. Particular attention should be paid to digital tools that can help overcome persistent performance gaps that have characterized educational outcomes in our current system.

11.5.5. *UNDERSTAND AND HONOR BEST PRACTICES FOR USING DIGITAL EDUCATION TO BUILD A MORE EQUITABLE AND INCLUSIVE SOCIETY.*

The COVID-19 pandemic tested our educational institutions as never before. Many efforts, understandably, were disappointing, but some schools, administrators, and teachers seized the moment to create effective platforms for digital education.

To recognize that achievement, the White House should convene a ceremony for *America’s Great Teachers During the COVID-19 Pandemic*, nominated by students and institutional leadership, honoring their commitment, innovation, and resilience. The White House and OSTP, in partnership with NSF and other agencies and private companies, has previously used its convening power to advance and celebrate

STEM education through White House Olympiads and the like. As the country works its way through the pandemic, the White House should similarly recognize urban teachers, rural community teachers, elementary school, middle school, high school, community college, and university teachers exemplifying the best of human ingenuity, adaptation, and commitment to the craft of teaching.

11.5.6. THE FEDERAL GOVERNMENT SHOULD CONTINUE TO FOSTER THE DEVELOPMENT OF RESEARCH NETWORKS AND BROADBAND TESTBEDS THROUGH A CLEAR R&D FUNDING AGENDA THAT IS FOCUSED ON DIGITAL NETWORKS, EQUIPMENT, SERVICES, AND APPLICATIONS, WITH A PARTICULAR FOCUS ON DIGITAL EQUITY AND INCLUSION.

11.5.6.1. Support efforts to identify, develop, test, and deploy applications of digital technologies that could foster economic and social mobility.

As discussed in Chapter 8 on workforce development, there is a mismatch between the jobs people from communities of color and low-income communities often have training to do and the jobs of the future. In that light, the government should seek to identify, develop, test, and deploy applications of digital technologies that foster economic and social mobility, including development of a technology-enabled, short-term workforce training that can enable low-income workers to obtain the skills they need for higher-paying jobs.

There are several barriers to such an effort. The Federal government currently undertakes significant investments aimed at harnessing science and technology to achieve some goals (national security, health, energy, space, basic science), but not others (education, workforce development, economic and social mobility, racial disparities). As a result, agencies like HUD, Education, Labor, and the human service components of HHS have little or no capacity to engage with researchers and entrepreneurs to develop and deploy breakthrough applications of technology that would advance equity and inclusion.

Further, while there are notable private and philanthropic efforts offering online education and training, the private sector systematically underinvests in applications of technology that serve low-income communities. For example, there are currently approximately 36 million adults reading at the third-grade level or below, yet no private enterprise has committed itself to developing tools to solve that problem.

In addition, the development and rigorous evaluation of technology-enabled solutions is likely to be characterized by high fixed costs but low marginal costs—meaning that up-front costs may be substantial, but that, once developed, the resulting tools can be deployed widely and cheaply. Government social spending is not generally organized to support scalable applications. Funding is historically provided as a block or formula grant to states. States in turn then typically provide smaller amounts to local service providers. There is no national approach to developing scalable applications.

There are, however, examples of how such an approach could pay significant dividends. Over the last decade, DARPA sponsored the development of a *digital tutor by a Silicon Valley firm* that uses AI to model the interaction between an expert and a novice. Navy recruits who use the tutor to learn IT systems administration can outperform Navy experts with 9 or more years of experience. The firm believes that, with an investment of \$40 million, they could adapt their technology to dramatically improve the performance of students who are currently failing 8th grade math. Although this is the kind of experiment worth doing, the Department of Education does not have the capacity to support it.

11.5.6.2. Support R & D efforts in developing alternatives to current network architecture, particularly relating to 5G.

One of the most promising developments in broadband is the deployment of 5G mobile networks. Over time, 5G holds the promise of greatly improving the coverage and availability of broadband networks, increasing competition and reducing costs to consumers.

5G technology can also be used to improve both the character and quantity of jobs in the United States. One promising example involves the development of Open Radio Access Networks (ORAN). Today, mobile operators rely exclusively on closed, end-to-end Radio Access Networks (RAN), hardware and software primarily supplied by non-American companies. The current RAN Architecture is based on proprietary interfaces, which increases the costs of deployment and upgrades. Industry has begun to coalesce around a different approach, which utilizes a non-proprietary, multi-vendor ORAN, an approach that has already demonstrated its ability to lower capital and operational costs. That in turn, can improve the economics for closing

the availability gap, enabling broader deployment and adoption by lowering the costs to build and therefore the price to use.

The Federal government can support and accelerate the ORAN effort through R & D efforts including the following:

- 11.5.6.2.1. Create an innovation fund to spur R&D and deployment based on open, interoperable standards, including ORAN, and software-based wireless technologies.

To accelerate the development of ORAN, the Federal government could, as it has done with other technologies, create an innovation fund that would help the private sector create viable 5G alternatives from all ends of the supply chain, while at the same time laying the foundation for increased employment in the United States. Such a fund could be managed by NTIA, with input from the Defense Advanced Research Projects Agency (DARPA), the National Institute of Standards and Technology (NIST) and the FCC, among others.

- 11.5.6.2.2. Design a program to incentivize investment and job creation in the U.S. by offering R&D credits and other incentives for network technology suppliers, including incentives to contract with minority owned enterprises.

As has been true of other industries where global leadership began with Federal government support, there is an opportunity to improve the competitiveness of the U.S. in next-generation mobile networks based on targeted incentives to build local capacity. Policymakers should include in such efforts specific incentives for contracting with minority owned enterprises.

CHAPTER 12.

GENERAL GOVERNMENT SERVICES

12.1. PROBLEM STATEMENT

As documented in Chapters Three and Four of this Plan on the availability and adoption gaps, digital equity and inclusion requires all Americans to have networks available to their communities, the means to afford broadband and the skills necessary to use it. But it also requires that those providing services to low-income and communities of color also have the necessary digital tools to provide those services in an effective manner. There are a myriad of ways that government could be more effective in delivering such services but, unfortunately, many government IT systems are outdated, government budgets are constrained in upgrading and maintaining digital infrastructure, government agencies do not face competitive pressures that force private sector actors to stay on the cutting of digital services and to prioritize citizen-centric experiences.

These problems all result in a lack of innovation and poorer service that negatively impacts all Americans, but they have a particularly problematic impact on those who depend more on government services. Further, there several government technology shortfalls, such as with mobile transfer payments and mobile applications that disproportionately affect lower income persons and communities of colors who rely more on mobile phones than the general population. The current situation also creates a data divide, where certain communities do not have sufficient data collected about them, creating social and economic inequalities. In addition, there are opportunities, such as by creating APIs to enable non-governmental organizations to link Americans to services, to better serve low-income and communities of color that our country has utilized.

12.2. VISION STATEMENT

We should have our government institutions improve their online services to offer solutions on par with the best private sector actors, where competition drives continuous innovation. The government should take advantage of digital technology to make it easier for all persons, but particularly those from low-income communities and communities of color, to understand and benefit from the full range of government services, interact with those services, such as in making or receiving payments, and in enabling non-government organizations to assist Americans receive the help they need. The government should also collect data that fairly represents the activity of all Americans, not just those currently online.

12.3. GOALS

- Surveys should reflect that Americans are as satisfied with their interactions with government digital interactions as they are with the best private sector actors.

- In order to improve usability and measure use, by the end of 2021, all Federal and most state and local government agencies should monitor and report metrics about their website performance to a public dashboard.
- By the end of 2022, interactions with Federal government websites should be as easy to do on a mobile device as on laptop.
- By the end of 2022, all government forms should be able to be accessed and filled out online.
- The government should end the data divide by collecting data that fairly reflects the activity of all Americans, not just those currently online.

12.4. THE CURRENT SITUATION

Broadband provides access to critical government information and services, such as obtaining reliable health information, applying for and receiving government benefits, searching for community news and activities, and accessing voting resources. Many government agency leaders recognize that citizens and businesses have grown accustomed to high-quality digital services in the private sector and increasingly expect the same from the public sector, whether it is on their mobile device or personal computer.

Even before the COVID-19 pandemic, many Federal government agencies have been pursuing digital strategies to improve government service delivery and organizational efficiency. Unfortunately, governments at all levels often fail to meet the standards set by the private sector or leverage the full potential of emerging technologies to deliver better and more efficient services. There are several reasons this is the case.

First, many government IT systems are outdated. The Government Accountability Office (GAO) has identified multiple Federal government IT systems that are more than 30 years old, with some over 50 years old.¹³² Another GAO analysis found that only about 11 percent of Federal IT systems run in the cloud.¹³³ One recent analysis found that the Federal government had more than 930 million lines of code using more than 70 obsolete programming languages, like COBOL and Fortran.¹³⁴ These systems not only present significant security risks, but they also can be difficult and expensive to maintain, especially when agencies cannot find programmers with this experience or must pay a premium for their services. GAO sampled 10 legacy systems in the Federal government and found that they cost \$337 million per year just to maintain.¹³⁵ These systems make it harder for government agencies to provide the kind of seamless, online experience citizens expect.

Second, agencies typically do not receive sufficient funding to invest in necessary IT upgrades, let alone state-of-the-art innovation in adopting new IT systems and applications and using them in cutting-edge ways. Federal agencies have massive IT budgets, but most of this funding goes to operations and maintenance: “keeping the wheels from falling off.” The Federal government spent more than \$90 billion on IT in 2019, but 80 percent of these expenses went to operating and maintaining existing systems, up from around two-thirds a decade earlier.¹³⁶ Upgrading IT systems requires substantial investments, even if they reduce operating costs in the long-run, and appropriators at all levels of government usually prefer to commit funds to other purposes.

Third, government agencies do not face competitive pressures that force private sector actors to stay on the cutting of digital services and to prioritize citizen-centric experiences—people do not move to another jurisdiction because their government’s website is lousy.¹³⁷ In contrast, when a private sector firm fails to effectively embrace the Internet, it loses market share, its profits shrink, and it may go out of business. That focuses the mind of business leadership. As a result, the bar for excellence is relatively low and government agencies tend to lag in effective digital adoption, which affects their performance and how citizens feel about these government institutions. And all too often, online or “e-government” services are organized around the interests and needs of the particular agency, rather than the citizen or business user. To take one example, Montgomery County, Maryland was named the top digital county in the United States in 2019, yet its citizens rate their experiences on county websites as mediocre, at best. But, compared to other counties, Montgomery County received top marks.¹³⁸

Moreover, government services must be usable for everyone cannot merely cater to a target market. Governments must build digital experiences that can be used by the less literate, less digitally literate, non-English speakers, and citizens of all ages, backgrounds, and disabilities. This makes usability and user testing even more important for government products at all levels. Unfortunately, government products frequently lag private-sector equivalents in terms of usability and user

testing. This is why usability is the first goal of this chapter and is featured across multiple recommendations.

Recently enacted bipartisan Federal legislation has prioritized efforts to digitize government: the 21st Century Integrated Digital Experience (IDEA) Act requires government agencies to produce modern, mobile-friendly websites, mobile applications, and online forms; the Modernizing Government Technology (MGT) Act established the Technology Modernization Fund, albeit initially with only around \$100 million to fund IT modernization projects in Federal agencies; and the Open, Public, Electronic and Necessary (OPEN) Government Data Act mandates Federal agencies to publish information online, using standardized, machine-readable data formats.¹³⁹

While all helpful, these initiatives have had relatively little funding, as has been the case in most states and localities.

12.5. RECOMMENDATIONS

To improve online government services, as well as government adoption of digital technologies more broadly, there are several things governments should do. We have organized these into three sections.

12.5.1. *EMBED INNOVATION IN GOVERNMENT.*

At the core of improving digital government is innovation. Americans experience innovation every day, and they expect continued innovation. But innovation is hard and is often not seen as essential to accomplishing the mission of government. As a result, it is as if the government is living in a 20th-century analog world full of bureaucracy, paper, and delay, with users of Federal services suffering from higher costs, less functionality, and lower quality.

There are several unique challenges that make innovation in government more difficult than in the private sector. Federal agencies suffer from all the limitations large businesses suffer from—including bureaucracy and middle-manager resistance—plus a host of other challenges unique to government. First, it is harder for older organizations to innovate, because innovation would require challenging a status quo that, for Federal agencies, is decades old. In addition, compared to businesses, agencies have limited funds to pursue novel ideas. Finally, unlike private companies, agencies face no competition that will take their market away if they do not innovate, but they do face consequences if they try to innovate and fail. This means senior government leaders have little incentive to innovate, and even significant disincentives to do so, therefore opportunities to pursue digital innovation get short shrift.

While there are many steps that government can take to pursue digital innovation, these steps would be strengthened by embedding innovation into the DNA of government itself. By transforming itself through a combination of bottom-up efforts that foster innovation and top-level leadership that encourages and prioritizes innovation, the Federal government can improve the lives of Americans, boost productivity, and restore faith in government.

12.5.1.1. Establish a position of Chief Innovation Officer within the White House.

The major challenge in transforming the Federal government into an innovation-based enterprise is that there is no one who “owns” the challenge. Presidents do not have the time or usually the inclination to focus on innovation. And they face little electoral consequence for not innovating. If voters must fax in an employment form to the Office of Personnel Management (OPM) instead of e-mailing it, this issue likely won’t be the key one that swings their votes. As a result, issues of innovation are relegated to the second tier, with agencies generally having leeway to call their own shots. At the same time, political appointees running agencies all too often ignore the innovation agenda in favor of a more front-facing political agenda. Why do the hard work of improving the internal operations of an agency when the average tenure of political appointees is just two-and-a-half years? In short, no one is on the bridge steering the Federal “ship” toward innovation.

To solve this, the next administration should establish a chief innovation officer (CINO) whose responsibility would be to coordinate and drive innovation within the Federal enterprise. The CINO would complement the chief technology officer (CTO), whose role should be focused on supporting technological innovation in the broader society and economy, and the Federal chief information officer (CIO), whose job is to focus on the Federal IT enterprise. The CINO would work closely with the CIO but would not necessarily be a tech-centric role. For instance, if the CINO is tasked with leading a cross-agency process improvement project to streamline services for low-income working mothers, the CINO would leverage process improvement, human-centered design practices, and other innovation methods to define and tackle

the challenge—some solutions pursued would involve digital government tools and some might be nontechnical.

12.5.1.2. Increase the size of the Presidential Innovation Fellows Program.

Change agents are key drivers of innovation in many organizations. While many private sector firms seek to embed change agents in their companies, doing this in government can be a struggle. One program to address this challenge is the Presidential Innovation Fellows (PIF). The PIF program brings in a diverse group of product designers, engineers, and executives with industry expertise and entrepreneurial perspectives to pursue digital innovation in the Federal government. This program is an important avenue from bringing in outside talent but is relatively small with only around 20 individuals per year entering the program.¹⁴⁰ To rapidly increase the rate of digital innovation, the next administration should increase the program to an annual new cohort of at least 100 individuals and maintain this new rate going forward.

In addition, we recommend that the Administration consider adding a new inter-governmental element to the expanded Presidential Innovation Fellows Program. While Federal government services are important, many citizens witness government most frequently at a local level. When it comes to innovation (performance management, process improvement, digital services, open data, replacing legacy systems), there is high variability across city and county governments in the United States. Presidential Innovation Fellows could provide remote and in-person project-based consulting to local governments seeking advice on best-in-class e-gov implementations that could then be shared with other jurisdictions. This resource could be invaluable, especially to more rural or resource-strapped areas who have the political will to innovate but lack the time and expertise to start.

12.5.1.3. Establish a bottom-up innovation tool for Federal employees.

Frontline workers often generate important new ideas for how an organization should operate. Unfortunately, the Federal government is not well-designed to harness ideas from these workers. It still by and large embraces a hierarchical management culture, where frontline workers' job is to perform, not innovate. A survey by the Partnership for Public Service and the Hay Group found that just 39 percent of Federal employees felt that creativity and innovation were rewarded.¹⁴¹ And according to a recent survey by Eagle Hill Consulting, 72 percent of Federal employees say their agencies rarely or never seek their ideas for improving their agency, while half say that they don't know how to submit ideas to their agencies.¹⁴²

But the emergence of powerful and scalable social-networking technologies could allow Federal workers to easily engage in generating innovation ideas. The OMB should develop a tool to enable any Federal employee to propose innovation ideas, especially for the better digital delivery of services, in a structured format. In reviewing these ideas, the focus should be on ideas that can be implemented across government, not just a single agency. The initiative could be akin to an internal challenge.gov.

12.5.1.4. Expand the number of innovation “skunk works” in Federal agencies.

Because innovation in government is not a key electoral issue, it is often deprioritized. Government agencies can accelerate innovation by creating dedicated spaces to develop and debate ideas that can solve challenges and create new approaches to agency practices. Pioneered by Lockheed Corporation in the 1950s, several major corporations have created “skunk works”—separate organizational entities not constrained by the dominant corporate mindset or rules. The idea behind skunk works is to create a dedicated space, less encumbered by the day-to-day concerns of providing services or products, as well as the rules and routines governing companies. Many of these skunk works are not just focused on identifying and launching new ideas, but on killing old ones. For example, the National Security Agency (NSA) has an internal accelerator called “Incubation Cell” that views its mission as killing bad ideas because they will otherwise persist. A few agencies, such as the NSA, CIA, and HHS, have skunk works-like efforts. However, the next administration should establish a pilot program where four or five additional agencies establish skunk works focused on disruptive digital innovation within their operations.

12.5.1.5. Establish a digital innovation ideas panel within OMB.

The private sector often has valuable knowledge and extensive expertise about potential solutions to problems in government agencies, but the process of proposing new ideas to the Federal government is complex and opaque to many outsiders. This prevents agency leaders from learning about potential solutions to problems that are common across government. To address this issue, the next administration should

create a process to allow individuals in the private sector to apply to present digital solutions to a panel of OMB officials, who could then work with agencies to ensure relevant solutions are considered in the procurement process.

12.5.1.6. Allow agencies to divert a small share of their budgets to innovation projects.

Agencies need funds for innovation. For an agency that truly wants to innovate, most have limited capital for internal “venture” investing, and many lack the ability to quickly prototype, refine, fail, and try again, because it can be almost impossible to get sign-off on new projects quickly. To solve this, Congress should allow agencies to allocate a small share of their operating budgets to serve as an internal innovation seed fund, so they can start pilot projects more easily. In particular, agencies should prioritize projects that deliver better government services or improve government productivity. The authority could be set to expire after five years, at which point GAO could assess the results.

12.5.2. IMPROVE GOVERNMENT SERVICE DELIVERY.

Digital technologies offer many opportunities to improve government services. Indeed, the widespread availability of broadband and mobile Internet means that government services can always be accessible, allowing for more convenience and flexibility. However, agencies should continue to improve their online services to offer solutions on par with the best private sector actors, where competition drives continuous innovation.

To start, agencies should meet basic standards such as ensuring every website loads quickly, meets all accessibility requirements, and is optimized for both mobile devices. Moreover, they should ensure every form is digital, allowing for electronic data entry, signing, and submission. The Federal government should also require its internal teams and vendors undertake representative UX/UI (user experience/user interface) testing be done before web products are launched or revamped.

Unfortunately, more than two decades after the Federal government started on its digital journey, many have still not even accomplished these basic steps. And the track record of many state and local governments is no different. This means agencies have a significant opportunity for improvement. First, they should all receive the resources needed to meet these basic standards. Second, they should develop roadmaps to start leveraging emerging technologies like artificial intelligence, the Internet of Things, augmented reality and virtual reality (AR/VR), and blockchain to offer next-generation e-government services.

12.5.2.1. Monitor and report metrics about Federal agency website performance to a public dashboard.

As noted, too many Federal websites perform poorly compared to the best-in-class private ones.¹⁴³ The Federal government should better track website metrics to promote agency accountability. OMB should require that Federal agencies participate in the Digital Analytics Program (DAP) hosted by GSA, and OMB and GSA should expand DAP to include additional metrics, such as page-load speeds, mobile friendliness, and accessibility. The government also should consolidate the data it collects on Federal websites into a single public dashboard. Since most website tests can be automated, OMB should mandate that each agency regularly test its websites against each of these metrics and provide the data to the public dashboard. States should mandate the same kind of measures, perhaps collected by an organization like the National Association of State CIOs (NASCIO).

12.5.2.2. Launch a website modernization sprint to fix known problems with Federal websites.

Many Federal agencies have known problems with their websites but lack clear solutions to resolve them. OMB should direct agencies to launch a series of “sprints” to address known problems, especially failures to meet security and accessibility requirements. Through the sprint process, agencies can identify the underlying technical or functional causes of these issues and determine the best approach to mitigate them. This approach to problem solving is widely used in product development and allows for rapid, iterative responses to known issues. Addressing security weaknesses quickly is especially prudent given the threats that cyberattacks pose to the U.S. government. The U.S. Digital Service playbook offers recommendations for iterative product design that agencies can use as a starting point to launch these sprints.¹⁴⁴

12.5.2.3. Improve automated and personalize online government customer support.

One of the major opportunities to improve service in government is by providing more automated and personalized online experiences. In particular, government

agencies can use automation technologies including machine learning, robotic process automation, and chatbots to deliver faster and better services. For example, online chatbots leverage technologies like natural language processing and analytics to answer questions from users. Multilingual chatbots could prove to be particularly helpful to help non-English-speaking populations navigate government resources, such as immigration services. Similarly, robotic process automation can streamline routine services, such as automatically processing an e-mail request.

These technologies not only expedite government services for the end user, but they also make government significantly more efficient by freeing up government staff from routine activities and allowing them to focus on higher-value work. For example, if all state unemployment insurance agencies had adopted this technology prior to the pandemic, they likely would have been able to handle many more transactions more effectively. For this reason, federal, state, and local IT investments should focus on increasing productivity and online service through digital transformation and automation.

12.5.2.4. Expand use of user-centric design interfaces.

Virtually all best-in-class private sector companies that depend on the Internet for survival spend considerable amount of money and time improving the design of the user interfaces of their websites to make it easy for users to find what they want. They leverage design-thinking processes to immerse themselves in the customer experience which allows them to develop and test online services that meet the specific needs of their customers.¹⁴⁵ For example, the financial services and tax software company Intuit employs individuals with a variety of skills to “design for delight” by taking steps to deeply understand the needs of their users and conduct user testing to make decisions based on actual user behaviors.¹⁴⁶ The U.S. Digital Service has developed a comprehensive web design framework for Federal agencies, and while some 200 agencies have adopted this modern code base, many more have not.¹⁴⁷ The next administration should require Federal agencies to adopt this standard for all new websites. In addition, states should either adopt the Federal codebase or pool their resources, perhaps through NASCIO, to develop similar code libraries that they can deploy across similar services (*e.g.*, employment services, parks, etc.).

12.5.2.5. Establish desktop and mobile page-load speed benchmarks for websites.

Users will expect government websites and apps to load at speeds similar to their private sector counterparts. But many local, state, and Federal agencies have yet to optimize their websites to ensure they load quickly on desktops and mobile devices. This could further slow development and adoption of digital government services as users will find less value in online alternatives that they see as inconvenient. The Federal government already has established standards and best practices for Federal websites based on consumer convenience, accessibility, and security. Given that the majority of Federal websites still need to significantly improve their page-load speeds, OMB should work with the Federal CIO to develop Federal guidelines on page-load speed across devices. And state and local CIOs should do the same.

12.5.2.6. Establish video streaming best practices for all public government events.

Many government events—conferences, panel discussions, and speeches—take place all over the country. For most Americans, attending these events in person is not an option, especially with the pandemic. While many Federal agencies put some or all of their events online through streaming video, they do this inconsistently and using a variety of platforms, many with significant capacity restrictions which limits their potential audience. Moreover, some of these platforms are not accessible, such as not enabling live automatic captioning when manual captioning is not provided. To address this problem, OMB should establish video streaming best practices for all public government events and provide agencies with funding to implement these requirements. Federal agencies should no longer procure event video streaming services from contractors that do not meet these best practices.

12.5.2.7. Launch a Federal website consolidation initiative.

There are so many Federal government websites that finding the right information, or up-to-date information, can be a major challenge. While it is important to provide comprehensive information about government agencies in an accessible online format, this complex system of agency-affiliated websites complicates the user experience and reduces the efficiency of digital services. OMB should launch a website consolidation initiative with the goal of eliminating and consolidating duplicative or unnecessary websites. Additionally, each newly created website should have a planned life cycle, which sets a specific date when it should be removed and

archived or renewed and refreshed. The same planning mechanism should be employed for old government websites.

12.5.2.8. Optimize government websites for mobile use.

As with other web services, government website visitors do not necessarily use a desktop computer to access them. During the summer of 2020, half of all visits to government websites participating in the Digital Analytics Program used mobile devices.¹⁴⁸ Not only are a significant portion of visitors using mobile browsers; for around 20 percent of Americans, mobile devices are their only form of home Internet access.¹⁴⁹ Despite the demand for mobile-friendly websites, many government websites are not optimized for mobile use, which excludes a significant portion of the population, particularly from low income and communities of color who rely more on mobile devices than the general population, from using web-based government services. Government agencies should ensure all websites are mobile-friendly to make these services more accessible to the communities that need them. This includes informational website pages as well as web forms or other interactive elements.

12.5.2.9. Expand the use of mobile payments.

Compared to other developed economies, contactless payment adoption in the United States has been relatively slow, but concerns about spreading disease are changing this: 60 percent of users report feeling more comfortable making contactless payments now than before the pandemic.¹⁵⁰ Greater adoption of mobile payments would allow individuals to make payments without making physical contact with others or other devices, reducing the risk of transmitting infections during the pandemic. While many high-contact government services, such as transit, are provided by state and local authorities, the Federal government can provide funding and best practices to encourage adoption of these technologies, including working with private sector payments systems innovators. In addition, while some states have adopted mobile payments for electronic benefits transfer (EBT) programs like the Supplemental Nutrition Assistance Program (SNAP) and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) in ways that particularly benefit low income and communities of color, others have not, and the Federal government should expand these programs.

12.5.2.10. Make all government forms digital.

Given the unnecessary costs involved in ordering, sending, preparing, and filing paper and non-fillable electronic forms, all Federal agencies, including the IRS, should upgrade their automated processing systems so they can receive fillable electronic forms and implement an e-filing system. Agencies can base their e-filing systems off the Business Services Online program provided by the Social Security Administration, which provides several services, such as allowing employers to electronically complete and file up to 50 W-2 forms through its website. And if agencies want to offset the costs of building an e-filing system or processing scanned paper filings, they can do so by charging fees for government customers to obtain and file paper forms. This will both fund the development of new systems and cut costs by discouraging filers from using the more expensive paper-based filing options.

12.5.2.11. Create an “offline mode” for government apps to allow use when not connected.

Some people, such as those in rural areas, do not always have full-time access to the Internet. Others, particularly in low income and communities of color, may only connect to the Internet through public Wi-Fi hotspots. Government agencies should design apps with an “offline mode” that would, for example, allow individuals to complete a form offline, but then submit the results when they are back online. These would also allow individuals to work when they are offline, such as on an airplane. Many government websites require an active connection which limits the utility of these apps for individuals with sporadic connectivity.

12.5.2.12. Mandate the use of Login.gov across all Federal government services.

GSA has developed Login.gov as a shared service for Federal agencies to use to authenticate users to online services. Not only does this simplify the authentication process for users and provide a single trusted authentication service for both users and developers, it also allows agencies to replace outdated methods for remote verifying the identity of online users. Many agencies rely on “knowledge-based verification” where users must provide certain information from the credit files about themselves to prove their identity. However, since many individuals have had sensitive personal information stolen from data breaches, this method is not reliable. Instead, services like Login.gov use more secure methods, such as verifying

physical credentials like a driver's license or passport, or verifying someone's possession of a mobile device with a cell phone carrier.¹⁵¹

While many government agencies have begun using the Login.gov service, it is not yet universally adopted. The next administration should require all government agencies to move to this newer platform to ensure citizens can securely and easily access government services. GSA should expand the program to also allow state and local governments to join the program.

12.5.2.13. Establish a one-stop-shop for citizens to access and share personal data held by government agencies.

To provide necessary services and allocate resources, many government agencies collect personally identifiable information about individuals as part of their day-to-day operations. This often results in individuals having to provide the same information to multiple government agencies, adding both time and cost to multiple government services. This information should be consolidated in a single secure online location that can be accessed by individuals as well as authorized government agencies.

This consolidation will improve the efficiency and accessibility of digital government services. When collecting personally identifiable information, GSA should offer individuals a single website where they can access all the information Federal government agencies have collected about them, and share this information as necessary with others, such as when applying for government benefits. Ideally, GSA would form a partnership with states to allow the same functionality across all levels of government.

12.5.2.14. Build more government APIs to enable non-government organizations to link citizens to services.

Government agencies provide access to many important services and information online, but citizens may prefer to access these services and information through non-government websites and applications, particularly given the fact that best-in-class private sector web applications are usually significantly better in terms of user interface and ease of use. Rather than only building government apps and websites, government agencies should build application programming interfaces (APIs) that allow third-party developers to integrate government services into their own applications, while ensuring that consumer data and privacy remains protected. For example, rather than requiring people to use a government website to make reservations and purchases at state and national parks, open APIs would enable qualified travel websites to allow individuals to book reservations for campsites or pay for day passes.

Likewise, it is an arduous process for small businesses to find out what their regulatory requirements are or what help they can get from governments, including in the COVID-19 crisis. And while most agency websites try to list these things, figuring this out is extremely difficult for companies. Open APIs, powered by better technology, could let businesses and individuals enter into private sector for-profit or non-profit applications information about their company or themselves and have the applications automatically identify the right information and resources tailored specifically to them.

12.5.2.15. Establish a Federal Grant Program to Eliminate Data Poverty.

One of the primary reasons that individuals go online is to get information. But sometimes individuals cannot find the information they want or the information they find is not very accurate for themselves or their community. For example, cities may only collect air quality data or traffic data for wealthier areas of the city creating pockets of data deserts in communities. Or certain hospitals serving higher-income individuals may have better data sharing practices than those in lower-income neighborhoods, limiting the availability of data that researchers can use to address health conditions disproportionately affecting people with lower incomes. As an increasing number of digital services are built to make sense of data, people living in data-rich environments stand to benefit considerably, but others living in data poverty will miss out on these opportunities.^[1] Similarly, decisions made from these datasets may overlook important opportunities to identify and serve the needs of all citizens.

The answer to this problem is not to limit the use of data, but rather to ensure that everyone stands to benefit from data-driven innovation. To close the gap, the next administration should establish a \$100 million grant program to eliminate data poverty. The goal of this program would be to fund projects that take concrete steps to close the data divide, such as by training citizens in under-represented communities how to submit feedback through city mobile apps or subsidizing wearable medical devices to increase representation in health datasets. The program should

focus on updating legacy systems that limit data generating and reporting capacities; equitable deployment of IoT—likely in partnership with universities; building data trust and literacy; Research grants for under-examined and analyzed local topics with community demand; and support for local anchor institutions to conduct data inventorying and auditing, open data platform building, internal training.

12.5.3. INVEST IN MORE MODERN SYSTEMS, INCLUDING NEW APPLICATIONS.

To fully equip the government for a digital future, agencies should not only update current practices, but also invest in systems at the cutting edge of innovation. In the private sector, such investments have yielded higher productivity and efficiency. Government agencies can similarly benefit from investments in digital technologies that will help them become more productive, such as by automating routine processes, benefiting from digital economies of scale, and using data analytics to make better decisions.

To accomplish this, the Federal government should introduce investment programs and initiatives that focus on modernizing existing systems and strengthening them against disruptions such as those from the COVID-19 pandemic. Many government websites and digital tools are outdated, vulnerable to cyber-attacks, and lacking low-contact or contactless alternatives necessary to protect employees and maintain a largely virtual workforce. Government agencies should invest in modernizing and securing existing systems, as well as developing low-contact and remote alternatives to existing practices.

Further, as technologies continue to evolve, systems that align with industry standards today could become outdated in a matter of years. Agencies' digital transformation should include policies and practices that enable them to keep pace with innovation in Internet of Thing (IoT) devices, blockchain, robotic process automation, immersive reality, cloud computing, and emerging technologies of the future. Government agencies should consistently explore potential uses for these new and emerging IT systems to improve government services and facilitate effective digital transformation.

12.5.3.1. Launch a “Digital New Deal” to modernize outdated government systems.

Many government agencies have critical operations running on outdated computer systems. During the spike in unemployment applications due to COVID-19, many government unemployment systems crashed because they were unable to handle the surge in demand. Given the capabilities of cloud computing today, this was an eminently preventable problem. In addition, making changes to these older systems can be difficult due to a lack of programmers with the right skills. For example, at least 12 states use COBOL, an outdated programming language from the 1970s, in their unemployment agency.¹⁵² All government agencies using outdated systems should move to modern, cloud-based systems that can accommodate fluctuating demand and provide services more efficiently. Similarly, many local governments have not digitized property parcel data and property tax records, an improvement that would not only help broadband mapping, but also potentially significantly reduce title search costs when people buy residential properties.

As Congress pursues further national recovery legislation, it should allocate substantial funds to federal, state, and local governments to modernize their IT systems. Too many government agencies are using systems that are outdated, not customer-friendly, and expensive to maintain. These older systems pose a drain to their budgets and limit their ability to meet future challenges. The Technology Modernization Fund (TMF) established an innovative funding vehicle for government agencies to obtain funding for IT projects. While the TMF has received some funding, it has been significantly lower than originally proposed. Congress should provide at least \$3 billion in funding to significantly expand the TMF for Federal agencies and dedicate the funding to modernizing IT systems that support public-facing services.

12.5.3.2. Develop and fund a globally competitive smart-cities program and national Internet of Things (IoT) strategy.

When governments implement new policies, such as stay-at-home orders, they struggle to understand the impacts these decrees have on their communities. To prevent this barrier in the future, Congress should allocate at least \$2 billion for smart city funding. This program could be jointly managed by HUD, NIST and NSF. Increasing adoption of IoT devices is necessary to generate key datasets that could help communities better respond to a pandemic, such as smart thermostats to track public health trends and fitness trackers to understand how people's fitness habits, sleep behavior, and overall health indicators change during a pandemic. Moreover, as discussed in the recommendation on eliminating data poverty (12.5.2.15), our

country faces a data divide—where certain communities do not have sufficient data collected about them, creating social and economic inequalities. Smart city data can be another tool to help ensure national datasets are diverse and representative, helping to close that data divide.¹⁵³

Local governments can also use connected technologies to better manage public services and resources, thereby improving their resilience in times of crisis, whether it be a health epidemic, terrorism, or natural disaster. All of this would also make broadband adoption, particularly mobile, more valuable to citizens.

12.5.3.3. Fund a government blockchain pilot projects program to expand the number of blockchain initiatives.

Many transactions, such as buying or selling property, require using a trusted intermediary such as a bank or a government agency, which creates a constraint during physical distancing when these institutions are unavailable. Blockchain allows multiple parties to engage in secure, trusted transactions with one another without an intermediary and without physical contact. Government agencies could benefit from greater adoption of blockchain technology to improve the accessibility and security of digital services. Blockchain-driven solutions not only reduce physical contact, but also allow for more efficient, timely, and cost-effective processes and services in both the public and private sectors.

The Federal government should fund a dedicated blockchain pilot projects program to facilitate development and deployment of these solutions, in collaboration with the private sector, which has been innovating across a range of blockchain use cases. By investing in and supporting blockchain projects, government agencies can accelerate the deployment of this technology, thereby creating more opportunities for automation and digitalization in the economy and taking steps to increase financial inclusion.

12.5.3.4. Develop and implement policies to enable long-term teleworking.

While virtually all major corporations in the United States seamlessly transitioned to enabling telework, including for their customer service representatives, too few government agencies were fully prepared to enable much of their workforce to telework long-term. This meant many lower-level GS workers were without work for months because their agencies could not adequately provision them for remote work.

Preparing to adapt for long-term telework now can mitigate the potential workforce impacts of such a transition in the future. Due to improvements in technology, many jobs, especially public-facing customer service jobs, can be performed remotely at home. For two-income working families, caregivers, multigenerational households, and individuals with disabilities, teleworking presents enormous opportunities. Government agencies should ensure they have the technology systems and organizational procedures in place to enable long-term telework. Doing so would also have benefits long after physical distancing requirements are lifted, as telework has been shown to improve productivity, cut costs, and improve employee morale if done effectively.

Congress should establish a one-time telework modernization fund for government agencies to upgrade their IT to modern standards—and to qualify, their agencies would be required to act within the next six months. They should also institute a fund for state governments to do the same.

12.5.3.5. Establish an “18F” for cybersecurity.

One factor that is critical to ensuring adequate use of e-government services is that systems are secure. Unfortunately, many government agencies lack the resources and expertise to fully address their systems’ cybersecurity risks: a 2018 GAO study identified addressing “cybersecurity workforce management challenges” as one of ten critical actions needed to address cybersecurity vulnerabilities in the U.S. government.¹⁵⁴ Without a fully equipped cybersecurity workforce, government systems continue to lag behind their private sector counterparts in security measures, making government systems particularly vulnerable. As digital services expand and more Americans rely on these systems, these vulnerabilities will be exacerbated. Private sector expertise would improve agencies’ capacity to build and maintain more secure e-government systems.

The next administration should direct the General Services Administration (GSA) to establish an office that brings in top private-sector talent to collaborate with other agencies on cybersecurity issues to improve government security. This team should be modeled off some of the most successful aspects of the existing GSA office known as 18F, which focuses on user-centered product development, rapid prototyping, reviewing, and refining of its products, and coaching peers throughout government. The goal of this initiative would be to incorporate private-sector knowledge

and nongovernment culture into high-impact, high-priority Federal government cybersecurity projects. Members of this team could serve short-term stints based on new projects, agency needs, and available funding.

12.5.3.6. Invest in augmented and virtual reality (AR/VR) solutions.

Augmented and virtual reality (AR/VR), immersive technologies that enable users to experience digitally rendered content in both physical and virtual space, can reduce costs and increase productivity in the Federal workforce. AR/VR offers a range of potential uses in government, including providing realistic scenario-based training for emergency response, enabling government employees to communicate more effectively with members of the public, and improving efficiency of high-tech manufacturing and machine repair. These technologies also support health care training and patient care, education, job skilling, infrastructure planning, and new opportunities for small businesses through retail and commerce. As technological improvements make AR/VR more affordable and user-friendly, government agencies should explore opportunities to utilize these technologies. Several agencies including FEMA, Veterans Affairs, and NASA have already started to explore AR/VR-based solutions for workforce development and public engagement. Rather than continue this ad-hoc approach to investment in these technologies, the Federal government should develop a government-wide procurement strategy for AR/VR investment.

12.5.3.7. Replace annual reports with dashboards.

Almost every government agency, no matter its size, publishes a yearly report about its activities. While these reports are a useful tool for providing insight and accountability on public-sector operations, they are no longer the best option for an increasingly digital government. Annual reports do not accurately reflect the current activities and priorities of an agency at a given moment, nor do they offer readers the ability to easily seek out answers to specific questions or concerns. To function within a more digital government, annual reports should be dynamic, accessible, and easy to read.

Agencies should begin replacing annual reports with dynamic dashboards that provide real-time information on government programs. GSA can provide the technical building blocks for agencies to implement dashboards, and OMB can provide guidance on best practices for data visualizations so that dashboards present information in the most user-friendly way possible. This transition will be an important element of any agency's digital transformation.

12.5.3.8. Expand FedRamp Metrics

To improve the overall efficiency of e-government services, agencies will have to rely on cloud computing services more now than in the past. FedRAMP is a Federal program that helps Federal agencies procure secure cloud computing services, but it suffers from long timelines, high costs, and review processes that are inconsistent across Federal agencies. These issues have created barriers to businesses offering their services to the Federal government, thereby slowing agencies' access to cloud services.

To ensure FedRAMP is not acting as a competition barrier for cloud providers, especially smaller ones, OMB should track how long it takes different sized vendors to get through the authorization process and pilot a tiered authorization approach that would allow providers to operate on a provisional basis. This will accelerate agencies' adoption of necessary cloud computing services and ensure consistency in procurement across the government.

CONCLUSION

A variety of Internet applications like e-commerce, streaming video, online banking, social media, and more have driven broadband adoption, both fixed and mobile. Building better e-government services can continue to support adoption and provide more value to those who are online. More importantly, taking bold steps to bring government agencies at the federal, state, and local levels much closer to private sector best practice will go a long way to improving opportunity, boosting quality of life, and ensuring a better civic life for all.

CHAPTER 13.

CIVIC ENGAGEMENT

13.1. PROBLEM STATEMENT

Failings of digital equity and inclusion limit the ability of all Americans, and particularly those with lower incomes and communities of color, from full engagement in the political and civic lives of their communities, both offline and online. At the

same time, while broadband and applications such as social media have encouraged and facilitated new forms of civic engagement, misinformation, online voter suppression tactics, and hate speech have endangered those who live in low-income communities and people of color. Further, social media platforms have created new harms related to micro-targeting in advertising and other uses that results in discriminatory outcomes for communities of color.

13.2. VISION

We need improved sources of accurate and relevant information, and tools that enable Internet users to improve their own welfare, and to engage productively with the democratic and civic institutions of their communities and the Nation. The Internet ecosystem must become a healthy, self-sustaining environment, with effective mechanisms for quickly identifying and countering dangerous misinformation and toxic behavior.

13.3. GOALS

The key goals for the digital equity and inclusion in civic engagement are to:

- Reduce the amount and negative impact of harmful misinformation, online voter suppression, and hate speech on the Internet;
- Increase the amount of content that addresses the concerns and needs of low-income communities and communities of color;
- Improve the tools available for low-income persons and persons of color to engage in civic discussions, giving them a stronger voice both offline and online in policy decisions.

13.4. CURRENT SITUATION

Civic engagement is the lifeblood of any democracy and the bedrock of its legitimacy. Increasingly, our national conversation, our sources for news and information and our knowledge of each other ride on broadband networks and applications. The transition to new information technologies and services have opened new doors that enhance America's media environment, but have left traditional sources of news and information, including journalism, under severe stress.

Broadband holds the potential to strengthen our democracy by dramatically increasing public access to news and information, and to provide new tools for Americans to engage with their government and one another online. For example, we have seen how social media responded to some of the problems with the 2016 elections *by improving the information provided in the 2020 election*. We have also seen efforts by social media to *keep people informed and limit misinformation about COVID-19*. However, there are still misinformation campaigns about the pandemic and vaccine that proliferate on social media platforms and target people of color.

The Internet has enabled the wide-spread dissemination of misinformation that can weaken our country. Unfortunately, we have seen several examples of that phenomenon recently, with a particularly negative impact on communities of color. Without better controls, both public and private, there is genuine risk that the Internet could widen racial, partisan, educational, gender and other divides, rather than achieve its potential to close them.

One example involves information about public health. The COVID-19 pandemic provides a tragic, and important, example of what can happen with information targeted to minority communities. As the report, *Canaries in the Coal Mine: COVID-19 Misinformation and Black Communities*, documented:

[T]he Black community was awash in medical misinformation about the coronavirus pandemic, even as Black people were dying from COVID-19 at a rate much higher than other demographics. Dangerous health misinformation hit the community like a second virus, a confounding and inflaming new factor injected into an already depleted immune system, making it that much harder for the Black community to survive the pandemic.

The damage done by the misinformation is exacerbated by a long history of medical abuses against the Black community. The report noted that "Black people across the U.S. have for centuries and for good reason been skeptical of government interventions and the medical community, relying on community knowledge for their very survival. That necessary self-reliance, when it comes to matters of health, can make the community a vulnerable target for disinformation." The report further noted that the risk was compounded "by failures of tech companies and elected officials to speak to the Black community in ways that are culturally accessible." The report found that the predominant narratives spreading in Black communities in the United States posed "an immediate threat to the health of Black people and is a symptom of an information ecosystem poisoned by racial inequality. Black lives

are consistently put in danger, and it is incumbent upon community actors, media, government, and tech companies alike to do their part to ensure that timely, local, relevant, and redundant public health messages are served to all communities.”

A second example involves Internet disinformation campaigns directed at minority communities aimed at suppressing voting rights. As documented in *The State of Black America 2020*, in a chapter titled “The Vote and the Virus: Inoculating the Election From Disease and Disinformation,” the 2016 election was marred by a number of “hoaxes (that) were aided and abetted by Russian internet trolls whose systematic attempts to suppress the Black vote were motivated by geopolitical rather than political objectives.” While the authors viewed the impact of those efforts as likely to have been minimal, they suggest the impact of similar efforts could be much larger in 2020. As the authors point out, “one of the time-tested truisms of disinformation is that it thrives in times of uncertainty when there is both a large demand for information and a short supply of available facts. Thus, any change to standard voting procedures, however reasonable, necessary, or lifesaving, will create a potentially nightmarish scenario where the increased demand for up-to-date information is met with a manipulated supply meant to misinform parts of the electorate.”

A third example relates to the decennial census disinformation. As Spencer Overton, President of the Joint Center on Political and Economic Studies recently wrote to Congress, related to his testimony at a hearing on “A Country in Crisis: How Disinformation Online is Dividing the Nation,” census disinformation threatens to result in an undercount of underserved communities, which would fall short of the constitutional mandate that apportionment of Representatives be based on “persons” counted by a census conducted in such a manner that Congress directs by law. In 2016, the Russian Internet Research Agency coordinated a campaign to impersonate Black Americans and encourage Black Americans to “boycott the election” (Black Americans made up 12.7 percent of the U.S. population but accounted for 38 percent of the U.S.-focused ads purchased by the Russian Internet Research Agency). These kinds of targeted ads discourage Black communities from participating in the political process. A similar disinformation campaign targeted at marginalized groups attempting to sow distrust of the census or boycott the census could result in a serious undercount of marginalized communities, which could result in diminishing the votes and resources of these populations and their fellow residents, and unfairly inflating the political influence and government benefits enjoyed by those communities where there was not an undercount.

The danger of misinformation campaigns has become more acute, due to the crisis affecting traditional news outlets, particularly those designed to serve communities of color.

As the authors of the report “African American Media Today: Building the Future from the Past,” summarized their findings:

Today, the Black press struggles to remain in operation. While the virtual disappearance of traditional advertising has challenged the news industry as a whole, it has been particularly damaging to the Black newspaper industry. Shrinking staffs have left many operations without tech savvy or the manpower to quickly pivot to new revenue building operations. And while some mainstream news institutions establish paywalls for their digital media platforms, many in the Black American community understand that readers are unlikely to accept news through the paywall model.

That report did hold up hope. In looking at the most prominent Black American oriented websites, it noted that “Each of these sites seems positioned for future growth” and that “Many social trends also seem to be fueling the bright futures of Black American-oriented news and culture sites.” To serve Black American audiences, these digital news platforms will need funding to be sustainable. That potential, however, may not be achieved, unless we address the availability, adoption, and affordability gaps discussed in Chapters Three, Four, and Five.

13.5 KEY CHALLENGES TO OVERCOME

Information technology legal scholar Ellen Goodman suggests that we find mechanisms that increase the “signal” and decrease the “noise” in information delivered through the Internet. “Signal,” in this context, is information that is truthful and supportive of democratic discourse. “Noise” misinforms and undermines discursive potential. “When signal overpowers noise, Goodman write, “there is high fidelity in the information environment.” She further explains “Digital platforms can overwhelm signal with noise. Scale and speed, user propagation, automated promotion, inauthentic and hidden amplification, and the mixture of sponsored and organic

speech all make digital discourse different . . . It is therefore not shocking that platform architecture not only tolerates but even favors low-fidelity speech.”

The challenge then, is improving the mechanisms by which key stakeholders, including public institutions and individuals have the resources to eliminate or at least reduce the noise, while elevating the signal. Of course, there are First Amendment issues here that must be respected. Government should not be in the position to compel or censor speech. But just as the government can prohibit certain kinds of speech that create a public health hazard or sponsor speech designed to provide information to enhance public health and safety, so here, we should search for ways that, consistent with First Amendment precedents, address the challenges of improving signal to noise ratio.

This also applies to social media companies that allow users to promote ‘noise’ online. Companies have the power to prohibit speech that are unhealthy and unsafe for Black and Brown communities. Online content has real-world consequences for people of color, and, unlike Government, social media platforms have the authority to remove content that is harmful. Tech companies must publish and update rules or community guidelines to create strong mechanisms to eliminate the noise.

13.6 POLICY RECOMMENDATIONS

In light of the above, we offer the following recommendations related to elevating relevant and reliable information and providing tools for individuals and countering misinformation.

13.6.1. CIVIC ENGAGEMENT RELATED RECOMMENDATIONS IN OTHER CHAPTERS.

There are several civic engagement related recommendations in other chapters that we cross-reference here. These include:

- *Provide Digital Readiness Training.* To enable greater use of broadband functionality, including for purposes of civic engagement, state and local governments should ramp up digital readiness efforts, as described in Chapter Four.
- *Optimize Websites to Facilitate Engagement.* To enable greater civic engagement, state and local governments should improve their websites to facilitate utilization and feedback on policy issues, such as budgeting, as described in Chapter Twelve.

13.6.2. HOLD HEARINGS TO HELP INFORM PUBLIC.

Congress should hold a series of civil rights-focused hearings with high-level executives from the companies that have been the major sources of disinformation to discuss their content moderation practices and how those practices can be augmented to protect public health, civic engagement, and civil rights.

13.6.3. PASS LEGISLATION TO PREVENT VOTER SUPPRESSION ON SOCIAL MEDIA.

As a follow-on to those hearings and as part of a broader effort to restore and enhance voting rights, Congress should enact laws that prevent deceptive voter suppression tactics on social media.

13.6.4. CLARIFY THAT SECTION 230 DOES NOT IMMUNIZE RACIALLY DISCRIMINATORY AD TARGETING BY PLATFORMS.

Social media companies should be held accountable if they target (and/or deliver) employment or housing ads away from communities of color and other protected groups or target (and/or deliver) voter suppression ads toward Black users and other protected groups. Congress should consider making this an explicit carve-out to Section 230—that Section 230 does not provide a defense to Federal and state civil rights claims of underlying discrimination through online ad targeting and delivery. Section 230 carve-outs already exist for violations in various areas of the law. A clear congressional carve out would prevent companies from asserting that the Civil Rights Act of 1964, the Fair Housing Act, and other landmark civil rights laws are inapplicable simply because a platform discriminates online rather than at a brick-and-mortar storefront.

13.6.5. RESTORE FUNDING OF OTA.

Congress should restore funding for the Office of Technology Assessment and add to its mandate that it help Congress understand and address how best to combat disinformation and other practices that discriminate against communities of color and create barriers to civic engagement.

13.6.6. EMPOWER FTC TO ADDRESS NEW DECEPTIVE PRACTICES.

Congress should specifically empower the FTC to address deceptive practices related to public health and safety, voting, and other actions related to civic participation such as the census.

13.6.7. EMPANEL A COMMISSION TO STUDY PUBLIC INFORMATION ON COVID-19.

The President or Congress should empanel a Commission to study what information about the pandemic was made publicly available, how this information affected societal response, and what should be done to limit the impact of false and dangerously misleading information moving forward, while ensuring robust opportunity for debate and expression. There should be particular attention to what information was targeted at low-income communities and communities of color. The purpose of the Commission should not be to impose civil or criminal liability for misinformation spread during the COVID-19 pandemic. Rather, the Commission should seek to understand and explain how different media platforms—and the ideas shared on them—shaped societal response to the pandemic and to provide advice to all stakeholders for how to better provide information in a public health emergency.

13.6.8. EMPANEL A COMMISSION TO STUDY THE IMPACT OF THE DIGITAL DIVIDE ON THE 2020 CENSUS.

The accuracy of the 2020 Census, which relied heavily on online answers, has been called into question because of how failings of digital equity and inclusion may have skewed the results, a situation likely made worse by COVID-19. An expert panel should be commissioned to study the impact on the results and if necessary, the Census results should be adjusted to reflect a more accurate count.

13.6.9. ESTABLISH BEST SOCIAL MEDIA PRACTICES.

Social media platforms should provide banner notices with accurate information, redirect to deradicalizing sites, and refuse ads that promote voter or public health misinformation or that link to websites promoting such misinformation. In addition, social media should be transparent about how they are acting to ensure that algorithms used are not biased and serve all communities.

13.6.10. ESTABLISH RULES RELATED TO POLITICAL MICROTARGETING.

Political microtargeting involves using large data sets to tailor and deliver messages to small subgroups of the electorate. It has some benefits, for example, in terms of get-out-the-vote and community mobilization ads. But it has also been used to spread targeted misinformation. As Spencer Overton of the Joint Center for Political and Economic Studies has noted, microtargeting “allows those intending to deploy misinformation about elections the opportunity to target ads at those most likely to believe the misinformation, while steering it away from those more likely to challenge and correct the misinformation, thereby hardening polarization.” Senator Ron Wyden has asked platforms for a moratorium on political microtargeting, which would be useful to preventing disinformation, but such an action should be done in a way that ensures that the actions do not prevent less-wealthy candidates that lack resources for television ads from targeting their supporters online and mobilizing them and marginalized communities to the polls.

13.6.11. ENABLE REAL-TIME AD TRANSPARENCY AND ARCHIVES.

Congress should enable real-time ad transparency and access to archives, such as proposed in the bipartisan Honest Ads Act, by requiring digital platforms that reach a critical size with to display information about the audience targeted, the number of views generated, the dates and times of publication, the ad rates charged, and contact information for the purchaser. The information should be made available in a public, online file that should be user-friendly, easily searchable, and sortable through an application programming interface (API).

13.6.12. PROTECT PRIVACY ON SUBSIDIZED DEVICES AND SERVICES.

Privacy protection is also a fundamental bedrock of civic engagement so, as described in Chapter Four, the FCC should take actions to assure that recipients of Lifeline subsidies or other broadband related subsidies are not provided devices or services that violate privacy rights consistent with the FTC’s privacy framework policy by using preloaded tracking software to collect personal information from the user without disclosing this practice to the user.

13.6.13. INCREASE INVESTMENT IN RELIABLE, RELEVANT AND TRUSTED INFORMATION FOR UNDERSERVED COMMUNITIES.

To enable greater civic engagement, the Federal government should make grants through the Corporation for Public Broadcasting to local noncommercial stations for journalism by and for underserved communities.

CHAPTER 14.

INSTITUTIONALIZING DIGITAL EQUITY AND INCLUSION
IN THE POLICY PROCESS

14.1. PROBLEM STATEMENT

Achieving digital equity and inclusion requires a sustained, systemic, and appropriately resourced effort. It also depends on inter-agency coordination, and collaboration with federal, state, and local governments. Currently, policymakers do not have the tools to monitor and evaluate the success of efforts to close the digital equity gap. Responsibility is diffused across multiple agencies and stakeholder groups. Data collection practices are inadequate to capture the obstacles individuals face in broadband availability, adoption, and affordability. A lack of effective outreach results in provider-centric coverage maps that do not reflect the challenges faced by diverse communities.

To achieve full utilization, agencies will need to centralize efforts, and coordinate with federal, state, and local partners to collect data and implement programs. Without a coordinated approach, agencies will continue to solve disparate pieces of the problem, leaving holes in otherwise-potent efforts to close the gaps.

14.2. VISION

Governments must develop tools they currently lack to evaluate and improve, in a centralized and systematic manner, efforts to achieve digital equity and inclusion, ensuring that as the economy, society, and technology change, policymakers can find and address evolving and emerging sources of inequity. Agencies expanding broadband access at the Federal level will need to collaborate effectively and share data while developing partnerships with state and local authorities who are working on on-the-ground efforts to expand broadband access in their communities.

Robust data collection, including individual and household data, should be available for decision-making, and made open to the public so that governments can be held accountable. Additionally, considerations of availability, adoption, and affordability should be included in all new legislation on the digital economy.

14.3. GOALS

- By the middle of 2022, the Federal government should have the data it needs to evaluate progress towards digital equity and inclusion.
- By the end of 2021, personnel in key positions in federal, state, and local governments should be hired to ensure that digital equity and inclusion remains an on-going, high-priority goal.
- By the end of 2021, mechanisms should be in place to disseminate information through an Office of Digital Equity and a Digital Equity and Inclusion Administration Task Force. These entities should have the tools they need to review data on past performance, and make and communicate necessary adjustments to strategies and policies adopted to achieve digital equity and inclusion.

14.4. THE CURRENT SITUATION

The 2010 National Broadband Plan was clear in noting that, “This plan is in beta and always will be.” The authors emphasized that a constantly evolving economy, society, and technology required continuous review and update of the plans, goals, strategies, and measurement. The same is true for the digital equity and inclusion agenda. But to evolve, policymakers seeking to achieve digital equity and inclusion will need to have data, personnel, and information sharing strategies essential to understanding changing conditions, and to develop and communicate needed course corrections.

Today, that is not the case. Federal programs to expand digital equity and inclusion have been channeled through a variety of executive departments and agencies, coordinated through the American Broadband Initiative, an inter-departmental effort launched in 2019. According to the American Broadband Initiative’s *2019 Milestones Report*, over twenty Federal agencies have been tasked with some level of responsibility for achieving the overall goal. Agency staff also lack the data, personnel, and institutional structure needed to achieve their goals. There are inadequate

mechanisms for bringing agencies together to evaluate progress and align on tactics and strategies.

While access to information on digital equity and inclusion, such as the FCC's public *interactive Broadband Map*, has become more readily available over time, the value of this information cannot be fully realized without a clear central vision. There are also significant limits to the value of the information that is being collected. The FCC's dataset, for example, is updated based on Form 477 data, submitted twice a year by service providers. As discussed in Chapter 3, however, there are structural and procedural flaws to the current data collection process. These flaws are expected to be addressed through implementation of the 2020 Broadband DATA Act, which requires the FCC to collect data and prepare maps that report broadband availability at a much more granular level.

Additionally, each agency participating in the American Broadband Initiative relies on their own personnel to carry out specific agency workstreams. Without dedicated staff to carry out the broader vision of institutionalizing digital equity and inclusion, it remains difficult to adapt to changing conditions. The USDA and FCC carry out the bulk of the Federal government's grant, loan, and subsidy programs for broadband, for example, but there is little coordination between these organizations, and no centralized staff focused on the issue of equity in broadband access, adoption, and utilization.

Finally, the agencies included in the American Broadband Initiative lack a common review and oversight process to bridge their separate information and personnel. There is no incentive for public-private partnerships between industries and government agencies to collaborate. Many of the American Broadband Initiative's problems are structural; the program lacks authority, incentives, and adequate budgeting. There are inherent conflicts which affect chain of command and reporting. Without better data, a deep well of personnel, and a coherent review and oversight structure, efficient and sustainable solutions are impossible to achieve.

14.5.1. DATA COLLECTION.

A fundamental challenge to institutionalizing a digital equity and inclusion agenda is how the Federal government defines and prioritizes the data that need to be collected. If surveys and maps leave out crucial segments of the population or limit the respondents who can provide their input, the data will not be useful for improving overall broadband utilization.

Much of the focus so far has appropriately been on coverage maps. Unfortunately, as Congress has recognized on a bi-partisan basis, the maps are updated infrequently, limiting their accuracy and consistency. Moreover, coverage maps are often inaccurate due to differences in the criteria for determining "unserved" areas, with rural areas served poorly by definitions that may work well in urban areas. For instance, the assumption that all households in a given Census Block Group (CBG) are covered if any one household in that CBG is covered is less applicable to rural areas, where a few households may be separated by hundreds of miles.¹⁵⁵ These maps do not have a defined level of geospatial granularity, such as household level, so it is difficult to find households affected by poor coverage, and for households to advocate for better coverage from their local politicians. Most important, coverage maps often have missing or incomplete data.¹⁵⁶ This can impact the frequency of updating coverage maps, since dealing with missing data can take valuable time and resources. Again, these flaws are expected to be addressed through implementation of the 2020 Broadband DATA Act.

14.5.2. EQUITY IN DATA COLLECTION.

As with any type of data, the Federal government needs to examine critically any biases that could affect its collection, analysis, and interpretation. Fundamentally, when collecting survey data and coverage statistics, sampling bias is a concern—if surveys are conducted exclusively online, households who already have broadband access will be more easily able to fill out the survey. Data collection efforts need to have alternative ways for people to fill out surveys, such as a booth set up at a library or local park that provides devices and broadband access for the survey. Self-selection bias or ambiguously worded questions can also lead to confusion for respondents and generate poor quality results.

Data collections efforts should also be designed to consider how different methods can underrepresent the challenges facing specific demographic groups. For example, if data collection methods primarily involve surveys conducted by public schools, these methods may overrepresent households with school-age children, and underrepresent older individuals who may face additional challenges to participating in surveys. A survey that is collected only in English may exclude individuals who are not fluent in English. Surveys should be easily completed, ideally within 5–15 min-

utes per household, so that individuals are not burdened by the request for data collection. A burden of several hours of data collection, for example, will privilege individuals who have the time and resources to dedicate to filling out these surveys.

When collecting survey data, collection efforts should promote community engagement at the local level so that anchor institutions and groups are mobilized to participate in the data collection process. Local legislators, public schools, community organizations, houses of worship, and other focal points in the community can be excellent advocates for data collection efforts.

Data collection is fundamentally linked with public policy and accountability. Non-confidential survey data should be open to the public in accessible formats, so that individuals and organizations are able to hold local, state, and Federal offices accountable for enforcing broadband policy. Transparency also requires an open forum for complaints, such as a helpline or Federal point of contact that can process reports of broadband issues or incorrect coverage statistics and coverage maps.

14.5.3. PERSONNEL.

Institutionalizing digital equity and inclusion requires hiring people with strong technical expertise, structuring teams so that they are incentivized to make progress toward achieving the goals and ensuring coordination across teams. Right now, ownership of digital equity is thinly spread across several individuals in a variety of agencies, preventing coordinated efforts and progress. Many people have diffuse responsibilities, with digital equity as only one goal among many. Even if the individuals appointed to work on digital equity and inclusion have the right expertise and skill set, split responsibilities and part-time assignments distract individuals from making necessary contributions.

14.6. RECOMMENDATIONS.

The recommendations for institutionalization involve three basic strategies: Data Collection, Dissemination of Information, and Personnel. Each strategy is discussed below.

14.6.1. DATA COLLECTION.

The Federal government should collect the necessary information for agencies to monitor, evaluate, and course-correct policies related to digital equity and inclusion. That includes but is not limited to affordability, devices, digital literacy, digital readiness, technical support, and applications and content. This leads us to make the following recommendations:

14.6.1.1. Federal agencies should expand broadband data collection.

Federal agencies, including the proposed Office of Digital Equity (see Chapter 4), should expand the collection of data on broadband use by target populations, particularly underserved communities. This data would be in addition to the indicators specified below in Table 1, as the goal is to have specific data related to how constituents interact with Federal agencies. Each Federal agency should collect the data necessary (the broadband availability, adoption, affordability challenges, etc.) of each population it serves, and more specifically, should track how constituents interact with the agency. Areas of data collection could include:

- percentage of case files that were created via in-person, telephone, or online mechanisms;
- percentage of respondents who use online platforms from home, via mobile devices, or at anchor institutions such as libraries, community centers, or schools;
- the ratio of cost of broadband relative to the average income in the community.

The data should be made public in a format that can be collated and compared across agencies and programs. The FCC could leverage government websites like Data.gov and Strategydata.gov, which have demonstrated a willingness to improve data user interfaces. These websites are ideally positioned to inform the public on broadband access and adoption throughout the country. For information deficits that require additional personnel to gather the data, a crowdsourced option sponsored on social media or popular public forums can reduce the time required and stimulate participation.

14.6.1.2. The FCC should explore alternatives to coverage maps to contextualize geographic data with additional indicators focused on broadband availability, affordability, and adoption.

Coverage maps, while useful for gauging access, are limited in their ability to pinpoint concerns related to quality of availability, affordability, and adoption, which are the three factors driving utilization and the achievement of digital equity and inclusion. Table 1 below lists possible questions and indicators in each of the key

goals that would elicit more granular and actionable data, measuring whether individuals are truly seeing a positive impact of broadband in their lives. Collection of this information should primarily be through individual or household surveys as the goal is to assess the practical impact of broadband in people's day-to-day lives, though care should be taken to avoid imposing burdensome disclosure obligations on consumers and service providers as well as avoiding disclosure of competitively sensitive or proprietary information.

Current coverage maps are limited in that they only report whether an area does or does not have broadband availability. Ideally, the data collection suggested in Table 1 would be layered over coverage maps. For example, one layer could include the original coverage map, but another layer could include a gradient of upload and download speeds to determine where broadband quality needs improvement. In addition to presenting layered digital maps, the FCC should also maintain a public database that would include county-by-county census data which we propose should be supplemented by the indicators in Table 1. This would allow researchers and policymakers to cross-reference coverage with the contextual data provided in Table 1.

GOAL	KEY QUESTION	INDICATOR(S)
<i>Availability:</i> Do households have access to broadband?	Does the area have broadband service?	• Number of broadband providers in the area
	Do the services meet minimum Federal requirements?	• Upload speed • Download speed • Latency
	Is the broadband service of good quality?	• Number of interruptions to service per day • Number of customer complaints
<i>Affordability:</i> Are households using broadband?	Is broadband affordable for the households in an area?	• Median net income of household • Size of household • Household members by gender, race, national origin, and immigration status • Median price of broadband plan
	How is broadband being made more affordable?	• Local or Federal programs in the community that provide discounted or free broadband plans • Programs operated by providers to provide discounted/subsidized service • Programs operated by NGOs to provide discounted/subsidized service
<i>Adoption:</i> How are households using broadband?	What is broadband used for?	• How often do members of households use broadband for education, health care, and jobs? • Are you able to access telework/remote learning/social media/streaming with your household's broadband plan? • How many interruptions to any of the above services—especially telework and remote learning—do you generally experience in a day?
	Do broadband plans meet the needs of different customers?	• Number of available broadband plans that vary in speed and cost • Key locations where broadband is free • Are you aware of any low-cost/no-cost broadband services in your area? • If you are aware, do you subscribe to one of these services? • If you are aware and do not subscribe, what is the primary reason for not subscribing?
	Are broadband services available in the languages spoken in the area?	• Number of languages spoken in the area • Number of languages of broadband services
	Does broadband usage correlate with more job opportunities?	• Unemployment rate in the area • Number of people actively looking for jobs online

Table 1. Supplemental Data Collection for Coverage Maps

To collect these data, which appropriately rely significantly on individual/household participation, the Federal government would need to embrace novel approaches to data collection, leveraging existing Federal data collection infrastructure. The Census Bureau, for example, conducts the American Community Survey on an an-

nual basis to gauge certain community indicators. This survey currently collects data on how many households have a computer, how many households have a broadband Internet subscription, and the population over age 65 that does not have a computer in the household. Expanding that data collection could include incorporating additional coverage statistics, as described in Table 1, to better understand how broadband is being adopted and utilized, beyond how many households have broadband availability.

Expanding data collection efforts, though necessary, could prove costly, as it is labor intensive. The Federal government should rely on existing outreach infrastructure to avoid duplicative efforts while collecting data. For example, the Federal government could provide additional funding for USPS employees to conduct surveys (either online or paper) when delivering mail to various households, and the seasonal workforce that supports the U.S. Census every decade could also be charged with collecting more detailed data on broadband experience in years when the Census is not running.

14.6.1.3. The Federal government should conduct mobile surveys to isolate problems with broadband access.

One way to conduct online research would be to use underlying data from coverage maps to develop a machine learning model that isolates areas of low coverage. Individuals in low coverage areas could then be asked to complete surveys on mobile devices that ask questions similar to those in Table 1. Individuals without mobile devices can be reached by Federal workers from a partnering agency. If these surveys are conducted once a quarter, this could help generate relevant, timely, and accurate coverage statistics that cover not only broadband access, but also adoption and utilization.

14.6.1.4. The Federal government should identify, study, and publish research on the benefits of universal availability and adoption.

The Federal government should identify, study, and publish potential benefits to national goals and agency goals if all people in the U.S. fully utilized broadband with increasing performance and efficiency. This Plan identifies many benefits in areas such as education, health care and workforce development, and has identified new funding sources and mechanisms to obtain those benefits. But as the economy, society and technology evolve, the Federal government should continually identify and reevaluate the benefits, so that Federal agencies can focus attention and resources on issues that would yield the greatest benefit. Identifying targeted benefits of universal availability, adoption, and affordability will also help the Federal government effectively prioritize work streams within efforts to achieve digital equity and inclusion, and to determine funding mechanisms that are closely aligned to expected benefits.

14.6.2. *THE FEDERAL GOVERNMENT SHOULD ESTABLISH AN OFFICE OF DIGITAL EQUITY.*

Once the government has collected the data, it should develop strategies for making it public. The result will be a more informed debate about how to improve digital equity and inclusion. It will also lead to greater accountability for agencies charged with improving digital equity and inclusion. This leads us to make the following recommendations:

14.6.2.1. The Office of Digital Equity should create an online hub that catalogues digital inclusion resources.

As described in Chapter 4, we recommend that the Federal government create an Office of Digital Equity. That office, working with the FCC and its Consumer Advisory Committee (CAC), and in partnership with other agencies working to promote broadband adoption, such as NTIA, HUD, and the Department of Education, should create an online hub that catalogues digital inclusion resources, including those provided by states and local governments, non-governmental organizations, and private enterprises. The hub should list resources according to the component of digital inclusion that they address, including but not limited to affordability, devices, digital literacy, technical support, and applications and content. With a growing number of organizations working on digital inclusion initiatives, this would help groups avoid duplicating efforts, and to inform those groups of multiple available resources. For example, a community organization that is operating a successful digital literacy program in a public housing community may be able to secure funding for teachers, and to give devices to students, but be unable to afford antivirus security or operating software. In that instance, the organization could access the online portal and learn about programs like Microsoft's Citizenship Licenses, or the software lending libraries offered by several public libraries.

14.6.2.2. The Office of Digital Equity should convene annual National Digital Inclusion Summits.

The Office of Digital Equity should convene a series of in-person and online National Digital Inclusion Summits to bring together stakeholders with digital inclusion organizations, Tribal leaders, and community anchor institutions including community media organizations, libraries, faith-based organizations, schools, civil rights organizations, foundations, and disability rights advocates. These gatherings should include press and media outlets, as well as content creators who may be able to inform campaigns to promote the relevance of broadband for underrepresented communities. Grassroots digital inclusion organizations would also be able to share the challenges they are facing and connect with local and Federal government representatives as well as businesses who may be able to assist in filling the gaps.

14.6.2.3. The Federal government should set minimum standards for Federal benefits programs' use of websites.

As discussed in Chapter 12, the Federal government should pursue steps to improve government performance that would also help to promote digital equity and inclusion. To institutionalize digital equity and inclusion in ongoing policy considerations, the government should study, identify best practices, and adopt policies to set minimum standards for Federal benefits programs' use of websites and online web portals. Increased availability of broadband means that more individuals can apply for Federal benefits online, as well as monitor their applications, receive communications, or update eligibility information. This kind of access can benefit both applicants and agencies. Conversely, poorly created online portals or websites can make the application process more difficult, or jeopardize security.

Best practices, evaluation, and timelines for compliance should be replicated government wide. Developing and promoting a foundational template for how online portals and websites are created can help further institutionalize digital equity and inclusion. The inter-agency process should share information across institutional silos, identifying the best agency resources for creating websites and portals, and a common set of evaluation benchmarks for these tools. These evaluation benchmarks should include ease of use, cybersecurity precautions, digital accessibility, and language translation capacity. The Federal government should publish clear data use policies, so citizens understand how their data is being used.

14.6.3. PERSONNEL.

Government must have personnel with the authority and accountability for promoting digital equity and inclusion. This leads us to make the following recommendations:

14.6.3.1. Create a Digital Equity and Inclusion Administration Task Force within the Office of Digital Equity.

Digital equity and inclusion require inter-agency collaboration, and the expertise of a broad set of stakeholders. To guide the progress of digital equity and inclusion, the President should sign an Executive Order to create a Digital Equity and Inclusion Administration Task Force housed within the Office of Digital Equity. The task force will differ from the American Broadband Initiative, serving in a consulting capacity instead of an administrative role. The Office of Digital Equity should consult the Task Force on its collaborations with state and local digital equity offices, process for data collection, and progress toward national digital equity goals. The Task Force should recognize where its respective agencies can support the Office of Digital Equity's efforts, especially in terms of data sharing and identifying permanent Federal personnel needs to maximize long-term progress.

Task force membership should include agency leaders from the FCC, NTIA, Department of Education, HUD, HHS, and Department of Labor, and experts in technology infrastructure, city planning, community development, workforce development, and education technology. For accountability purposes, the task force should publish a semi-annual report of its findings and progress, with a goal to dissolve once processes are put in place to streamline data collection and cooperation across agencies. Once these benchmarks are met, the task force should dissolve in two years.

Experts on the task force can also provide input on potential bias in the data collection process (see 14.5.3 Equity in Data Collection) and develop mechanisms to address concerns. A multi-stakeholder approach, as opposed to government-only representatives, increases opportunity for diverse discussion surrounding best practices for equity in data collection.

14.6.3.2. Designate staff responsible for implementing agency digital equity and inclusion plans and require them to provide updates on progress on a regular basis.

At least two staff positions should be created within the Office of Digital Equity to monitor the implementation of digital equity and inclusion programs. One would be responsible for overseeing the data collection process, including the collection of relevant broadband-related data and the assessment of evolving benefits of availability, affordability, and adoption. A second staff member would be responsible for overseeing the dissemination of information, including the creation of an online resource hub for digital access, the organization of national digital inclusion summits, and the creation of a minimum standard for Federal benefits programs' use of websites.

Both staff members should regularly report to the head of the Digital Equity and Inclusion Administration Task Force, described in 14.6.3.1. The staff members should submit a publicly available report detailing progress semi-annually.

14.6.4. COVID-19.

The ongoing COVID-19 pandemic has laid bare stark disparities in broadband availability, affordability, and adoption, and in the ownership of devices needed to connect to remote schooling, telehealth, job search and training, and other critical services that have shifted operations largely or entirely online. Any plan that the Federal government undertakes regarding COVID-19 needs to integrate with longer-term digital equity and inclusion efforts.

14.6.4.1. The Federal government should partner with state and local governments to collect relevant data, including efforts to expand access, adoption, and utilization carried out at the local level.

State and local agencies, including public schools, have taken significant action to expand broadband and device access to help individuals engage with services and programs that have been moved online, especially during the COVID-19 pandemic. As a result, local authorities may be best equipped to provide up-to-date information on new initiatives to improve broadband utilization in partnership with schools, transportation services, parks, and other community centers. Federal agencies should work with state and local authorities to determine best practices, and to evaluate the impact of these programs to identify community-based programs that would benefit from increased Federal funding or guidance for implementation.

14.6.4.2. The Federal government should advocate for funding for short-term programs that are temporarily bridging the broadband access gap.

Given the rapid shift to virtual delivery of critical services, including education, workforce, and health care, state, and local governments, along with private sector providers, have raced to fill gaps in broadband utilization, providing everything from mobile hotspots for individuals to use at home to equipping school buses with Wi-Fi to support students in neighborhoods with limited broadband access. In many cases, these are short-term solutions that have emerged that only temporarily bridge availability and affordability gaps. But significant expenditure on mobile hotspots and other equipment creates a strain on school districts and local governments, which are already facing the economic effects of the pandemic. The Federal government should fund short-term programs to expand broadband access, and the Office of Digital Equity could promote these efforts to state or local digital equity offices as they distribute broadband access grants to school districts, libraries, park authorities, and any other state or local agency that is operating a short-term program to support individuals in the community who do not have broadband access.

14.6.4.3. The Office of Digital Equity should be charged with collecting data related to the minimum standards for critical service delivery during COVID-19 and racial disparities related to how these services are currently being provided.

During the COVID-19 pandemic, critical services, including public education, workforce, and health care, have experienced a significant transition to virtual delivery. The Federal government should collect data about these critical services to determine minimum and optimal standards for online delivery. These benchmarks could include speed, latency, service design, website and application design, and data utilization characteristics. Once the Office of Digital Equity has determined the minimum and optimal standards in these key scenarios, the benchmarks should be incorporated into the coverage statistics shown in Table 1, so that data collection efforts can include whether individuals have broadband service necessary to effectively utilize these services. The Office of Digital Equity should conduct further analysis to understand any racial disparities that may result in communities of

color having limited access to remote schooling, workforce, telehealth, and other critical services that are now being delivered online.

CONCLUSION

THE FIERCE URGENCY OF CONNECTING NOW

As we finished the writing of this Plan, the Biden Administration and Congress had just begun developing a comprehensive infrastructure plan for the U.S., one that will consider substantial steps toward ending the longstanding failings of digital equity and inclusion described in this Plan. It is our firm hope that our detailed recommendations will prove helpful in designing and implementing those efforts.

In politics, as elsewhere, timing is everything. The awful combination of 2020s pandemic and the multiple incidents demonstrating continuing racial discrimination, most notably with George Floyd's murder, has reignited stalled efforts to address many forms of inequity. Both crises revealed in the starkest terms what it means, among other hardships, to be without broadband at home, whether the reason is because one cannot get it, cannot afford it, or cannot make effective use of it. What was once considered a luxury instantly became essential to prepare for and secure employment, to get a basic education, and to receive health care of nearly any kind.

With the arrival of multiple COVID-19 vaccines, there is strong hope of a return to normalcy sometime in 2021. But we will never return to a time when debates about the importance of Internet availability, adoption, and affordability seriously entertain the possibility that the millions without connections don't need or want them. That bridge has been crossed.

Now it's time to do something bold to reap the benefits of full utilization of a wide range of digital tools and services to improve the economic, social, and political life of the U.S.; not just for those without service but for everyone.

It's time because we now have clear and convincing evidence of both the need and the value of universal adoption. It's time because the failures of digital equity and inclusion are vivid in the minds of Americans and their elected representatives. It's time because this moment of clarity will not last long, despite how clear the calculus of costs and benefits of equity and inclusion has been conclusively proven.

In the next few months Congress will consider major legislative initiatives to address long festering areas of public underinvestment. Broadband must be one of those areas that receives new funding.



In the next few years, the Administration will consider many steps for how to create a more equitable and inclusive economy and society. Digital equity and inclusion must be on that agenda.

Not every need will be funded. Not every positive action will be taken. But we must aggressively and deliberately seek to use the tools of the information age to close the many gaps discussed in this Plan. Our country has gone through regular economic and societal transformations in its short but illustrious history. So far, each one has excluded substantial populations from the full benefits of those transitions.

The accelerating pace of change means that avoiding those failings this time requires what Dr. King referred to as the "fierce urgency of now." We need a surge of government action that produces sustainable results. The actions recommended

in this Plan represent a collective understanding of the need to take concrete actions, and to take them quickly and decisively. As Dr. King also said in 1967, as the United States faced a similar crossroads, “If we do not act, we shall surely be dragged down the long, dark, and shameful corridors of time reserved for those who possess power without compassion, might without morality, and strength without sight.” Let us use our power, our might, and our strength to ensure our transition to an information economy is at last the one that achieves the vision of the Declaration of Independence, that all Americans are created equal.

ENDNOTES

¹See Section 3.8.5. It should be noted that the FCC’s CAF II auction and RDOF Phase I auction fail to meet these criteria.

²For example, New York’s “Broadband for All” program “called for applications for funding to provide access to broadband at speeds of at least 100 [Mbps] (download) in most places, and 25 Mbps (download) in the most remote, unserved parts of the State.” [www.ny.gov/programs/broadband-all].

³Paul de Sa, *Improving the Nation’s Digital Infrastructure*, Federal Communications Commission, available at https://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db0119/DOC-343135A1.pdf

⁴Cartesian, available at <https://www.cartesian.com/fiber-broadband-association-new-study-finds-all-fiber-deployments-to-90-of-households-achievable-in-next-decade/>

⁵See Fiber Broadband Association, About Us, available at www.fiberbroadband.org/about-us

⁶Except where noted, the data below is from the 2019 ACS; Figures in the appendix offer more granular detail on some of the following datapoints, such as income.

⁷<https://liverpool5g.org.uk/wp-content/uploads/2020/04/Liverpool-5G-Testbed-Benefits-Outcomes-Impact.pdf>

⁸Laura LaBerge *et al.*, How Covid-19 Has Pushed Companies Over the Technology Tipping Point and Transformed Business Forever, McKinsey (Oct. 5, 2020), <https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/how-covid-19-has-pushed-companies-over-the-technology-tipping-point-and-transformed-business-forever>.

⁹Lance Whitney, Where the Jobs Are: Tech Hiring is On the Rise, Tech Republic (Nov. 12, 2020), <https://www.techrepublic.com/article/where-the-jobs-are-tech-hiring-is-on-the-rise/>.

¹⁰Jhacova Williams, Laid Off More, Hired Less: Black Workers in the COVID-19 Recession, The RAND Blog (Sept. 29, 2020), <https://www.rand.org/blog/2020/09/laid-off-more-hired-less-black-workers-in-the-covid.html>.

¹¹*Blacks, Latinos And Native Americans Bear Heaviest Financial Burden Of Pandemic: Shots—Health News: NPR*

¹²Valerie Wilson, 10 years after the start of the Great Recession, black and Asian households have yet to recover lost income, Economic Policy Institute (Sept. 12, 2018), <https://www.epi.org/blog/10-years-after-the-start-of-the-great-recession-black-and-asian-households-have-yet-to-recover-lost-income/>.

¹³Mark Muro, Alan Berube & Jacob Whiton, Black and Hispanic underrepresentation in tech: It’s time to change the equation, Brookings Instit. (Mar. 28, 2018), <https://www.brookings.edu/research/black-and-hispanic-underrepresentation-in-tech-its-time-to-change-the-equation/>.

¹⁴Marc Morial, The Gumbo Coalition at pp. 173–180 (HarperCollins Leadership, 2020).

¹⁵Federal and state-certified Registered Apprenticeship programs are made up of five components: (1) involvement from employers; (2) structured on-the-job training; (3) related technical instruction (RTI), comprised of technical education at community colleges, technical schools, apprenticeship training schools, or provided online or at the job site; (4) apprentice rewards, such as wage increases, for skill gains; and (5) a resulting nationally-recognized credential that lets employers know apprentices are fully qualified for jobs. See U.S. Department of Labor “A Quick-Start Toolkit: Building Registered Apprenticeship Programs” at 9, available at https://www.doleta.gov/oa/employers/apprenticeship_toolkit.pdf (last visited November 16, 2022).

¹⁶See Deloitte Insights and Manufacturing Institute, *The Jobs Are Here, But Where Are the People?* at 2, available at <https://www.themanufacturinginstitute.org/wp-content/uploads/2020/03/MI-DI-The-jobs-are-here-where-are-the-people.pdf> (last visited November 16, 2022).

¹⁷See McKinsey & Company, “COVID-19 Recovery in Hardest-Hit Sectors Could Take More Than 5 Years” (July 29, 2020), finding that in a “muted-recovery” scenario, some industries, including arts, entertainment and recreation; accommodation and food services; transportation and warehousing; and manufacturing, could take more than five years to return to 2019-level contributions to GDP, available at <https://www.mckinsey.com/featured-insights/coronavirus-leading-through-the-crisis/charting-the-path-to-the-next-normal/COVID-19-recovery-in-hardest-hit-sectors-could-take-more-than-5-years> (last visited October 22, 2020).

¹⁸See BestColleges “2020 Online Education Trends Report,” available at <https://res.cloudinary.com/highereducation/image/upload/v1584979511/BestColleges.com/edutrends/2020-Online-Trends-in-Education-Report-BestColleges.pdf> (last visited November 6, 2020).

¹⁹See LinkedIn Talent Solutions “The Ultimate List of Hiring Statistics for Hiring Managers, HR Professionals, and Recruiters,” available at https://business.linkedin.com/content/dam/business/talent-solutions/global/en_us/c/pdfs/Ultimate-List-of-Hiring-Stats-v02.04.pdf (last visited November 6, 2020).

²⁰See About Glassdoor, available at <https://www.glassdoor.com/about-us/> (last visited November 6, 2020).

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²⁷ See Section 8.4.2.1, *infra*, detailing these programs and other pre-and post-COVID-19 efforts.

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²⁹ See, for example, the Career One-Stop website, which includes a search tool for the nearly 2,400 American Job Centers nationwide, available at <https://www.careeronestop.org/LocalHelp/AmericanJobCenters/find-american-job-centers.aspx?&location=20006&radius=25&ct=0&y=0&w=0&e=0&sortcolumns=Distance&sortdirections=ASC&curPage=1&pagesize=25> (last visited November 16, 2020). The page currently has a COVID-19 update that says, “Many AJCs are temporarily closed or have moved to virtual services. You may see updates for individual centers below. Please call or e-mail a center for the latest information on their current services.” A search of the American Job Center Finder for AJCs within 25 miles of the Washington, DC, area, for example, yields 17 results. Ten locations are listed as “closed to public; available by phone and e-mail”; six are listed as “closed to the public due to the COVID-19 until further notice”; and one is listed as “operating at limited capacity to ensure social distancing due to COVID-19.”

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¹²³ Stephanie A. Fryberg, “Using Culture and Growth Mindset to Create Identity Safe Spaces for Diverse Students” available at https://www.seattleschools.org/UserFiles/Servers/Server_543/File/District/Departments/School%20Board/16-17agendas/06_01_2017/20160603_Retreat_Fryberg_presentation.pdf

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¹²⁵ Research on the effectiveness or impact of culturally responsive teaching practices on student outcomes (July 2019), https://ies.ed.gov/ncee/edlabs/regions/midatlantic/askarel_106.asp.

¹²⁶ Dr. David Steiner, Curriculum Research: What We Know and Where We Need to Go (Mar. 2017), <https://standardswork.org/wp-content/uploads/2017/03/sw-curriculum-research-report-fnl.pdf>.

¹²⁷ The Benefits of Teachers of Color In P-12 Classrooms (Jan. 29, 2020), <https://www.ugu.edu/blog/the-benefits-teachers-color-p-12-classrooms2001.html>. Gershenson, S., Holt, S. B., & Nicholas Papageorge, Who believes in me? The effect of student-teacher demographic match on teacher expectations, 52 *Econ. of Education Rev.* 209–224 (2016).

¹²⁸ Robert Pondiscio, *Failing by design: How we make teaching too hard for mere mortals*, Thomas Fordham Instit. (May 10, 2016), <https://fordhaminstitute.org/national/commentary/failing-design-how-we-make-teaching-too-hard-mere-mortals>.

¹²⁹ TNTP, *The Mirage: Confronting the Hard Truth About Our Quest for Teacher Development* (Aug. 4, 2015), <https://tntp.org/publications/view/the-mirage-confronting-the-truth-about-our-quest-for-teacher-development>

¹³⁰ Individualized Tutoring to Improve Learning, J-PAL, https://www.povertyactionlab.org/case-study/individualized-tutoring-improve-learning?utm_campaign=may20&utm_medium=email&utm_source=newsletter (last accessed Feb. 2, 2021).

¹³¹ National Academies of Science, *Summary, Monitoring Educational Equity* (2019), <https://www.nap.edu/read/25389/chapter/2>

¹³² Government Accountability Office, “Agencies Need to Develop Modernization Plans for Critical Legacy Systems,” June 2019, <https://www.gao.gov/assets/700/699616.pdf>.

¹³³ Government Accountability Office, “Cloud Computing: Agencies Have Increased Usage and Realized Benefits, but Cost and Savings Data Need to Be Better Tracked,” April 2019, <https://www.gao.gov/assets/700/698236.pdf>.

¹³⁴ “Federal Agencies’ Reliance on Outdated and Unsupported Information Technology: A Ticking Time Bomb, Hearing before the Committee on Oversight and Government Report, House of Representatives, May 25, 2016, <https://www.govinfo.gov/content/pkg/CHRG-114hhrg23644/html/CHRG-114hhrg23644.htm>.

¹³⁵Heather Kuldell, “10 Government Legacy Systems Cost Taxpayers \$337 Million Every Year,” NextGov, June 12, 2019, <https://www.nextgov.com/it-modernization/2019/06/10-government-legacy-systems-cost-taxpayers-337-million-every-year/157682/>.

¹³⁶“Federal Agencies’ Reliance on Outdated and Unsupported Information Technology: A Ticking Time Bomb, Hearing before the Committee on Oversight and Government Report, House of Representatives and “Spending on legacy IT continues to grow, but there is light at the end of the tunnel,” Federal News Network, August 17, 2018, <https://federalnewsnetwork.com/ask-the-cio/2018/08/spending-on-legacy-it-continues-to-grow-but-there-is-light-at-the-end-of-the-tunnel/>.

¹³⁷Robert Atkinson, “Turbo-Charging E-Government,” Information Technology and Innovation Foundation, June 1, 2006, <https://itif.org/publications/2006/06/01/turbo-charging-e-government>.

¹³⁸Press Release, “An Award Winning County,” Montgomery County Maryland, <https://www.montgomerycountymd.gov/mcg/award.html> (last accessed Feb. 12, 2021).

¹³⁹“21st Century Integrated Digital Experience Act,” Digital.gov, <https://digital.gov/resources/21st-century-integrated-digital-experience-act/> (last accessed Feb. 12, 2021); “The Technology Modernization Fund,” TMF, <https://tmf.cio.gov/> (last accessed Feb. 12, 2021).

¹⁴⁰“Presidential Innovation Fellows,” <https://presidentialinnovationfellows.gov/> (last accessed Feb. 12, 2021).

¹⁴¹Partnership for Public Service, “What Drives Innovation in the Federal Government” (Partnership for Public Service, August 2011), <https://ourpublicservice.org/publications/download.php?id=87>.

¹⁴²Tom Shoop, “Most Feds Say Agencies Aren’t Interested in Their Ideas,” Government Executive, June 5, 2017, http://www.govexec.com/excellence/promising-practices/2017/06/most-feds-say-agencies-arentinterested-their-ideas/138394/?oref=govexec_today_pm_nl.

¹⁴³Daniel Castro, Galia Nurko & Alan McQuinn, “Benchmarking U.S. Government Websites,” Information Technology and Innovation Foundation, Nov. 27, 2017, <https://itif.org/publications/2017/11/27/benchmarking-us-government-websites>.

¹⁴⁴U.S. Digital Service, “Digital Services Handbook,” <https://playbook.cio.gov> (last accessed Feb. 12, 2021).

¹⁴⁵Jeanne Liedtka, “Why Design Thinking Works,” *Harvard Business Review*, September–October 2018, <https://hbr.org/2018/09/why-design-thinking-works>.

¹⁴⁶“Design for Delight,” Intuit Labs, n.d. <http://www.intuitlabs.com/design-for-delight> (last accessed Feb. 12, 2021).

¹⁴⁷Dan Williams & Maya Benari, “Introducing USWDS 2.0,” April 8, 2019, <https://designsystem.digital.gov/whats-new/updates/2019/04/08/introducing-uswds-2-0/>.

¹⁴⁸Based on 90-day data up to September 21, 2020 via <https://analytics.usa.gov>.

¹⁴⁹“Mobile Fact Sheet,” Pew Research Center, June 12, 2019, <https://www.pewresearch.org/internet/fact-sheet/mobile/>.

¹⁵⁰Christy Bieber, “Contactless Payments Are Set to Continue Growing Post-COVID,” *The Ascent*, June 18, 2020, <https://www.fool.com/the-ascent/research/contactless-payments>.

¹⁵¹Government Accountability Office, “Federal Agencies Need to Strengthen Online Identity Verification Processes,” May 2019, <https://www.gao.gov/assets/700/699195.pdf>.

¹⁵²“Unemployment checks are being held up by a coding language almost nobody knows,” *The Verge*, April 14, 2020, <https://www.theverge.com/2020/4/14/21219561/coronavirus-pandemic-unemployment-systems-cobol-legacy-software-infrastructure>.

¹⁵³Daniel Castro, “The Rise of Data Poverty in America,” Center for Data Innovation, Sept. 10, 2014, <http://www2.datainnovation.org/2014-data-poverty.pdf>.

¹⁵⁴Government Accountability Office, “Urgent Actions Are Needed to Address Cybersecurity Challenges Facing the Nation,” July 25, 2018, <https://www.gao.gov/products/GAO-18-645T>.

¹⁵⁵Katya Schwenk, “FCC will make broadband maps ‘more granular and more accurate,’” *State Scoop* (June 13, 2019), <https://statescoop.com/fcc-will-make-broadband-maps-more-granular-and-more-accurate/>.

¹⁵⁶Federal Communications Commission, Staff Report, Coverage Maps Investigation, Mobility Fund Phase II, <https://docs.fcc.gov/public/attachments/DOC-361165A1.pdf>; *FCC Reveals Misleading Coverage Claims*, *Coverage Critic* (Sept. 6, 2019), <https://coveragecritic.com/2019/12/06/fcc-reveals-misleading-coverage-claims/>; Carrie Mihalcik, Microsoft: FCC’s broadband coverage maps are way off, *CNET* (April 9, 2019), <https://www.cnet.com/news/microsoft-fccs-broadband-coverage-maps-are-way-off/>.

PUBLIC KNOWLEDGE
Dec. 13, 2022

Hon. BEN RAY LUJÁN, Chair,
Subcommittee on Communications, Media, and Broadband,
U.S. Senate,
Washington, DC.

Hon. JOHN THUNE, Ranking Member,
Committee on Commerce, Science, and Transportation,
U.S. Senate,
Washington, DC.

Dear Chair Luján and Ranking Member Thune,

Public Knowledge is a consumer advocacy group that promotes freedom of expression, an open internet, and access to affordable communications tools and creative

works. We appreciate the opportunity to offer this letter for the record regarding the critically important programs beyond deployment funding that must comprise our Nation's efforts to further close the digital divide. While ensuring access to broadband is obviously an important first step, we must also ensure that once access is available it is affordable and that residents have the digital skills and training to realize the full potential that broadband can bring to their lives. We hope this hearing highlights those challenges and the important work being done at the federal, State and Tribal level to promote adoption. This Congress and the next have much work left to do to close the digital divide and Public Knowledge remains committed to working with members on a bipartisan basis to give all Americans the opportunity to succeed in the digital age. With that, we offer you our views on the following programs and efforts that are underway.

Affordable Connectivity Program

The Affordable Connectivity Program is a groundbreaking program that has helped more than 15 million U.S. households connect to the internet, some for the first time.¹ However, because of the success of this program, the funding Congress allocated is unlikely to last as long as anticipated. If this program ends, it could leave millions unable to connect. Thus, it is imperative that Congress replenish the fund, at least temporarily. Ultimately, we believe that the Universal Service Fund is the best mechanism for funding a permanent broadband subsidy, because it would offer predictable, sustainable support. However, to fund a permanent broadband subsidy through USF would require contributions reform—a policy debate that has been ongoing for the past decade. Because we cannot wait years longer to replenish the ACP, Congress should top-up the program as soon as possible.

In the meantime, Congress and the Commission should do what it can to improve enrollment. Although enrollment has exceeded Congressional expectations, it still falls short of the 48 million households that are eligible.² In order to improve enrollment, Congress must step in to ensure that the National Verifier functions properly. To work as designed, the National Verifier needs data about eligible populations from the relevant state, Federal and tribal agencies. Unfortunately, many agencies do not share this information because of privacy laws, a lack of resources, or simply a lack of desire. This forces consumers to undergo a lengthy verification process that almost ⅔ do not complete.³ We urge Congress to require relevant agencies to share data about qualifying consumers with the National Verifier for verification purposes, and to clarify that this type of narrow data sharing preempts relevant privacy laws.

Digital Discrimination

The Commission recently released its notice of proposed rulemaking regarding Congress' bi-partisan direction in the Infrastructure Investment and Jobs Act to adopt rules to eliminate and prevent digital discrimination.⁴ Ultimately, the rules around digital discrimination, if implemented correctly, will be one of the most effective mechanisms available to ensure that *everyone* regardless of their income, race, ethnicity, color, religion or national origin has access to affordable, reliable internet.

There are three key elements of strong rules that prevent and eliminate digital discrimination. The first is the standard that the FCC utilizes to determine whether discrimination is present. We urge the Commission to adopt a standard that holds Internet Service Providers (ISPs) per se liable for intentional discrimination. In addition, the Commission should hold ISPs liable for acts that lead to a discriminatory impact within a given geographic area.

Moreover, the Commission should take a holistic view of comparable service. Service isn't *just* price and speeds, but should also include, at a minimum, latency, resiliency, customer service, promotional offers, and reliability. These too are investments into the network and service in an individual's neighborhood as much as investment in fiber or upgraded equipment.

¹ Universal Service Administrative Company, *ACP Enrollment and Claims Tracker*, available at 2022, <https://www.usac.org/about/affordable-connectivity-program/ACP-enrollment-and-claims-tracker/#total-enrolled>, last accessed Dec 12, 2022.

² The White House, *Fact Sheet: Vice President Harris Marks Important New Milestone in Administration's Efforts to Cut Costs for American Families*, (July 21, 2022), available at <https://www.whitehouse.gov/briefing-room/statements-releases/2022/07/21/fact-sheet-vice-president-harris-highlights-milestone-of-1-million-new-participants-on-reducing-high-speed-internet-cost-for-americans/>.

³ Government Accountability Office, *FCC Has Implemented the Lifeline National Verifier but Should Improve Consumer Awareness and Experience* (Jan 2021), available at <https://www.gao.gov/assets/gao-21-235.pdf>.

⁴ Infrastructure Investment and Jobs Act, Pub. L. No. 117–58, 135 Stat. 429, § 60506 (2021) (codified at 47 U.S.C. § 1754) (Infrastructure Act).

In addition, the Commission should compare what service consumers get for the price they are being asked to pay. As the recent investigative report by Markup found “AT&T, Verizon, EarthLink, and CenturyLink disproportionately offered lower-income and least-White neighborhoods slow Internet service for the same price as speedy connections they offered in other parts of town.”⁵ This is unconscionable. As this data demonstrates, it will be critical that protected classes are not charged as much for lower quality service as their peers are charged for significantly better service. Taking this holistic view will ensure that providers don’t discriminate against protected classes in less obvious, but still harmful, ways.

Finally, the Commission must interpret its mandate to “take into account issues of technological and economic feasibility” as Congress intended, narrowly. Congress did not intend for this language to serve as a safe harbor for ISPs, but instead just one of many factors the Commission considers when evaluating instances of proposed digital discrimination. To actualize this, the Commission should adopt a rebuttable presumption that service is technically and economically feasible. To rebut the presumption of economic feasibility, an ISP should have to show that the cost of deployment is so high that it would be impossible to offer service, even based on a long-term investment schedule. To rebut technical feasibility, the ISP should demonstrate that the needed technology either does not exist, or that deployment would be impossible based on physical obstructions or technical issues that cannot be worked around.

Digital Equity Grants and Foundation

Even when people have access to broadband, they might not have the skills or devices they need to get online. That’s why Congress enacted the Digital Equity Grant program—which offers states more than \$3 billion to teach their residents digital skills and help them obtain a computer or tablet. However, more than 10 percent of households across the country do not have a device, and 1/3 of U.S. workers don’t have adequate digital literacy skills.⁶

Fixing these problems will cost significantly more than the \$3.2 billion dollars initially allocated by Congress. Thus, we need to consider the Digital Equity grant program an initial investment that must be supplemented. Senator Luján’s Digital Equity Foundation bill is a smart way to use spectrum auction proceeds to promote digital equity initiatives for the long term.⁷ Unlike broadband access and affordability programs, digital equity does not have a long-term funding source and that must be remedied. We urge Congress to consider taking up this legislation as part of any spectrum legislation that is moving this year.

We appreciate you holding this important hearing on the range of topics that in addition to deployment are critically important to closing the digital divide for all Americans.

Sincerely,

JENNA LEVENTOFF,
Senior Policy Counsel,
Public Knowledge.

⁵ Dollars to Megabits, You May Be Paying 400 Times As Much As Your Neighbor for Internet Service (Oct. 19, 2022)/.

⁶ See Digitunity, *The Issue*, <https://www.digitunity.org/the-issue/> (last accessed Dec. 12, 2022); Cite to digitunity and Amanda Bergson-Shilcock, *The New Landscape of Digital Literacy* (May 2020), National Skills Coalition, <https://nationalskillscoalition.org/wp-content/uploads/2020/12/05-20-2020-NSC-New-Landscape-of-Digital-Literacy.pdf>.

⁷ Digital Equity Foundation Act of 2022, S. 4865, 117th Cong. 2d Sess. (2022).

CTIA
December 13, 2022

Hon. BEN RAY LUJÁN, Chairman,
Subcommittee on Communications, Media, and Broadband,
U.S. Senate Committee on Commerce, Science, and Transportation,
Washington, DC.

Hon. JOHN THUNE, Ranking Member,
Subcommittee on Communications, Media, and Broadband,
U.S. Senate Committee on Commerce, Science, and Transportation,
Washington, DC.

Re: *Letter for the Record: Subcommittee on Communications, Media & Broadband
Hearing, "Ensuring Solutions to Meet America's Broadband Needs" (Dec. 13,
2022)*

Dear Chairman Luján and Ranking Member Thune:

CTIA¹ commends the Senate Commerce Committee's Subcommittee on Communications, Media & Broadband for convening a hearing to examine past and ongoing efforts to meet America's broadband needs and respectfully requests this letter be included in the hearing record. CTIA urges the Subcommittee, as it considers these issues, to recognize the important role that America's wireless providers are playing in closing the digital divide and advancing digital equity.² In particular, 5G Home broadband (or Fixed Wireless Access (FWA)) is the fastest-growing category of residential and business broadband offerings, providing an important new competitive option for consumers, expanding robust broadband service in communities that have remained unserved or lacked reliable access, and making broadband prices more affordable. Wireless providers also have long been the backbone of efforts to ensure affordable service to low-income consumers with both prepaid and postpaid mobile wireless broadband offerings.

5G Home Broadband offers affordable, scalable, easy-to-deploy high-speed residential and business broadband services over fixed wireless. These advantages position fixed wireless to play a meaningful role in achieving the goal of connecting all Americans to broadband. Progress towards this bipartisan goal can be greatly advanced through the Infrastructure Investment and Jobs Act's (IIJA) Broadband Equity, Access and Deployment (BEAD) program—if properly implemented in accordance with congressional intent. Indeed, 5G Home Broadband offers a cost-effective option for many communities seeking to gain connectivity through the BEAD program, and can help states maximize the use of this valuable funding.³ In fact, Accenture recently concluded that "rural and underserved communities stand to benefit significantly from 5G FWA, with this wireless technology capable of bringing robust broadband connectivity to nearly half of rural households in the U.S."⁴

5G Home Broadband is also delivering on the longstanding goal of bringing more facilities-based competition to consumers. Wells Fargo recently noted that "fixed wireless is a viable competitive threat, particularly in rural areas."⁵ As customers flock to this new competitive offering, it's no surprise that America's two fastest-growing home broadband providers are wireless operators. In the last quarter alone, 5G Home Broadband brought in 24 net subscribers for each new cable broadband

¹ CTIA—The Wireless Association® ("CTIA") (www.ctia.org) represents the U.S. wireless communications industry and the companies throughout the mobile ecosystem that enable Americans to lead a 21st century connected life. The association's members include wireless carriers, device manufacturers, suppliers as well as apps and content companies. CTIA vigorously advocates at all levels of government for policies that foster continued wireless innovation and investment. The association also coordinates the industry's voluntary best practices, hosts educational events that promote the wireless industry and co-produces the industry's leading wireless tradeshow. CTIA was founded in 1984 and is based in Washington, D.C.

² See MMTc (in partnership with CTIA), *Wireless in Communities of Color: Bridging the Digital Divide* (July 2022), <https://www.mmtconline.org/wp-content/uploads/2022/07/Wireless-in-Communities-of-Color-July-2022.pdf> (exploring how wireless is helping bridge the digital divide, including for communities of color, low-income households, and rural communities).

³ See Infrastructure Investment and Jobs Act, Pub. Law No. 117–58, § 60102(f), 135 Stat. 1195 (2021).

⁴ Accenture, *5G Fixed Wireless Broadband: Helping Close the Digital Divide in Rural America*, at 2 (2021), <https://api.ctia.org/wp-content/uploads/2021/11/CTIA-Rural-HHs-mini-POV-V2-20211115.pdf>.

⁵ Hal Singer, *Is Fixed Wireless Ready To Take On Cable? It's Early, But the Initial Data Seem Promising*, *Forbes* (July 25, 2022) (internal quotation marks omitted).

subscriber.⁶ Wall Street has taken note concluding that “[f]ixed wireless access (FWA) has displaced cable as the driver of broadband growth.”⁷ Part of the reason is that “wireless home Internet is cheaper” than fixed-line providers’ offerings,⁸ with services starting as low as \$25/month. Data show that 5G Home Internet customers are receiving speeds at or above 100 Mbps and peak speeds up to 1 Gigabit.

Additionally, wireless providers have a strong history of expanding affordable Internet access for low-income consumers. Wireless providers led the way in bringing a variety of offerings to low-income households and students through the FCC’s Lifeline program, the Emergency Broadband Benefit Program (EBB), and the Emergency Connectivity Fund (ECF), and have made important contributions to increasing connectivity in Tribal communities.⁹ In fact, more than 55 percent of households eligible for the Affordable Connectivity Program (ACP), funded by the IIJA, apply their ACP benefit to a wireless offering.¹⁰ Support from ACP and other similar programs allows providers to realize the sustained customer base necessary to bring advanced 5G services to large, sparse, and topographically hard-to-serve areas such as Tribal Lands. Judd Hinkle, CEO of a wireless provider that serves significant Tribal areas, Smith Bagley, observes that “those additional funds allow us to increase our capacity and to build out for the future.”¹¹

To ensure equitable inclusion in our increasingly connected economy, companies throughout the wireless ecosystem offer programs and engagement that support digital literacy and skills training, career growth, education, and economic empowerment. For example, wireless companies are working to provide digital skills and STEM education to millions of youth, scholarships to underrepresented communities, and job training and opportunities—including as 5G network technicians—to prepare and engage workers for jobs of the future.

Wireless providers have played, and are playing, an important role in ongoing and past efforts within the public and private sectors to bring affordable, resilient, and secure broadband to all communities, including rural, Tribal, and low-income urban areas that lack access to affordable broadband service. It is critical that a technology-neutral approach be taken to ensure wireless solutions can be unleashed to meet the needs of all Americans across our Nation. We would be happy to discuss these issues with you further.

Sincerely,

MEREDITH ATTWELL BAKER,
President and CEO,
CTIA.

⁶*LRG: FWA Continues to Displace All Others for Broadband Growth*, TELECOMPETITOR (Nov. 17, 2022), <https://www.telecompetitor.com/lrg-fwa-continues-to-displace-all-others-for-broadband-growth/> (citing Leichtman Research Group and stating “[t]he market research firm found that the top cable companies gained about 39,000 subscribers, wireline phone companies lost more than 136,000 subscribers— while FWA gained 920,000 subscribers”).

⁷*Id.*

⁸Jared Newman, *Comcast and Charter face a grim new reality: actual competition*, *Fast Company* (Aug. 30, 2022), <https://www.fastcompany.com/90782532/comcast-and-charter-face-a-grim-new-reality-actual-competition>.

⁹*How Cellular One is Connecting Rural Communities and Tribal Lands*, CTIA Blog (Mar. 11, 2022) (“Cellular One”) <https://www.ctia.org/news/how-cellular-one-is-connecting-rural-communities-and-tribal-lands>.

¹⁰USAC, *Additional ACP Data* (as of Nov. 1, 2022), <https://www.usac.org/about/affordable-connectivity-program/ACP-enrollment-and-claims-tracker/additional-ACP-data/>.

¹¹*Cellular One*, *supra* note 9.

INCOMPAS
Washington, DC, January 5, 2023

Hon. BEN RAY LUJÁN, Chairman
Subcommittee on Communications, Media, and Broadband,
Washington, DC.

Hon. JOHN THUNE, Ranking Member,
Subcommittee on Communications, Media, and Broadband,
Washington, DC.

Re: Ensuring Solutions to Meet America's Broadband Needs Hearing on Tuesday,
December 13, 2022

Dear Chairman Luján and Ranking Member Thune:

INCOMPAS, the Internet and competitive networks association, is submitting this letter in response to the Subcommittee on Communications, Media, and Broadband's hearing on December 13, 2022, entitled "Ensuring Solutions to Meet America's Broadband Needs." INCOMPAS kindly requests that you include our letter response as part of the hearing record.

INCOMPAS is the leading trade association advocating for competition and innovation in the broadband marketplace, representing new network builders, Internet innovators, and the world's leading video streaming and cloud services. Our members help deliver better service to consumers, businesses, government agencies, and local communities seeking more choice, lower prices, and faster broadband speeds that attracts jobs and private investment.

Our members have been at the forefront of investing in and delivering high-speed, competitive broadband infrastructure throughout the U.S. and across the globe. INCOMPAS is unique among trade associations in that we represent the entire Internet value chain.¹ Our members include competitive providers that are deploying, last mile, middle mile, and global Internet infrastructure that deliver modern Internet services to consumers and businesses of all sizes. We have small, local competitive broadband Internet access service (BIAS) providers (also known as Internet Service Providers or ISPs) that are deploying fiber and fixed wireless infrastructure and competing against incumbent cable/telcos in the residential and business marketplaces. We also have fiber providers that are deploying middle mile, last mile, small cells, mobile 5G connectivity, and delivering wholesale service to other providers in the marketplace. We have business and enterprise providers that sell nationwide voice and data services, and we also have members providing streaming, gaming, social media and other online content, and offering OTT voice/text, data center and cloud computing services. Member companies are delivering multiple broadband technologies in the marketplace, including fiber, fixed wireless, mobile (5G), and satellite.

Our members' success is undeniable. In addition to building fiber to the some of the most rural corners of America, our members' achievements include providing business service to 75 percent of Fortune 500 companies, building the fastest speed network on record, and being awarded the number one ranking for customer service in America.

Network competition and streaming/online content competition go hand-in-hand. The rise in quality, creative, and affordable online content and cloud computing is the leading driver for broadband deployment. INCOMPAS members have made massive investments in streaming, cloud computing, video gaming, social media, and thousands of online applications and services for consumers and businesses that power the U.S. economy and help consumers.

To ensure everyone in the U.S. has modern network connectivity, a bipartisan Congress is making a significant, once-in-a-generation investment through the Infrastructure and Investment Jobs Act (IIJA) in broadband network, adoption, training, and other digital equity programs. INCOMPAS and its members support this investment, and we have been actively representing our members' interests in its implementation at NTIA and in the states. In 2021, INCOMPAS launched its BroadLand "Internet for All" campaign to support universal connectivity and the objectives of the IIJA. Fortunately, the Biden Administration has adopted our tagline, "Internet for All," for the broadband investments made possible from the IIJA and earlier Congressional investments made during the COVID-19 pandemic. These investments are also in addition to the almost \$9 billion annual Universal Service Fund (USF) that the Federal Communications Commission (FCC) manages, which

¹Our membership is available on our website at <https://www.incompas.org/memberlist.asp?contentid=2109>.

for several decades has helped communities and millions of low-income families, schools, libraries, hospitals, and small businesses connect to voice and broadband services across the Nation.

During the hearing and in the written testimony, some of the witnesses described the massive effort and investment required to deploy broadband infrastructure and reported on the broadband investment made by industry. This investment—while significant—does not include the investment being made by streaming, online content, application and service providers. As such, INCOMPAS would like to offer further information to Congress about the local and global investments that are being made by the tech sector in infrastructure that is necessary to deliver today’s modern internet.

In October, INCOMPAS released a report prepared by Analysys Mason that demonstrates the massive investment made by tech companies in network infrastructure across the globe in delivering online content, applications, and services.² Their investments in network infrastructure enable hosting, transport, and delivery of Internet traffic. Streaming and tech innovators invested \$883 billion in Internet infrastructure from 2011 to 2021. Indeed, from 2018–2021, they increased their digital infrastructure investment over 50 percent by making an annual investment of more than \$120 billion. These investments are over and above their investments in content, applications, services, and research and development. As a result of these infrastructure investments, our tech members are bringing traffic closer to BIAS providers and end users which improves the quality of service for BIAS customers. Analysys Mason estimates that these investments save BIAS providers around the globe \$5.0–\$6.4 billion each year. It also found that while Internet traffic volumes have grown significantly, costs for BIAS providers have remained stable over time—demonstrating that the growth of Internet traffic has not led to increased costs for BIAS providers.

Be it for lower prices or better customer service, all consumers want more competition. Competition is also the law. Unfortunately, the witnesses representing incumbent BIAS providers continue to argue against competition by asserting that Federal funding not be used to compete directly against their older, slower networks. Incumbent leaders continue to claim that the funding will lead to “overbuilding.” However, incumbent providers do not need to be concerned about this issue when it comes to the IIJA as the legislation sets forth clear parameters for IIJA funding: specifically, that the investment must be made in *new* or upgraded broadband networks in unserved and underserved areas. Moreover, incumbents have had decades to build their networks—and many have done so with direct support from the USF and other broadband programs—yet, even with all this time and funding, the incumbents have still not been able to reach every location with robust, scalable future-proof broadband capability, which Congress has recognized is absolutely necessary for the U.S. to compete globally.³ Indeed, incumbents remain eligible for IIJA funding, and they have many advantages to obtain IIJA funding given their scale and position in the marketplace.⁴

Continuing to fund monopoly networks that do not ensure that every customer has choice in the market is a failed policy that must be left in the past. As such, INCOMPAS urges Congress to ensure that all unserved and underserved locations in the U.S. be eligible for IIJA funding as intended so that every location in the U.S. is finally served by broadband, that open and competitive processes are used for distribution of the funds, that competitive providers have an opportunity to participate, and that those companies funded are required to provide reasonable wholesale access so that customers have choice for their broadband service which will drive more affordability, innovation, and investment that benefit customers.

²Analysys Mason, *The Impact of Tech Companies’ Network Investment on the Economics of Broadband ISPs* (Oct. 2022), available at <https://www.incompas.org/Files/2022%20Tech%20Investment/FINAL%20Analysys%20Mason%20Report%20%20Impact%20of%20tech%20companies%20network%20investment%20on%20the%20economics%20of%20broadband%20ISPs.pdf>.

³This is not surprising. Last year, INCOMPAS provided Congress a report on the efforts of other countries to invest in future proof broadband networks. See INCOMPAS, *The Race to Faster Broadband Speeds* (July 2021), available at [https://www.incompas.org/Files/filings/2021/FINAL%201%20Gigabit%20and%20Fiber%20Goals%20in%20Other%20Nations%204%20\(2\).pdf](https://www.incompas.org/Files/filings/2021/FINAL%201%20Gigabit%20and%20Fiber%20Goals%20in%20Other%20Nations%204%20(2).pdf).

⁴The four largest BIAS providers represented by USTelecom and NCTA have almost 80 percent of the fixed BIAS market. See Leichtman Research Group, Inc. Press Release, *About 1,065,000 Added Broadband in 1Q 2022; Fixed Wireless Services Accounted for Half of the Net Adds in the Quarter* (May 18, 2022), available at <https://www.leichtmanresearch.com/about-1065000-added-broadband-in-1q-2022/>; see also INCOMPAS Comments, *Office of Economics and Analytics Seeks Comment on the State of Competition in the Communications Marketplace*, GN Docket No. 22–203 (filed July 1, 2022), at 5–6.

We echo the hearing witnesses who also discussed the uneven, complex, time-consuming, unpredictable and expensive process that broadband infrastructure builders encounter in accessing poles, conduit, public, private, and railroad rights-of-way, Federal lands, and multi-tenant environments (MTEs) to deploy their fiber, fixed wireless, small cell, and other technologies needed to deliver broadband capability to consumers, businesses, community anchor institutions, and the government sector.

It is important for Congress to understand that there is no national framework that affords broadband infrastructure builders a uniform or standardized process. Rather, it is a mix-and-match of federal, state, and local policies and regulations—requiring broadband infrastructure providers to navigate a complex, often time-consuming and costly process to deploy their networks. As such, INCOMPAS has been actively working to address the numerous barriers to fast and affordable deployment, and while some steps have been taken to address concerns we have raised, additional work must be done. INCOMPAS supports Congressional action to facilitate faster, more affordable infrastructure deployment, and we believe that Congress should revise Section 224 of the Communications Act to achieve these goals by ensuring all pole and conduit access is governed by the minimum standards the FCC has adopted. We also are advocating for the FCC to take action on a pending pole proceeding that, if resolved, will speed deployment in a more cost-effective manner for the poles the FCC regulates.⁵ This follows the FCC's important Order implemented earlier this year on improving competitive providers' access to MTEs, for which INCOMPAS has long advocated.⁶ This process took about five years, but our members are now able to obtain improved access in residential and commercial MTEs, which is critical to bringing better network connectivity and competitive choice to the 30 percent of Americans who live in MTEs and to the millions of businesses located in shopping centers and malls across the Nation.

In addition, INCOMPAS has encouraged state broadband offices to emphasize the importance for every city, town, and community to streamline their processes for faster broadband infrastructure deployment and to enable competitive builds by allowing for non-discriminatory, fast access at reasonable, cost-based rates, where charges apply. This is especially important for Federal funding from IJJA, but the same holds true for private sector investment, which also will be used for these Internet for All investments.

INCOMPAS' member companies work directly with local communities to ensure that the infrastructure being deployed will meet their needs, but regularly face unreasonable, costly demands, and/or significant delays. As such, we are working to educate policymakers at every level of government on the importance of broadband infrastructure, and specifically how competitive deployment and availability best meet consumer and business demands by driving better, faster networks and more affordable and innovative service. It also benefits local, state, and Federal government agencies who want competitive options for their communications services.

Finally, the hearing featured testimony calling for passage of the FAIR Contributions Act, which would require the FCC to study USF contribution reform for BIAS and edge providers. INCOMPAS believes that the FCC must move forward with USF contribution reform, and the association is concerned that suggestions that the FCC continue to study this issue will further delay much-needed reform that is required to preserve and sustain the USF. The potential for further delay of critical reform is exactly what Senators Klobuchar and Thune's legislation, the Reforming Broadband Connectivity Act, is intended to address. It would require the FCC to complete its long-delayed reform effort within a year. A number of Senators support this legislation, which further shows that there is significant concern that the FCC has failed to act on a long-standing reform proceeding for more than ten years. INCOMPAS believes that the FCC has the authority and responsibility under the current statute to complete its reform to ensure that the USF can continue to meet its mission.

The USF is critical for supporting broadband availability and connectivity; however, the FCC must act soon on reform, especially now that the quarterly factor has reached over 30 percent and has become an even more significant burden on customers. USF is funded based on telecom revenues, which have been declining as mobile and fixed broadband revenues have increased.

While the FCC has modernized every USF program to support broadband-capable networks and BIAS availability, it has not modernized the contribution factor to in-

⁵ See INCOMPAS Comments and Reply Comments in WC Docket No. 17–84.

⁶ See INCOMPAS Press Release, *INCOMPAS: Competition Comes to the Condo! FCC's MTE Action a Win for Families and Broadband Deployment* (Feb. 15, 2022), available at <https://www.incompas.org/content.asp?admin=Y&contentid=692>.

clude BIAS revenues. There is significant support for the FCC to reform the USF and add BIAS revenues to the contribution base now led by the USForward Coalition. Indeed, the USForward Coalition includes support from over 340 entities, and even USTelecom—which asserted in its written testimony that the FCC's authority should be vastly expanded to include edge providers—agrees that the FCC should, at a minimum, expand the base to include BIAS revenues.⁷ Historically services that are supported by USF subsidies are required to contribute to USF; thus, it is sound policy to expand the base to include BIAS revenues. Moreover, the factor would be less than 4 percent and would provide relief from the unreasonably high and burdensome contribution rate. Finally, financial support for USF would be more evenly distributed to all who benefit from the connectivity USF supports. No matter how BIAS customers use their broadband, they would be contributing to the USF that provides for its universal availability.

We thank you for the opportunity to offer our feedback on some of the issues that were raised in the hearing. We have received Senator Thune's letter of December 6 concerning broadband funding and regulatory structure and will be responding separately to that letter.

Sincerely,

ANGIE KRONENBERG,
President.

cc: Members of Subcommittee

The Markup

DOLLARS TO MEGABITS, YOU MAY BE PAYING 400 TIMES AS MUCH AS YOUR NEIGHBOR FOR INTERNET SERVICE

By Leon Yin and Aaron Sankin

October 19, 2022 06:51 ET

Viewable online at

<https://themarkup.org/still-loading/2022/10/19/dollars-to-megabits-you-may-be-paying-400-times-as-much-as-your-neighbor-for-internet-service>



Credit: Joel Eastwood and Gabe Hongsdusit. Sources: The Markup analysis of AT&T, CenturyLink, Verizon; U.S. Census Bureau
This article is copublished with AP

A couple of years into the pandemic, Shirley Neville had finally had enough of her crappy Internet service.

⁷ USTelecom Comments, *Report on the Future of the Universal Service Fund*, WC Docket No. 21-476 (filed Feb. 2022), at 5, (“the Commission should move quickly to launch a proceeding to explore the bounds of its permissive authority to assess services that include *telecommunications*—including broadband Internet access service (BIAS)”)

"It was just a headache," said Neville, who lives in a middle-class neighborhood in New Orleans whose residents are almost all Black or Latino. "When I was getting ready to use my tablet for a meeting, it was cutting off and not coming on."

Neville said she was willing to pay more to be able to Zoom without interruption, so she called AT&T to upgrade her connection. She said she was told there was nothing the company could do.

In her area, AT&T only offers download speeds of 1 megabit per second or less, trapping her in a digital Stone Age. Her Internet is so slow that it doesn't meet Zoom's *recommended* minimum for group video calls, doesn't come close to the FCC's *definition* of broadband, currently 25 Mbps, and is worlds below median home Internet speeds in the U.S., which *average* 167 Mbps.

"In my neighborhood, it's terrible," Neville said.

But that's not the case in other parts of New Orleans. AT&T offers residents of the mostly White, upper-income neighborhood of Lakeview Internet speeds almost 400 times faster than Neville's—for the same price: \$55 a month.

The vast gulf between the quality of service AT&T offered these neighborhoods for the same cost is not a fluke.

The Markup gathered and analyzed more than 800,000 Internet service offers from AT&T, Verizon, Earthlink, and CenturyLink in 38 cities across America and found that all four routinely offered fast base speeds at or above 200 Mbps in some neighborhoods for the same price as connections below 25 Mbps in others.

The neighborhoods offered the worst deals had lower median incomes in nine out of 10 cities in the analysis. In two-thirds of the cities where The Markup had enough data to compare, the providers gave the worst offers to the least-White neighborhoods.

These providers also disproportionately gave the worst offers to formerly redlined areas in every one of the 22 cities examined where *digitized* historical maps were available. These are areas a since-disbanded agency created by the Federal government in the 1930s had deemed "hazardous" for financial institutions to invest in, often because the residents were Black or poor. Redlining was outlawed in 1968.

By failing to price according to service speed, these companies are demanding some customers pay dramatically higher unit prices for advertised download speed than others. CenturyLink, which showed the most extreme disparities, offered some customers service of 200 Mbps, amounting to as little as \$0.25 per Mbps, but offered others living in the same city only 0.5 Mbps for 400 times as much—\$100 per Mbps.

Residents of neighborhoods offered the worst deals aren't just being ripped off; they're denied the ability to participate in remote learning, well-paying remote jobs, and even family connection and recreation—ubiquitous elements of modern life.

"It isn't just about the provision of a better service. It's about access to the tools people need to fully participate in our democratic system," said Chad Marlow, senior policy counsel at the ACLU. "That is a far bigger deal and that's what really worries me about what you're finding."

Christopher Lewis, president and CEO of the nonprofit Public Knowledge, which works to expand Internet access, said The Markup's analysis shows how far behind the Federal government is when it comes to holding Internet providers to account. "Nowhere have we seen either the FCC nor the Congress, who ultimately has authority as well, study competition in the marketplace and pricing to see if consumers are being price gouged or if those service offerings make sense."

None of the providers denied charging the same fee for vastly different Internet speeds to different neighborhoods in the same cities. But they said their intentions were not to discriminate against communities of color and that there were other factors to consider.

The industry group USTelecom, speaking on behalf of Verizon, said the cost of maintaining the antiquated equipment used for slow speed service plays a role in its price.

"Fiber can be hundreds of times faster than legacy broadband—but that doesn't mean that legacy networks cost hundreds of times less," USTelecom senior vice president Marie Johnson said in an e-mail. "Operating and maintaining legacy technologies can be more expensive, especially as legacy network components are discontinued by equipment manufacturers."

AT&T spokesperson Jim Greer said in an e-mailed statement that The Markup's analysis is "fundamentally flawed" because it "clearly ignored our participation in the Federal Affordable Connectivity Program and our low-cost Access by AT&T service offerings." The Affordable Connectivity Program was launched in 2021 and pays up to \$30 a month for Internet for low-income residents, or \$75 on tribal lands.

"Any suggestion that we discriminate in providing Internet access is blatantly wrong," he said, adding that AT&T plans on spending \$48 billion on service upgrades over the next two years.

Recent *research* looking at 30 major cities found only about a third of eligible households *had signed up* for the Federal subsidy, however, and *the majority* use it to help cover cellphone bills, which also qualify, rather than home Internet costs. Connectivity advocates told The Markup that it's hard to get people to jump through the bureaucratic hoops needed to sign up for the program when service is slow.

Greer declined to say how many or what percentage of AT&T's Internet customers are signed up for either the ACP or the company's own low-cost program for low-income residents.

In a *letter* to the FCC, AT&T insisted its high-speed Internet deployments are driven by "household density, not median incomes." But when The Markup ran a statistical test controlling for density, it still found AT&T disproportionately offered slower speeds to lower-income areas in three out of four of the 20 cities where we investigated their service.

"We do not engage in discriminatory practices like redlining and find the accusation offensive," Mark Molzen, a spokesperson for CenturyLink's parent company, Lumen, wrote in an e-mail. He said that The Markup's analysis is "deeply flawed" without specifying how. He did not respond to requests for clarification.

EarthLink, which doesn't own Internet infrastructure in the examined cities but rather rents capacity from other providers, did not provide an official comment despite repeated requests.

Internet prices are not regulated by the Federal government because unlike telephone service, Internet service is not considered a utility. As a result, providers can make their own decisions about where they provide service and how much to charge. The FCC declined a request to comment on the findings.

The investigation is based on service offers collected from the companies' own websites, which contain service lookup tools that list all available plans for specific addresses, using a method pioneered by researchers at *Princeton*. The Markup analyzed price and speed for nearly 850,000 offers for addresses in the largest city in 38 states where these providers operate.

Las Vegas is one city where large swaths of CenturyLink's offers were for slow service. Almost half didn't meet the current Federal definition of broadband. These fell disproportionately on Las Vegas's lower-income and least-White areas.

Las Vegas councilwoman Olivia Diaz said that in the summer of 2020, she approached families where children had stopped showing up to virtual lessons the previous school year to find out what went wrong.

City schools were preparing to begin their second school year marked by COVID-19 lockdowns.

"We kept hearing there were multiple children trying to connect in the household, but they weren't able to," said Diaz, who represents a district that's predominantly Latino and on the lower end of the city's income spectrum.

More than 80 percent of CenturyLink's Internet offers in her district were for service slower than 25 Mbps. Education advocacy group Common Sense Media recommends at least 200 Mbps download speeds for a household to reliably conduct multiple, simultaneous video conferencing sessions.

"I think it's unfair knowing that it is slow service that we're paying for that is not commensurate with the faster speeds that they have in the other parts of the city that are paying the same price," Diaz said. "It just breaks my heart to know we're not getting the best bang for our buck."

Diaz said city officials have asked CenturyLink to expand high-speed service in her district, but the company declined, citing the prohibitive cost of deploying new infrastructure in the area. CenturyLink did not respond to e-mails asking about this request.

Some officials told The Markup they've been yelling for years about bad service for high prices.

"If I was paying \$6 a month," Joshua Edmonds, Detroit's director of digital inclusion, "well you get what you're paying for." But he objects to people being asked to pay premium rates for bad service. "What I pay versus what I get doesn't really make sense."

In a 2018 *report*, Bill Callahan, who runs the online accessibility organization *Connect Your Community*, coined the term "tier flattening" to describe charging Internet customers the same rate for differing levels of service. He said The Markup's findings show how much of America's Internet market is based on the "basic unfairness" of Internet service providers deciding to deprioritize investing in new, high-speed infrastructure in marginalized areas.

"They've made a decision that those neighborhoods are going to be treated differently," said Callahan. "The core reason for that is they think they don't have enough money in those neighborhoods to sustain the kind of market they want."

The FCC *is currently drafting rules* under a provision of the 2021 infrastructure bill aimed at “preventing digital discrimination of access based on income level, race, ethnicity, color, religion, or national origin.”

A coalition of 39 groups led by the Electronic Frontier Foundation and Center for Accessible Technology *urged the FCC* to take aggressive action rectifying broadband inequality by examining the socioeconomics of the neighborhoods getting the slowest speeds and the prices they pay—regardless of whether the companies intended to discriminate.

AT&T insisted in filings with the agency that the standard for discrimination should be explicit, deliberate efforts to avoid building infrastructure in areas that are populated by people of color or lower-income residents.

It also asked for subsidies to build high-speed Internet in lower-income neighborhoods because, as AT&T asserted in its *letter* to the FCC, “most or all deficiencies in broadband access appear to result not from invidious discrimination, but from ordinary business-case challenges in the absence of subsidy programs.”

Advocates say that’s just not true. “There are very few places in the country where it is not economically feasible to deploy broadband,” said Brian Thorn, who served as a senior researcher for the Communication Workers of America, a union representing telecom employees, which has been vocal on the issue and *filed its own comment* to the FCC. (Full disclosure: The CWA is the parent union of The NewsGuild-CWA, which represents The Markup’s employees.) He said members are tired of seeing their employers make inequitable infrastructure deployment decisions.

“We would hear from members all the time that they’re out laying lines on one side of the neighborhood and not on the other,” he said.

In a *letter* to the FCC, the coalition asserted that “broadband users are experiencing discriminatory impacts of deployment that are no different than the impacts of past redlining policies in housing, banking, and other venues of economic activity.”

The term “redlining” derives from efforts by the Federal government to stem the tide of foreclosures during the Great Depression by drawing up maps, with the help of real estate agents, to identify areas that were safe for mortgage lending. Predominantly White neighborhoods were consistently rated better than less-White neighborhoods, which were shaded in red. Echoes of these maps still reverberate today in things like *rates of home ownership* and *prenatal mortality*.

Notes on the historical map explaining why one part of Kansas City, Mo., was redlined cited “Negro encroachment from the north.” In that same area, AT&T offered only slow service to every single address The Markup examined.

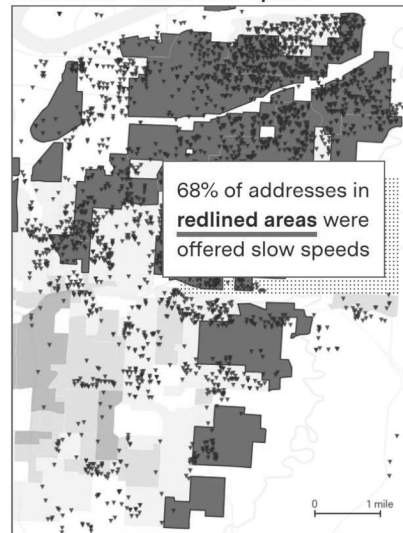
Across Kansas City, AT&T offered the worst deals to 68 percent of addresses in redlined areas, compared to just 12 percent of addresses in areas that had been rated “best” or “desirable.”

Historically redlined areas disproportionately received slow internet speeds in Kansas City, Mo.

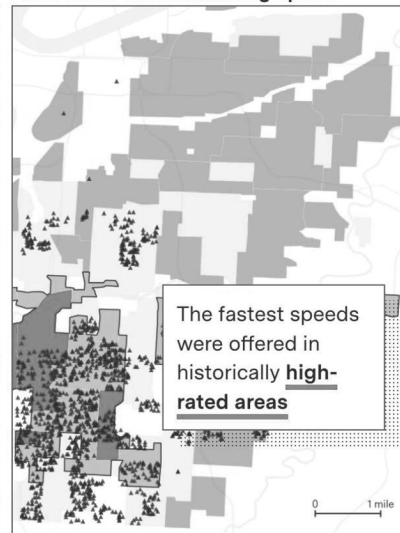
Residential addresses offered different download speeds for the same price

Historical loan grade: ■ Best ■ Desirable ■ Declining ■ Hazardous

Addresses offered slow speed



Addresses offered blazing speed



Map: Joel Eastwood • Source: The Markup analysis of AT&T; Mapping Inequality

Redlining maps frequently tracked neatly with the disparities The Markup found. Addresses in redlined areas of 15 cities from Portland to Atlanta were offered the worst deals at least twice as often as areas rated “best” or “desirable.” Minneapolis, which is served by CenturyLink, displayed one of the most striking disparities: Formerly redlined addresses were offered the worst deals almost eight times as often as formerly better-rated areas.

Pamela Jackson-Walters, a 68-year-old longtime resident of Detroit’s Hope Village, said she needs the Internet to work on her dissertation in organizational leadership at University of Phoenix online and to virtually attend church services. The slow speeds AT&T offered were a constant annoyance.

“They still haven’t installed the high-speed Internet over here,” she said. “How do we get it? Are we too poor of a neighborhood to have the better service?”



Pamela Jackson-Walters, whose Detroit neighborhood is almost entirely Black, has endured slow Internet speeds and weeks-long outages.
Paul Sancya/AP Photo

Hope Village has a per capita income of just over \$11,000 and is almost entirely Black. To add insult to injury, last fall, AT&T Internet service across Hope Village went down for 45 days before being restored. This summer, Jackson-Walters's Internet went down again, this time for four weeks, she said.

Jeff Jones, another longtime Hope Village resident, noted a bitter irony amid all the service problems. "To add to the insult, I can look out my bedroom window literally, maybe 150 yards, is the AT&T service facility," he said with a weary laugh. "I'm like, please help me! You're right there! How can you ignore this problem that is just right in front of your face?"

Until The Markup told Hope Village residents its findings about AT&T's pricing practices in Detroit, they didn't know that lower-income areas were more often asked to pay the same price for slower internet.

"That's the big piece," said Angela Siefer, the executive director of the National Digital Inclusion Alliance, which advocates for broadband access. "Folks don't know that they're being screwed."

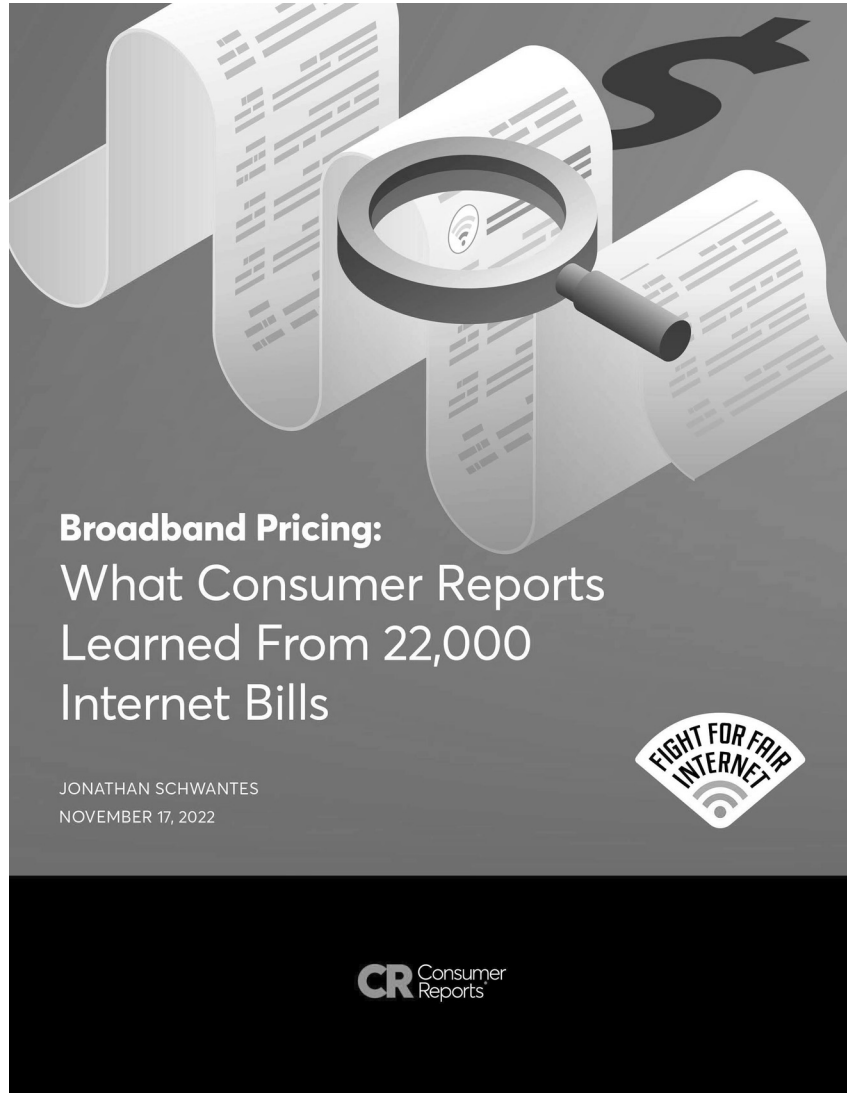


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Executive Summary

High-speed Internet service, commonly referred to as broadband, has become a requirement of 21st-century American life—a virtual necessity for many people attending school, getting and performing many jobs, receiving medical care and government services, or trying to purchase goods and services that are unavailable locally.

Yet broadband service is too expensive for many Americans to afford.

Consumer Reports (CR) launched the Fight for Fair Internet campaign to encourage policymakers and service providers to make broadband more accessible and affordable. This study was designed to shine a light on an important component of that goal: determining what consumers pay for Internet service, and exactly what they get for their money.

To do so, we collected and analyzed more than 22,000 consumer broadband bills. Many of the consumers who shared their bills also took Internet speed tests and completed a survey on their satisfaction with and the reliability of their Internet service. While this is not a nationally representative study and is not predictive of the broadband market, it is one of the most ambitious efforts of its kind to understand how much consumers are paying at a moment in time.

We believe our findings have important public policy implications.

*Key Findings:**Median cost of service*

Among the 18,359 consumer bills on which an Internet price could be identified, the median cost of high-speed Internet service was \$74.99 per month. Approximately half of the households were paying between \$60 and \$90 per month.

Confusing bills

Bills that are hard to understand make it difficult for consumers to budget and compare prices with alternative service options. The following factors contribute to this billing confusion:

Bundles. Numerous Internet service providers (ISPs), including Comcast (Xfinity), the Nation's largest provider, do not always itemize the internet price within their "bundled" TV, phone, and Internet packages. This was true of 2,827 of the 22,088 bills we analyzed, and 1,810 were issued by Comcast. This practice makes it impossible for both consumers and CR's researchers to determine the cost of the service and compare it with other providers.

Discounts. Many ISPs offer discounts on broadband service, including introductory promotional discounts and conditional discounts such as auto-pay discounts. The discounts identified typically ranged from \$10 to \$50. Discounts generally benefit consumers, but also make it challenging for consumers and researchers to determine the true cost of service and to compare it with other providers' prices. For example, it is not always clear from bills when discounts will expire and what the price will be afterward. Notably, more than half of the AT&T and Verizon bills we analyzed contained discounts, while none of the Google Fiber bills in our sample included discounts.

Fees. ISPs charge a wide range of fees that, together, can add up to a significant portion of the overall cost of service and contribute to the confusion around Internet pricing. Individual fees tied directly to Internet service in our sample

typically ranged from \$2.49 to \$9.95 per month. It is often difficult to determine whether these fees are associated with broadband or other elements of a service bundle. Some of these fees, such as the cost of renting a modem or wireless router from the provider, are avoidable, but most are not.

The unavoidable fees are especially problematic because consumers may believe they are government-imposed when, in fact, many are company-imposed and distinguished from the core service price at the provider's discretion. More than a dozen ISPs were found to charge company-imposed fees—also known as junk fees—under names such as “network enhancement fee,” “internet infrastructure fee,” “deregulated administration fee,” and “technology service fee.” They can surprise consumers when they appear on monthly bills, and can enable providers to raise prices without seeming to violate marketing or contractual price commitments.

Data cap charges. Several providers, including fixed broadband providers Comcast (Xfinity), Cox, Suddenlink, AT&T, and Wave Broadband, impose data caps in at least some areas and charge overage fees for exceeding those caps, or fees for unlimited data. Unlimited data can add as much as \$49.99 per month to the base cost of service.

Speed limitations

The results of online speed tests can depend on time of day, the quality and speed of a home WiFi network, and other factors unrelated to ISP performance.

That said, some study participants clearly experience severe broadband speed limitations. Download speeds routinely fail to match the advertised “up to” speeds of several ISPs. This was especially true of consumers paying for “premium” plans purporting to offer download speeds of between 940 and 1,200 Mbps, who in fact experienced median speeds of between 360 and 373 Mbps.

In addition, we found that a large number of consumers who participated in our study pay as much or more for a sub-broadband plan (which is generally defined as a download speed of less than 25 Mbps) as other consumers pay for advertised speeds of 300 Mbps or higher.

Lack of competition

CR counted how many ISPs were reflected in bills for each ZIP code where we had participants. We did not independently determine how many ISPs operate in each community, but our findings do point to a lack of choice for many consumers.

CR collected 9,116 bills from ZIP codes where we detected just one ISP. In ZIP codes where bills from two ISPs were present in our sample, that number dipped to 7,273. Three or more competitors were spotted in ZIP codes accounting for only 1,802 bills.

Though not conclusive evidence of a lack of competition, we found it telling that the overwhelming majority of bills came from ZIP codes where all study participants subscribed to the same ISP, or one of just two ISPs.

The data from bills analyzed by CR suggests that competition results in lower broadband prices. Americans in markets where we received bills from at least three broadband competitors reported paying, on average, about \$5 per month less for service than those in areas where we received bills from one or two providers, and reported prices were lower still as the number of local competitors increased. This mirrors the findings of previous studies.

Policy Implications:

Make broadband label easier to find

The Federal Communications Commission's proposed broadband “nutrition” label, designed to bring greater price transparency and uniformity to the broadband market, should be a) required to appear on all monthly broadband bills and b) machine-readable.

Encourage broadband competition

Two policy changes could spur competition in the broadband industry: permission and support for the creation of municipal broadband networks, and greater regulatory scrutiny of the legal challenges and other efforts by incumbent ISPs to thwart new competition in underserved areas.

Strengthen FCC oversight

The FCC should reassert its regulatory authority over the broadband Internet service industry, which would allow the Commission to ensure consumers have non-discriminatory access to broadband, monitor price-gouging, bar anti-consumer business practices, and better address price and fee transparency.

I. Introduction: Why CR Launched the Fight for Fair Internet Campaign

Consumer Reports (CR) launched the Fight for Fair Internet campaign in July 2021 with the goal of making broadband Internet service accessible to and affordable for all Americans. An important element of that endeavor is simply establishing how much U.S. consumers pay for broadband, and precisely what they get for their money.¹

Previous research has looked at broadband pricing by drawing on data from publicly available sources such as Internet service provider (ISP) websites, and represents solid and valuable work.² However, we hypothesized that previous research may not have fully captured some of the variables that affect the actual prices that consumers pay for broadband service, and could be usefully complemented by new research. CR therefore determined to collect data directly from monthly ISP bills sent to and paid by real consumers. And, indeed, after more than 10 months spent analyzing and extracting data from more than 20,000 consumer broadband bills, a more robust picture of the prices paid by the participants has emerged. We not only achieved the goal of finding out how much consumers are paying for their Internet service but also uncovered many additional costs of broadband service, including package speed costs, equipment costs, data and usage costs, various fees, and more.

Broadband access is an increasingly important policy and pocketbook issue because fast, reliable Internet service is an increasingly essential commodity. This was true before the COVID-19 pandemic, but it became urgently clear in March 2020 when, virtually overnight, millions of consumers began working from home, children were suddenly expected to attend school via the internet, and many healthcare visits were replaced with telehealth appointments to limit exposure to the coronavirus.³ At the same time, with traditional forms of social interaction, entertainment, and travel curtailed, already popular streaming video services quickly became a primary source of entertainment, and many Americans began routinely using the web to connect with friends and loved ones via video calls.⁴

Dramatic upticks in online Internet speed testing—Ookla (speedtest.net) recorded a more than 50 percent increase in the 12-week average of speed tests taken in the U.S. the week of March 16–22, 2020—demonstrate the extent to which consumers suddenly became “internet aware,” having recognized the need for both fast and reliable Internet service.⁵

¹For further information describing CR’s Fight for Fair Internet campaign (formerly known as Let’s Broadband Together), see <https://www.consumerreports.org/media-room/press-releases/2021/07/consumer-reports-launches-broadband-togetherna-nationwide-sea/>. Broadband Internet access service, or BIAS, is defined by the Federal Communications Commission as an Internet connection capable of at least 25 Mbps downstream speed and 3 Mbps upstream speed, and was last updated in 2015. The current Chair of the FCC, Jessica Rosenworcel, announced plans earlier this year to update that definition to 100 Mbps downstream and 20 Mbps upstream. See Chris Velazco, “FCC calls 25 Mbps ‘broadband’ speed. The push is on to up it to 100,” *Washington Post*, July 19, 2022.

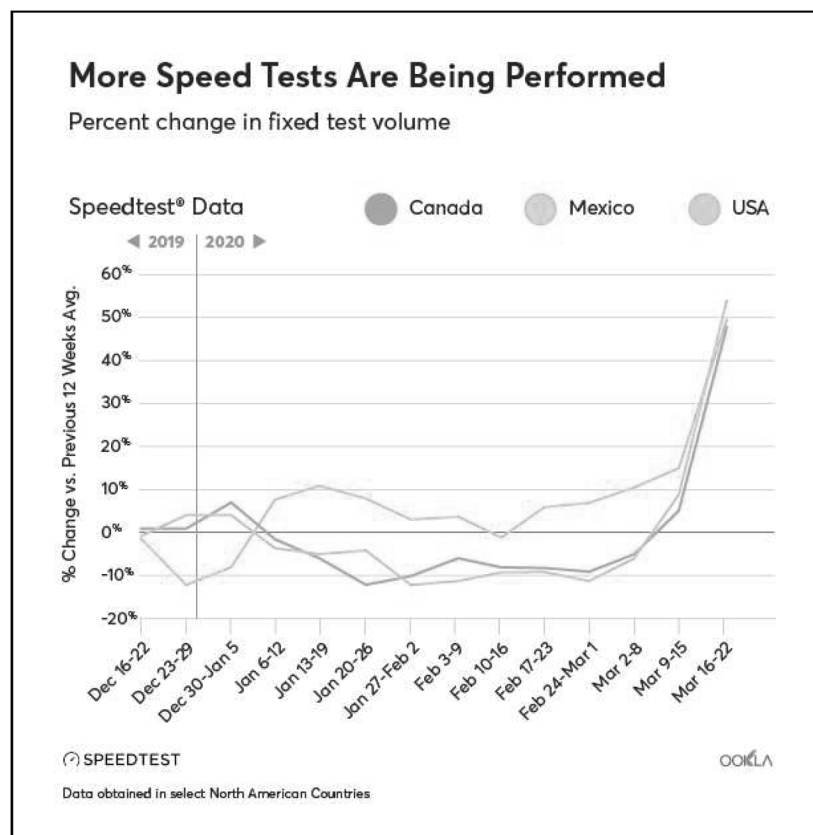
²See Becky Chao, Claire Park, Joshua Stager, “The Cost of Connectivity 2020,” *New America’s Open Technology Institute*, July 15, 2020, <https://www.newamerica.org/oti/reports/cost-connectivity-2020>, and S. Derek Turner, “Price Too High and Rising: The Facts About America’s Broadband Affordability Gap,” *Free Press*, May 20, 2021, <https://www.freepress.net/sites/default/files/2021-05/prices-too-high-and-rising-free-press-report.pdf>.

³Colleen McClain et al., “The Internet and the Pandemic,” *Pew Research Center*, September 1, 2021, <https://www.pewresearch.org/internet/2021/09/01/the-internet-and-the-pandemic>.

⁴Id.; See also: Brad Adgate, “The Impact COVID-19 Had On The Entertainment Industry In 2020,” *Forbes*, April 2021, <https://www.forbes.com/sites/bradadgate/2021/04/13/the-impact-covid-19-had-on-the-entertainment-industry-in-2020/?sh=613d3670250f>.

⁵Screenshot taken from “Tracking COVID-19’s Impact on Global Internet Performance,” *Ookla Insights Articles*, (March 13, 2020; updated July 20, 2020). Previously available at: <https://www.ookla.com/articles/tracking-covid-19-impact-global-internet-performance>.

Figure 1



CR survey data confirms the point: Nationally representative surveys show that, between July 2017 and May 2022, the percentage of Americans who agreed that Internet service is “as important as water or electricity” increased from 61 percent to 71 percent, and hit a high of 80 percent in April 2020.⁶ And more recently, 84 percent of respondents to Consumer Reports’ 2022 Telecommunication Survey of 33,204 CR members, reporting on their experiences with their current home Internet service provider as of March 2022, said the same (though this was not a nationally representative survey).

At the same time, broadband *pricing* also took on heightened significance, as it became clear that Internet “access” was not merely a matter of having the technical means to connect but also the economic means. Indeed, in a nationally representative survey of 2,565 adult U.S. residents conducted by CR in 2021, nearly a third of U.S. consumers who did not have broadband said the reason is because “it costs

⁶The first survey result can be found in a 2017 Consumer Reports nationally representative survey appended to CR’s Reply Comments submitted to the FCC’s “Restoring Internet Freedom” proceeding, (WC Docket No. 17–108) on August 30, 2017. Available at: <https://www.fcc.gov/ecfs/document/10831277255624/1>. The second survey results are available as part of CR’s May 2022 “American Experiences Survey (AES): A Nationally Representative Multi-Mode Survey.” Available at: https://article.images.consumerreports.org/prod/content/dam/surveys/Consumer_Reports_AES_May_2022.pdf. The April 2020 survey results are part of CR’s April 2020 “American Experiences Survey (AES): A Nationally Representative Multi-Mode Survey.” Available at: https://article.images.consumerreports.org/image/upload/v1666112268/prod/content/dam/surveys/Consumer_Reports_AES_Internet_Only_April_2020.pdf.

too much.”⁷ Broadband service, it appears, is simply too expensive—and therefore inaccessible—for many of the most financially vulnerable Americans.

The words of Virginia “Ginny” Madsen, a retiree living in San Leandro, California, who was interviewed by Consumer Reports in 2021, captures the vital importance of broadband in everyday life:

“I spent my stimulus check to be able to keep my Internet access because I realized it was too important to lose. This is an infrastructure. This is just like water service, sewer service. This is like electricity! People can’t live without this anymore. If businesses and government entities are going to require that you have Internet access, then they need to make sure that you can get it without being poverty-stricken over it.”

Accordingly, broadband affordability became an important component of the Federal government’s response to the pandemic. The first COVID relief packages included funds in support of existing broadband programs.⁸ But the December 2020 creation of the Emergency Broadband Benefit program (EBB) did far more, providing qualified low-income households with a \$50 monthly subsidy applied to Internet service (\$75 on Tribal lands). The EBB program in turn laid the groundwork for further government support for affordable broadband, and lives on today—albeit as a lower \$30 per month benefit, though the \$75 amount was unchanged for Tribal lands—as the Affordable Connectivity Program (ACP), a component of the Infrastructure Investment and Jobs Act of 2021 (IIJA).⁹ That law also included a requirement that any ISP receiving Federal money (\$42B+) to deploy new Internet infrastructure must offer a low-cost option to help more consumers afford broadband service.¹⁰

The 2021 infrastructure law also included two more important components aimed at broadband affordability, both of which CR actively supported: one, a directive to the Federal Communications Commission (FCC) to collect annual pricing data in conjunction with the second directive, the development of a standardized consumer broadband label (or broadband “nutrition” label) that will require ISPs to disclose pricing information, performance data, fees, and other information relevant to consumers’ purchasing decisions.¹¹

These measures were necessary because the broadband market has been largely unregulated since the so-called Restoring Internet Freedom Order (RIFO) was adopted by the FCC in late 2017.¹² At that time, RIFO unraveled the Commission’s net neutrality rules, stripped broadband internet’s status as a telecommunications service, and passed most of the Commission’s regulatory authority over broadband from the FCC to the Federal Trade Commission (FTC). This happened even though many ISPs also provide telephone and television services—typically using the same delivery technology and infrastructure—that continue to be regulated by the FCC, and even though the FCC maintains far more institutional knowledge about broadband technology than the FTC does.

One result of this regulatory confusion is a broadband marketplace largely devoid of requirements for or guidance on how ISPs should present pricing information to consumers. As a result, monthly bills vary from provider to provider, and some ISPs use more than one format. And while some bills are relatively easy to decipher, with prices clearly identified, others obscure the price of Internet service in a variety of ways.

This doesn’t just frustrate consumers. It also prevents them from comparing prices, thereby disrupting the proper functioning of the marketplace. And it potentially hampers policy decisions at a time when governments are spending billions of taxpayer dollars to expand broadband service to as many consumers as possible.

A better understanding of what consumers actually pay for broadband service, based on the crowd-sourced data in this report, can and should inform ongoing pol-

⁷ Survey Report, “BROADBAND: A Nationally Representative Multi-Mode Survey,” *Consumer Reports*, (July 2021): 3, https://article.images.consumerreports.org/prod/content/dam/surveys/Consumer_Reports_Broadband_June_2021, (CR 2021 Broadband Survey).

⁸ Kathryn de Wit and Anna Read, “States Tap Federal CARES Act to Expand Broadband,” *The Pew Charitable Trusts*, November 2020, <https://www.pewtrusts.org/en/research-and-analysis/issue-briefs/2020/11/states-tap-federal-cares-act-to-expand-broadband>.

⁹ “The Infrastructure Investment and Jobs Act,” Pub. L. No. 117–58, 135 Stat. 429, 1238 § 60502(a) (2021). Available at: <https://www.congress.gov/117/plaws/publ58/PLAW-117publ58.pdf>.

¹⁰ *Id.* at 1199, § 60102(h)(4)(B).

¹¹ *Id.* at 1243, § 60502(c)(1) and 1244, § 60504.

¹² “Restoring Internet Freedom Order,” WC Docket No. 17–108, Declaratory Ruling, Report and Order, 33 FCC Rcd 311, (adopted December 14, 2017; issued January 4, 2018) (RIFO). Available at: <https://www.fcc.gov/document/fcc-releases-restoring-internet-freedom-order>.

icy discussions regarding ways to increase broadband affordability, access, speed, and reliability. It also suggests ways that ISP bills can and should be made clearer and more useful for consumers. And our findings can and should help guide the FCC as it finalizes requirements for the standardized consumer broadband label it's been charged with creating.

NCTA–The Internet & Television Association, a trade group for the broadband industry, has long maintained that ISPs provide consumers transparent billing and pricing information on their websites and in their promotional materials, and that a large majority of Americans have multiple broadband providers to choose from. A spokesperson for the NCTA reiterated those points in November 2022 when a Consumer Reports reporter contacted the group about this report's findings.¹³

II. How CR Conducted the Study

CR launched the Fight for Fair Internet campaign on July 13, 2021, working with dozens of partner organizations to reach a large and diverse group of potential participants.¹⁴ This outreach directed interested consumers to a microsite that:¹⁵

- explained the purpose of the project;
- asked participants to share a copy of their monthly ISP bill;
- encouraged them to run an *internet speed test* using an online tool maintained by Measurement Lab, or M-Lab, the results of which were recorded by CR; and
- prompted them to take an optional survey designed to capture participants' demographic data and to gauge their satisfaction with and the reliability of their Internet service. We did not extract personally identifiable information from the bills; only ZIP codes were retained for geographical location purposes.

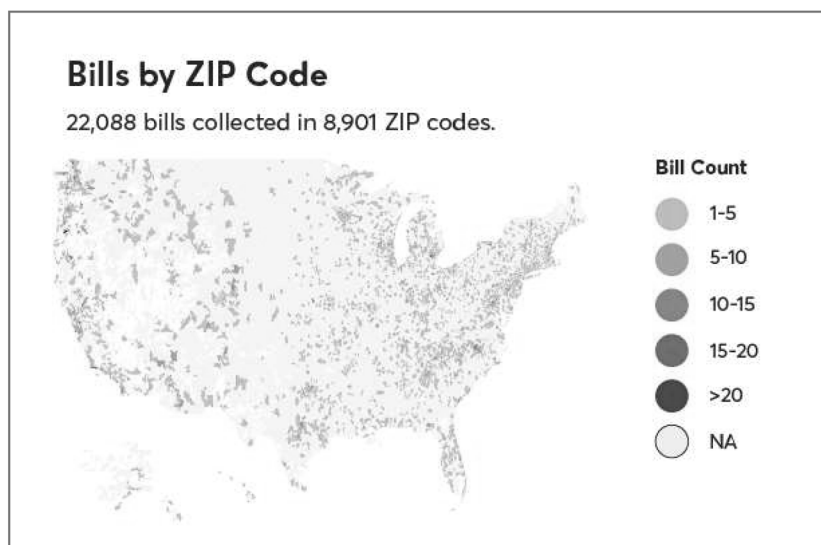
By the end of 2021, more than 57,000 Internet users had visited the microsite. For a variety of reasons, we analyzed only a subset of the submitted bills. Some bills were issued by foreign ISPs and because we sought to study prices paid by consumers in the U.S., they were discarded. We also removed all business internet, wireless internet, and seasonal Internet bills. More significantly, others were discarded because they lacked an itemized list of charges, making it impossible to distinguish Internet service costs from taxes, fees, and other charges unrelated to Internet service, which would distort our findings. Notable characteristics of the 22,088 bills ultimately analyzed include the following:

- Bills came from all 50 states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands.
- Bills originated in 8,901 of the 41,683 ZIP codes in the U.S., with 85.8 percent coming from urban areas, 6.7 percent from suburban areas, and 3.6 percent from rural areas.
- Bills were analyzed from 526 unique, domestic ISPs where a line item for Internet price was identified, though the overwhelming majority (92.4 percent) were issued by 25 ISPs, which included the Nation's largest ISPs.
- Bills represented a variety of provider types, including those that deliver Internet service via coaxial cable, fiber-optic cable, satellite, fixed wireless, and DL delivered over legacy phone networks.

¹³For more details about NCTA's response, see "You May Be Paying Too Much for Your Internet" at <https://www.consumerreports.org/electronics-computers/telecom-services/you-may-be-paying-too-much-for-your-internet-a7157329937/>.

¹⁴For a full list of partner organizations, see Appendix B.

¹⁵The site can be visited at <https://www.consumerreports.org/upload/broadband>.

Figure 2.1*Data Challenges*

For “internet-only” bills, where broadband was the only service provided and paid for, extracting price data from the bills was relatively straightforward. The task was more difficult when Internet service had been “bundled” or packaged along with television and/or phone service for a single price. Numerous ISPs, including Comcast (Xfinity) and others often do not itemize the Internet price within their bundled bills. In cases where a bundled services bill did not include a line item specific to Internet service, data from that bill was not incorporated into our Internet pricing analysis and was simply recorded as a bundled bill.

Discounts presented another challenge. Discounts are generally beneficial to consumers, of course. But they can make it confoundingly difficult for consumers, as well as researchers, to determine the “true” price of Internet service. Ideally, a bill would be clear about the reason for the discount, how long it lasts, and whether it is dependent on certain actions, such as enrolling in paperless billing, auto-payment, or a bundled service package. In fact, that was rarely the case in the bills we examined.

An AT&T bill sent to CR by one participant is illustrative. It gives a line item price of \$70 for Internet service with a plan name of Internet 1000. Beneath that, in italics, it says that a discount of \$10 was included in that price as a discount for bundling service, presumably for as long as the consumer keeps that bundle. Beneath that, a \$10 “Loyalty Credit” is deducted from the Internet price but doesn’t specify how the customer earned or can maintain that discount. In short, a bill such as this informs customers how much service costs in the current cycle but offers far less clarity on what it will cost in the future.

Figure 2.2

AT&T Bill			
Example of two discounts, one not listed as a line item			
Service activity			
Internet			
Monthly charges		Oct 05 - Nov 04	
1. Internet 1000			\$70.00
\$10 off with bundle			
HBO Max included			
2. Internet 1000 \$10 off Loyalty Credit			-\$10.00
Surcharges & fees			
3. State Cost-Recovery Fee			\$0.31
Total for Internet			\$60.31

Usage summary	
Data	Used
Data allowance (unlimited GB)	311

To address the issue of discounts, we extracted both pre-and post-discount prices as well as the amount of the discounts. To further examine the effect of discounting on Internet pricing, we determined the percentage of all bills, and the percentage of each ISP's bills, that included discounts.

So what can we accurately say is the price this consumer is paying AT&T for broadband in our sample bill above? The full, undiscounted price of \$80? Or the discounted price of \$60, or should that be treated as a temporary sale price? For the purposes of this study, CR attempted to untangle discounts in this bill by citing \$80 as a pre-discount price, two discounts of \$10 each resulting in a post-discount price of \$60. We repeated this analysis for discounted bills issued by major ISPs to better understand how discounts can both blur and lower the prices paid for broadband.

Another challenge was the need to ensure that discounts and fees *would* be counted when associated with Internet service and *would not* be counted when associated with television or phone service. To ensure this, we extracted every line item from every legitimate ISP bill and classified each based on the type of service provided (internet, television, or phone). This enabled us to identify which, if any, discounts, and fees were associated with Internet service. To avoid artificially inflating or deflating the Internet price and related Internet charges (*e.g.*, modem rental fee), if it could not be determined whether a fee or discount was associated with Internet service—and not with phone or television service—it was not counted toward the Internet service price or as a related Internet charge. For a more detailed discussion of the methodology used to analyze our data sample, please refer to Appendix A.

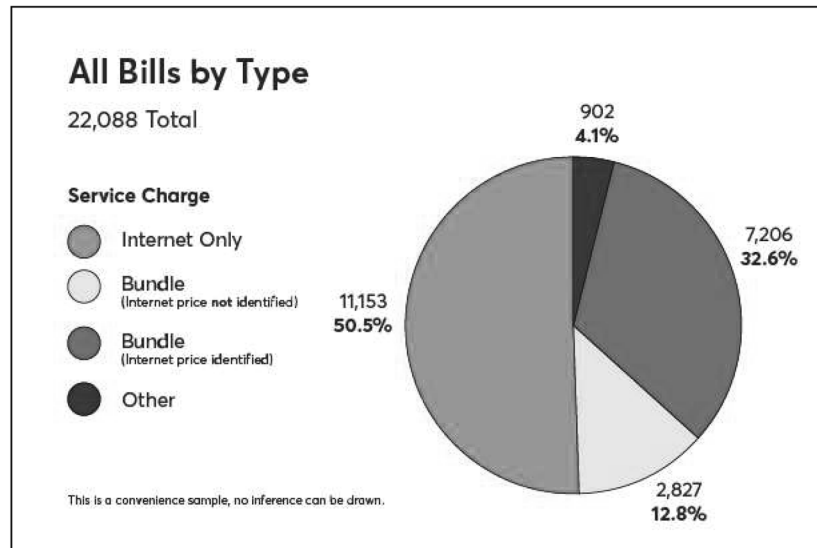
III. What the Pricing Data Tell Us

An important element of Consumer Reports' Fight for Fair Internet campaign is improving our understanding of how much consumers must pay for broadband service, including the various components of broadband prices.

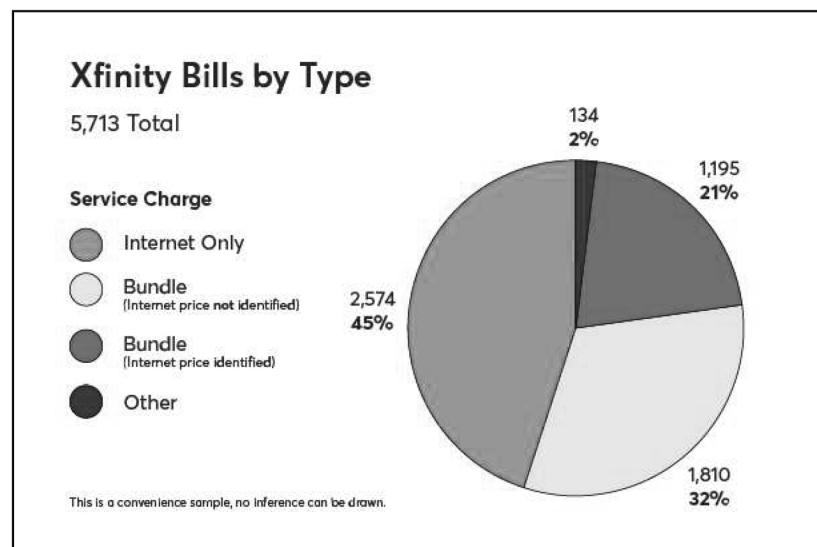
Bundles

Service packages that bundle together broadband with television and/or phone services can save consumers money but also have the effect of distorting the true price of Internet service, preventing shoppers from comparing prices, and otherwise making rational spending and budgeting decisions.

This is especially true when the pricing components of a bundled package are not broken down on bills, as we found to be the case with 2,827 bills in our sample. When we could not extract an Internet price from a bundled bill, we recorded the data as a "bundle with no Internet price" and did not count it in our pricing analysis. An Internet price could be clearly identified on 18,359 of the 22,088 bills.

Figure 3.1

Comcast (Xfinity), the country's largest ISP, rarely lists the Internet component of its bundled package prices. In fact, though we received 5,713 bills from Comcast consumers, 1,810 (32 percent) were bundled bills on which we could not identify an Internet price, which reduced the number of Comcast bills in our data sample.

Figure 3.2

Other companies routinely list the price for each service within their bundled package bills, and those values were captured in our pricing analysis. Our sample included 7,206 bundled bills in which an Internet price was listed.

Speed Boost Charges

Some ISPs charge an additional fee for increased speed performance, such as an additional \$20 for a “speed boost” to 300 Mbps download speed. We treated these costs as part of the base Internet price to accurately reflect what the consumer is paying for the service received.

Broadband Prices

The following table shows the mean and median prices for the 20 ISPs with the largest number of bills sent by participants.¹⁶

Figure 3.3

Average Internet Price by Provider		
ISP	Mean Price	Median Price
Suddenlink (Altice USA)	\$91	\$90
Optimum (Altice USA)	\$90	\$90
Verizon	\$83	\$88
Cox Communications	\$80	\$81
Spectrum (Charter)	\$78	\$75
Atlantic Broadband	\$78	\$76
Consolidated Communications	\$78	\$63
Xfinity (Comcast)	\$75	\$78
CenturyLink	\$70	\$56
Google Fiber	\$69	\$70
Sparklight	\$67	\$65
AT&T	\$66	\$65
Wave Broadband	\$61	\$60
Metronet	\$61	\$60
WOW!	\$60	\$60
Windstream	\$59	\$59
Sonic	\$57	\$50
RCN	\$56	\$55
Ziply Fiber	\$54	\$55
Frontier Communications	\$53	\$50

ISPs with largest sample sizes displayed; satellite ISPs excluded.
This is a convenience sample, no inference can be drawn.

¹⁶Since the launch of CR’s Fight for Fair Internet campaign, the following ISPs have re-branded their service: Suddenlink has been renamed and is now sold under the Optimum brand; both are owned by Altice USA. RCN, Wave Broadband, and Grande Communications are now all branded as Astound Broadband. Atlantic Broadband has changed its name to Breezeline. Additionally, some Windstream bills in our sample are branded and sold under the Kinetic name.

Tier Flattening

Researchers and consumer advocates have long noted a broadband-industry phenomenon known as “tier flattening,” in which consumers who have access only to the oldest and slowest Internet infrastructure are forced to pay as much or nearly as much for inferior service as those served by newer, faster infrastructure. (The “flattening,” in other words, reflects the narrow range of prices corresponding to a wide range of service speeds.) Tier flattening most commonly affects low-income consumers, who are most likely to live in rural and urban areas where premium broadband service is not available.¹⁷

We sought to determine whether tier flattening was characteristic of the pricing data we collected. From our sample, 1,133 AT&T bills provided a convenient case study because the names of the company’s service plans correspond to the “up to” download speed (in Mbps) offered.¹⁸ And, indeed, as the table below shows, AT&T customers with the five slowest service plans pay between \$55 and \$70 a month, while those with the five fastest plans generally pay only marginally more.

Figure 3.4

AT&T Internet Costs by Package			
Non-discounted prices of internet-only bills			
Package	Bill Count	Mean Price	Median Price
Internet 10	12	\$51	\$55
Internet 12	23	\$58	\$63
Internet 18	43	\$64	\$65
Internet 24	56	\$68	\$70
Internet 25	73	\$60	\$60
Internet 45	25	\$74	\$80
Internet 50	109	\$66	\$68
Internet 100	89	\$63	\$60
Internet 300	124	\$67	\$65
Internet 1000	579	\$78	\$80

This is a convenience sample, no inference can be drawn.

Discounts

Broadband providers offer consumers a range of discounts, including limited-time promotional discounts for new customers, discounts earned by bundling Internet service with television and/or phone service, and discounts for enrolling in automated payment plans. We manually reviewed bills to identify pre-discount prices, discounts, and post-discount prices. If it was clear that a discount was deducted from the Internet price—including on bundled bills—we accounted for it in our calculations. If we could not determine which service a discount applied to within a bundled bill, we did not include it in our pricing analysis.

¹⁷ Bill Callahan and Angela Siefer, “TIER FLATTENING: AT&T and Verizon Home Customers Pay a High Price for Slow Internet,” *National Digital Inclusion Alliance*, July 31, 2018, <https://www.digitalinclusion.org/wp-content/uploads/2018/07/NDIA-Tier-Flattening-July-2018.pdf>. See also Leon Yin and Aaron Sankin, “Dollars to Megabits, You May Be Paying 400 Times As Much As Your Neighbor for Internet Service,” *The Markup*, October 19, 2022, <https://themarkup.org/still-loading/2022/10/19/dollars-to-megabits-you-may-be-paying-400-times-as-much-as-your-neighbor-for-internet-service>.

¹⁸ See <https://www.att.com/support/article/u-verse-high-speed-internet/KM1010095/>.

Figure 3.5

Prevalence of Discounts			
Percent of bills that had discounts from selected ISPs			
ISP	Percent of Bills With Discounts	Mean Discount	Median Discount
Consolidated Communications	66%	\$39	\$30
Verizon	58%	\$46	\$40
AT&T	57%	\$18	\$20
Suddenlink (Altice USA)	53%	\$31	\$27
WOW!	53%	\$16	\$10
Atlantic Broadband	41%	\$30	\$21
CenturyLink	38%	\$37	\$16
Spectrum (Charter)	34%	\$25	\$24
Optimum (Altice USA)	29%	\$47	\$50
Xfinity (Comcast)	19%	\$37	\$36
Sonic	13%	\$13	\$10
Windstream	11%	\$15	\$11
Sparklight	8%	\$12	\$15
Cox Communications	8%	\$26	\$16
RCN	2%	\$9	\$10
Google Fiber	0%	\$0	\$0

Top ISPs as ranked by number of bills analyzed; satellite ISPs excluded; non-discounted mean (rounded to the nearest dollar) & median discount values displayed. This is a convenience sample, no inference can be drawn.

As the table above shows, many ISPs discount the price of broadband based on the bills we studied, some more than others. Notably, more than half of the AT&T and Verizon bills we analyzed contained discounts, while none of the Google Fiber bills in our sample included discounts. Because the bills we collected represent a snapshot of time, we cannot definitively say whether these percentages are indicative of how many customers of a particular ISP are receiving discounts, and it is likely these percentages fluctuate.

Discounts generally benefit consumers, of course. But they can also make it difficult for consumers (and researchers) to determine the true cost of service and to compare it with other provider prices. Among other issues, it is not always clear from bills when discounts will expire and what the price will be afterward.

Equipment Charges

Many ISPs offer consumers the option of renting a modem (which connects a home computer or network to the ISP) or modem-router combination (which additionally allows other home devices to connect to that Internet connection, usually via a WiFi signal). Because consumers can generally avoid these extra charges by purchasing their own equipment, we treated them as optional equipment fees. That was also how we treated “WiFi fees” and similarly named fees, which—though not

technically an equipment rental fee—essentially unlock the WiFi functionality of ISP-provided modem-router devices.

Until recently, some ISPs routinely charged consumers for modems they supplied even if the consumers decided to use their own devices instead.¹⁹ Congress outlawed that practice in 2019, with CR’s vocal support.²⁰ Nevertheless, some consumers continue to rent such devices from their ISP, so we cataloged these costs to determine how much these rental fees are adding to their monthly Internet bill.

Figure 3.6

Prevalence of Equipment Charges			
Percent of bills with equipment charges with average costs			
ISP	Percent of Bills With Equipment Charge	Mean Price	Median Price
Sonic	80%	\$10	\$10
Optimum (Altice USA)	67%	\$13	\$10
Windstream	67%	\$10	\$10
Consolidated Communications	63%	\$15	\$12
Atlantic Broadband	48%	\$17	\$15
CenturyLink	37%	\$10	\$10
Wave Broadband	30%	\$17	\$16
Spectrum (Charter)	29%	\$6	\$5
Sparklight	29%	\$11	\$11
WOW!	29%	\$12	\$14
Xfinity (Comcast)	28%	\$16	\$14
RCN	27%	\$14	\$13
Suddenlink (Altice USA)	26%	\$18	\$10
AT&T	25%	\$9	\$10
Cox Communications	24%	\$13	\$12
Verizon	21%	\$15	\$12
Frontier Communications	18%	\$10	\$10
Metronet	17%	\$13	\$10
Ziply Fiber	14%	\$10	\$10
Google Fiber	0%	\$0	\$0

Top ISPs as ranked by number of bills analyzed; satellite ISPs excluded; non-discounted mean (rounded to the nearest dollar) & median price displayed. This is a convenience sample, no inference can be drawn.

¹⁹Jon Brodtkin, “Frontier Customer Bought His Own Router—But Has to Pay \$10 Rental Fee Anyway,” *Ars Technica*, July 2, 2019, <https://arstechnica.com/information-technology/2019/07/frontier-customer-bought-his-own-router-but-has-to-pay-10-rental-fee-anyway>.

²⁰“Television Viewer Protection Act of 2019,” Pub. L. No. 116–94, 133 Stat. 3198, § 642(c) (2019).

Company-Imposed Fees, aka Junk Fees

Some ISPs charge mandatory fees with names such as “network enhancement fee” (Optimum) and “deregulated administration fee” (Windstream/Kinetic). Here, for example, is how Wave Broadband describes its “internet infrastructure fee”:

“Internet Infrastructure Fee helps defray costs associated with building and maintaining Wave’s fiber rich broadband network, as well as the costs of expanding network capacity to support the continued increase in customers’ average broadband consumption. This fee is neither government-mandated nor a tax, fee or surcharge imposed by the government; it is a fee that Wave assesses and retains.”

That description at least makes clear to consumers who are motivated to dig around in the fine print that it is not a government fee or tax. But the way these fees are presented on bills frequently creates the false impression that they are imposed by government regulation or taxation, when instead they are often routine input costs and distinguished from the core service price only at the provider’s discretion.

As CR noted in a 2019 study, “How Cable Companies Use Hidden Fees to Raise Prices and Disguise the True Cost of Service,” analogous fees are commonplace in the cable television market.²¹ They appear to be less common in the broadband market. But where they do exist, they have the same effects and can add up to a significant portion of the total cost of service.

Such fees do a disservice to consumers by muddying the true price of broadband, making it difficult for consumers to compare prices, creating a pretext for providers to advertise low base rates while actually charging higher prices, and enabling providers to raise prices while superficially appearing to honor lower introductory or contractually promised base rates.²²

²¹ Jonathan Schwantes, “How Cable Companies Use Hidden Fees to Raise Prices and Disguise the True Cost of Service,” *Consumer Reports*, October 3, 2019, <https://advocacy.consumerreports.org/research/2019-cable-fee-report>.

²² In a Consumer Reports “Share Your Story” campaign conducted last year, CR members shared stories of confusing advertising practices and promotional rates, and some members reported how fees make it difficult for them to understand the costs associated with their Internet service. See <https://digital-lab.consumerreports.org/2021/11/15/an-analysis-of-broadband-isp-practices>.

Figure 3.7

Company-Imposed Fees		
A sample of mandatory fees imposed by ISPs		
ISP	Company-Imposed Fee Name	Cost
Atlantic Broadband	High-speed Network Recovery Fee	\$5.25
CenturyLink	Broadband Cost Recovery Fee	\$3.99
Consolidated Communications	Broadband Cost Recovery Fee	\$2.97
Frontier Communications	Internet Infrastructure Fee	\$6.99
Grande Communications	Network Access and Maintenance Fee	\$5.57
Metronet	Technology Service Fee	\$9.95
Optimum (Altice USA)	Network Enhancement Fee	\$3.50
RCN	Network Access and Maintenance Fee	\$5.57
Service Electric	Network Access Fee	\$4.00
Suddenlink (Altice USA)	Network Enhancement Fee	\$3.50
Verizon	Municipal Construction Charge	\$2.49
Wave Broadband	Internet Infrastructure Fee	\$5.57
Windstream	Deregulated Administration Fee	\$7.77

This is a convenience sample, no inference can be drawn.

In this report, we are calling these “company-imposed fees” to distinguish them from government-imposed fees and taxes, but many industry critics and consumer advocates refer to them—not inappropriately—as “junk fees.” In short, we see no reason that such fees should be presented to consumers as line items separate from the price of basic Internet service.

Data Caps and Related Fees

Our sample includes bills on which an ISP imposes a “cap” or limit on the amount of data the customer can use per month, and then charges an “overage fee” if the customer exceeds that limit. Most ISPs will lift the data cap or offer unlimited data use for an additional fee.

Companies that use data caps include large ISPs such as Comcast (Xfinity), Cox Communications, and AT&T, and smaller ones such as Suddenlink and Wave Broadband. In our sample, ISPs typically set their data cap above 1TB per month. ISPs commonly claim that most customers do not exceed their cap, but our sample included bills on which terabyte caps were exceeded. We also found that some ISPs do not impose data caps uniformly across their coverage territory, which will be discussed in Section 4, on competition.

Figure 3.8 shows examples of submitted bills that contain charges for unlimited data allowance (Cox Communications and Comcast/Xfinity, respectively) and a data overage fee (Comcast/Xfinity).

Figure 3.8

Samples of Fees for Unlimited Data and Additional Usage

MONTHLY SERVICES Jun 17 - Jul 16	
INTERNET	
Premier Internet Service	\$97.99
Unlimited Data Plan	49.99
Total Internet	\$147.98
TOTAL MONTHLY SERVICES	\$147.98
TOTAL NEW CHARGES	\$147.98

Regular monthly charges		\$275.88
Your Xfinity package		\$213.98
X1 Premier Double Play		\$165.00
Includes Digital Premier, Streampix, AnyRoom DVR Service, HD Technology Fee and Performance Pro Internet		
TV: Starz		\$8.99
TV: More Sports & Ent Pkg		\$9.99
Internet: Unlimited Data Option		\$30.00
Peacock Premium (\$4.99 value)		\$0.00
Included in your Xfinity package on us. Experience timeless movies, TV shows and exclusive originals that you can't not watch. Just say "Peacock" into your Voice Remote to start streaming or visit xfinity.com/peacock to learn more.		

One-time charges		\$10.00
Additional usage		\$10.00
Internet: Additional Usage @ \$10/50GB May 01 - May 31		\$10.00

We found that satellite Internet providers, which are often the only Internet choice in rural areas, tend to set relatively low data caps—as low as 50MB, in some cases—and sell additional blocks of data for a substantial fee. This can sometimes result in staggeringly large Internet bills: One HughesNet monthly bill in our sample totalled more than \$465 because of a 25GB data token purchased for \$300 by the consumer who exceeded the plan's 50MB data cap.

Historically, these caps were attributed to the technical limitations of satellite-provided Internet service and the need to restrict bandwidth to better manage network congestion.²³ At least one satellite provider in our data sample, however, Starlink, does not currently impose data caps on its customers.

At a time when consumers are increasingly reliant on broadband, data caps lacking a clear justification unnecessarily discourage Internet use and increase prices. Earlier this year, CR publicly supported the introduction of the Uncap America Act, introduced by Sens. Ben Luján, (D–N.M.), and Cory Booker, (D–N.J.)²⁴ The legislation would, among other things, forbid ISPs from imposing data caps unless they could supply a technical justification to the FCC.

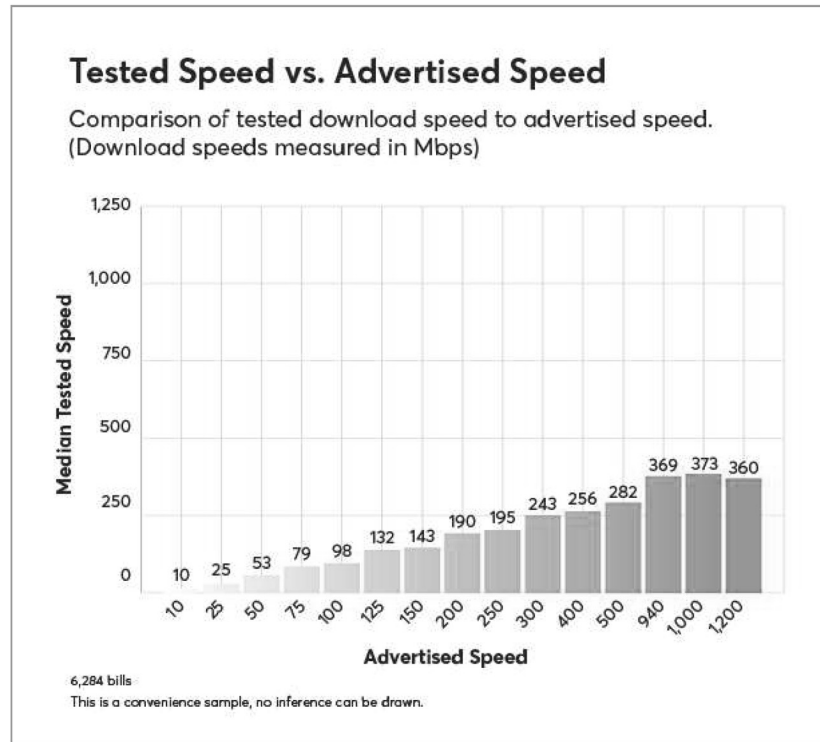
Speed Test Results

One aim of this study is to better understand the relationship between real-world Internet performance and the speeds offered when customers sign up. To gather data, we asked all participants to take an Internet speed test using an online tool hosted by Measurement Lab (M-Lab), and to report their upload and download speeds. M-Lab's speed test does not purport to measure the advertised speeds offered by ISPs. Participants conducted a total of 21,481 usable speed tests.

Because ISPs do not consistently print the download or upload speeds for a service package on their bills, our analysis was restricted to the subset of bills on which we could identify an advertised download speed. As the graphic below suggests, in some cases, the measured speed matched the “up to” advertised plan speed; in other cases, the measured speed was much lower than the advertised speed.

²³ Open Internet Advisory Committee Federal Communications Commission Report, “Policy Issues in Data Caps and Usage-Based Pricing,” Federal Communications Commission, August 20, 2013, <https://transition.fcc.gov/cgb/oiac/Economic-Impacts.pdf>.

²⁴ Jonathan Schwantes, “Consumer Reports supports the Uncap America Act to limit unnecessary Internet data caps,” press release, Consumer Reports Advocacy, July 21, 2022, https://advocacy.consumerreports.org/press_release/consumer-reports-supports-the-uncap-america-act-to-limit-unnecessary-internet-data-caps.

Figure 3.9

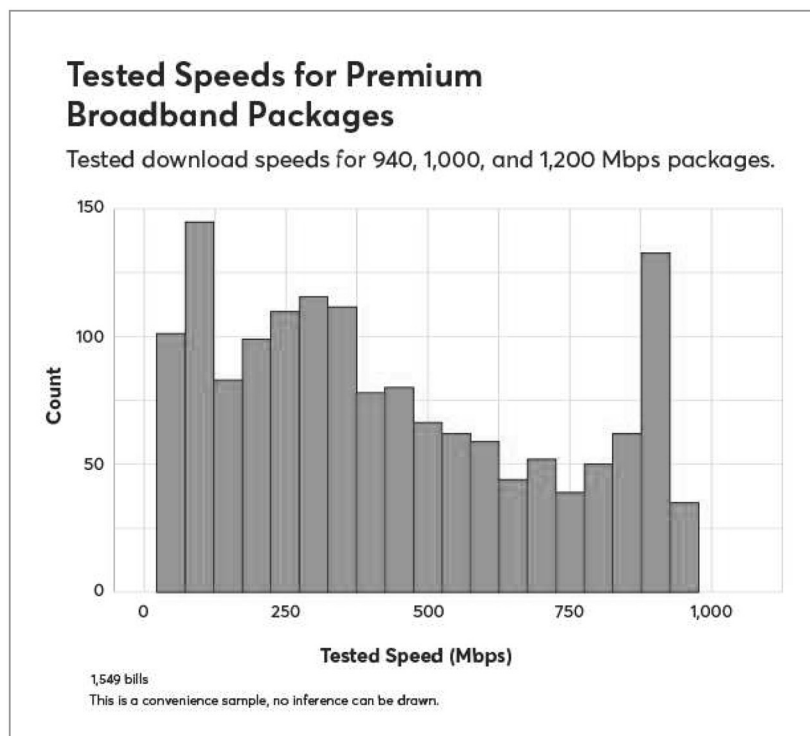
It is important to understand that Internet speed tests have limitations. A single speed test doesn't necessarily reflect typical conditions, let alone optimal ones. A test performed during peak usage times, for example, when network congestion is heaviest, is likely to be slower than one performed during a low-usage time. Additionally, speed test results can be heavily dependent on the quality and speed of one's home WiFi network and whether one is connecting via a virtual private network (VPN). This study did not control for such variations.

It is also worth emphasizing that ISPs typically market their broadband service as delivering "up to" certain upload and download speeds. This practice, though arguably confusing, is not a guarantee of certain speeds.

All that said, we found many instances where measured download speeds did not match the advertised "up to" speeds of several ISPs. This was especially true for users paying for premium plans purporting to offer download speeds of "up to" between 940 and 1,200 Mbps, who in fact reported median measured speeds between 360 and 373 Mbps, as can be seen in Figures 3.9 above and 3.10 below. Since M-Lab does not attempt to measure advertised speeds, these discrepancies should not be interpreted as a reflection of whether or not users are receiving the service they are paying for.

Nevertheless, they do provide valuable insight into how consumer's experience their connectivity.

Figure 3.10



IV. Competition

Compounding many of the problems caused by a lack of regulation in the broadband market is the industry's lack of competition: Some consumers simply have little or no choice of broadband providers.²⁵ One additional goal of the current study was to explore the extent to which local competition among broadband providers benefits consumers by lowering prices and improving the quality of service, as standard economic theory would predict and as other recent research has shown to be the case.²⁶

CR's own research shows that consumers are acutely aware of the market's lack of competition. According to CR's 2021 broadband survey, 26 percent of U.S. consumers who have broadband in their household say only one company was available when they were choosing their household's Internet service.²⁷ Additionally, a survey of 33,000 CR members (in this case not a nationally representative sample) found that more than one in five (22 percent) said they were not aware of any ISP options

²⁵ "FCC Releases 2020 Communications Marketplace Report," GN Docket No. 20-60, Federal Communications Commission, (December 31, 2020): 86-87 at para.126. Available at: <https://www.fcc.gov/document/fcc-releases-2020-communications-marketplace-report>. The report shows that more than 14.5 million (4.4 percent) U.S. residents have zero choices for fixed broadband at the 25/3 Mbps speed tier, and 27.5 million (8.3 percent) and 42.7 million (12.9 percent) residents lack even one provider for the 100/10 Mbps and 250/25 Mbps speed tiers, respectively. The equivalent numbers for residents who have only one choice of provider for the same tiers are 72.6 million (21.9 percent), 118.7 million (35.8 percent), and 172.5 million (52 percent).

²⁶ Tyler Cooper, "Competition and Pricing: How Starlink Could Change the Internet Industry," BroadbandNow, September 2020, <https://broadbandnow.com/report/starlink-competition-and-pricing>; see also Dan Mahoney and Greg Rafert, "Broadband Competition Helps to Drive Lower Prices and Faster Download Speeds for U.S. Residential Consumers," Analysis Group, November 2016, https://www.analysisgroup.com/globalassets/content/insights/publishing/broadband_competition_report_november_2016.pdf.

²⁷ CR 2021 Broadband Survey at p.2.

other than their current provider. Another 30 percent said they had just one other provider to choose from other than their current provider.

Both anecdotal evidence and academic research indicate that robust, head-to-head competition leads to lower consumer broadband prices and better service. For example, it was reported that when AT&T entered the Kansas City market in 2015, it pledged to match the price and speed of Google Fiber's existing Gigabit offering, at the time priced at \$70 per month.²⁸ Similarly, in 2017, Comcast reportedly offered prices \$40 to \$50 lower for its Gigabit service in Longmont, Colorado, where it faced competition from a municipal fiber-optic network, LPC NextLight, than in nearby communities where it did not.²⁹

Not surprisingly, however, incumbent ISPs have generally been resistant to the entry of new competition into their markets. Some have mounted legal challenges intended to stop funding of potential competitors in underserved markets.³⁰ And some of these anti-competitive efforts have reportedly been fed by misinformation about the price and services offered by competitors.³¹ To make matters worse, 17 states have laws that restrict or make it difficult for localities to build their own broadband networks, adding another barrier to competition, according to MuniNetworks.org, an organization that supports the development of local broadband networks.³² Meanwhile, according to CR's 2021 broadband survey, three out of four Americans feel that municipal or community broadband should be allowed to compete with conventional ISPs.³³

²⁸ Ben Popper, "AT&T Announces It Will Match Google Fiber's Price and Speed in Kansas City," *The Verge*, February 2015, <https://www.theverge.com/2015/2/17/8050935/att-google-fiber-kansas-city-gigapower-internet-price-match>.

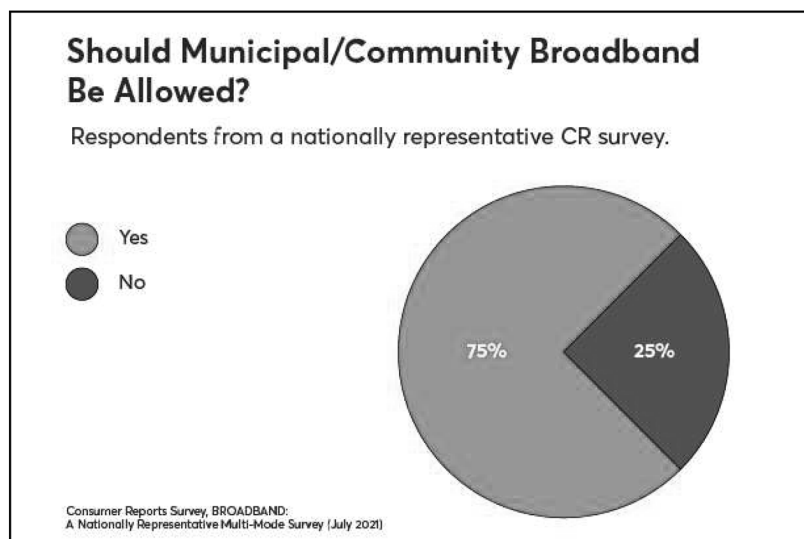
²⁹ Karen Antonacci, "Comcast rep caught spreading misinformation about Longmont's NextLight to Fort Collins," *Times-Call*, June 2017, <https://www.timescall.com/2017/06/22/comcast-rep-caught-spreading-misinformation-about-longmonts-nextlight-to-fort-collins>.

³⁰ Issie Lapowsky, "A poor Louisiana community won \$4 million for broadband. An ISP giant is standing in its way," *Protocol*, September 12, 2022, <https://www.protocol.com/policy/spark-light-east-carroll-broadband>; see also Ben Brody, "Bad broadband maps are keeping people offline, and everyone knows it," *Protocol*, January 4, 2022, <https://www.protocol.com/policy/deer-isle-broadband-maps>; see also Karl Bode, "Monopoly Internet Service Providers Mire Grant Process With Costly, Empty Challenges," *Institute for Local Self-Reliance*, December 22, 2021, <https://ilsr.org/monopoly-internet-service-providers-mire-grant-process-with-costly-empty-challenges>.

³¹ Karen Antonacci, "Comcast rep caught spreading misinformation about Longmont's NextLight to Fort Collins," *Times-Call*, June 2017, <https://www.timescall.com/2017/06/22/comcast-rep-caught-spreading-misinformation-about-longmonts-nextlight-to-fort-collins>; see also Maren Machles, "A Tale of Two Cities in Maine: Municipal Broadband and Misinformation," *Institute for Local Self-Reliance*, December 7, 2021, <https://ilsr.org/a-tale-of-two-cities-in-maine-municipal-broadband-and-misinformation>.

³² For an updated list of states that have laws that restrict municipal broadband networks, see <https://muninetworks.org/content/preemption-detente-municipal-broadband-networks-face-barriers-19-states>.

³³ CR 2021 Broadband Survey at p.8.

Figure 4.1

Findings Regarding the Effect of Competition

It was in this context that CR sought further data on the question of whether more broadband competition would benefit consumers, beginning with CR's 2021 broadband survey. That survey indeed suggests that the presence of multiple ISPs in a market leads to lower prices, specifically finding that Americans in markets with two broadband competitors reported paying about \$5 per month less for service than those with only one provider, and reported prices were lower still as the number of local competitors increased.³⁴

The current study produced similar results, as the table and graph below indicate. In Figure 4.2, the x-axis shows the number of providers represented among the respondents in each ZIP code; the y-axis, the average monthly price paid by respondents in those ZIP codes.

³⁴CR 2021 Broadband Survey at p. 2–3. See also: graphic on p.13 at https://advocacy.consumerreports.org/wp-content/uploads/2021/08/CR_Broadband-Survey_8_2021_VF.pdf.

Figure 4.2

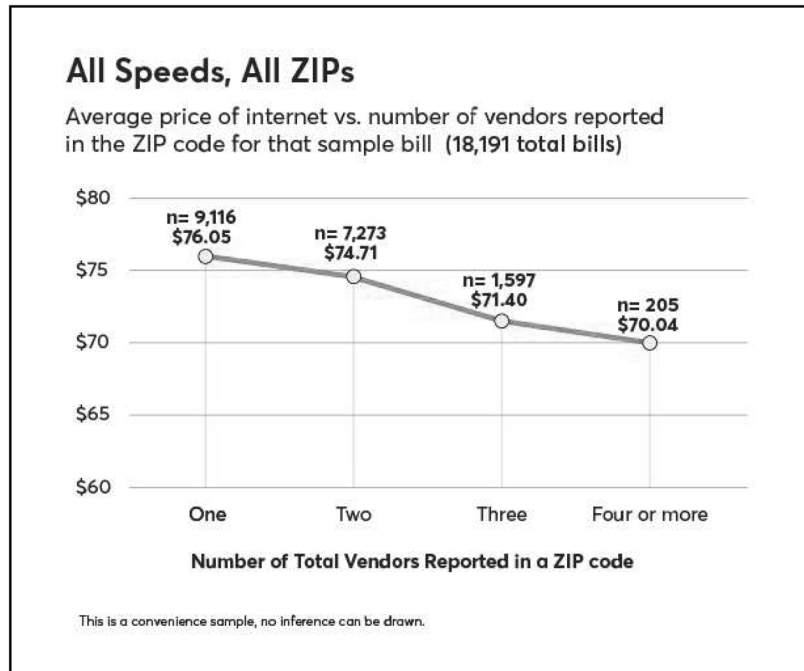


Figure 4.3

Vendors in a ZIP Code and Corresponding Sample Statistics

Reported Vendors	Bill Count	Mean Price	Median Price
1	9,116	\$76.05	\$74.99
2	7,273	\$74.71	\$74.99
3	1,597	\$71.40	\$70.00
4 or 5	205	\$70.04	\$65.00

Note: This is a convenience sample, no inference can be drawn.

We should be clear about the limitations of our data in this context. We cannot, based on the current study, know for certain how many ISPs operate in these ZIP codes, only how many ISPs were represented among the people who volunteered for our study. Nor do we know that all the consumers in ZIP codes with multiple ISPs

actually have a choice between that number of ISPs because access to a given ISP's service can vary from street to street or even building to building.

Nonetheless, it's notable that these findings closely mirror CR's earlier survey results. And the large number of bills from ZIP codes with one, two, and three providers puts the general trend line on firm statistical ground.

One additional finding of this study is worth emphasizing in the context of broadband competition: Numerous ISPs do not impose data caps uniformly across their coverage territory. This is notable in part because of a 2020 episode in which Comcast, a longtime user of data caps in its Midwestern and Western markets, announced it would begin using them in its Northeastern markets for the first time.³⁵ However, after public outcry including vocal opposition by Pennsylvania attorney general Josh Shapiro, the company postponed implementing the plan and, to date, has yet to expand data limits into the Northeast.³⁶ As noted by *MarketWatch*, "Comcast operates in 39 states and had begun enforcing the caps in 27 of them," but the 12 states and the District of Columbia in its Northeast region remain data cap-free as explained above.³⁷ Noteworthy is that Comcast faces head-to-head competition for its broadband service from cap-free Verizon Fios in most of those states, but not in those where it imposes a cap.³⁸

V. Reliability and Satisfaction

The optional survey we asked participants to complete included questions about the reliability of, and their overall satisfaction with, their Internet service.

Respondents were asked to rate the reliability on a scale of *excellent*, *very good*, *good*, *fair*, *poor*, or *very poor*. They were asked to rate their overall satisfaction with their Internet service, when considering all factors including price, customer service, and connection speed, on a scale of *completely satisfied*, *very satisfied*, *somewhat satisfied*, *somewhat dissatisfied*, *very dissatisfied*, or *completely dissatisfied*.

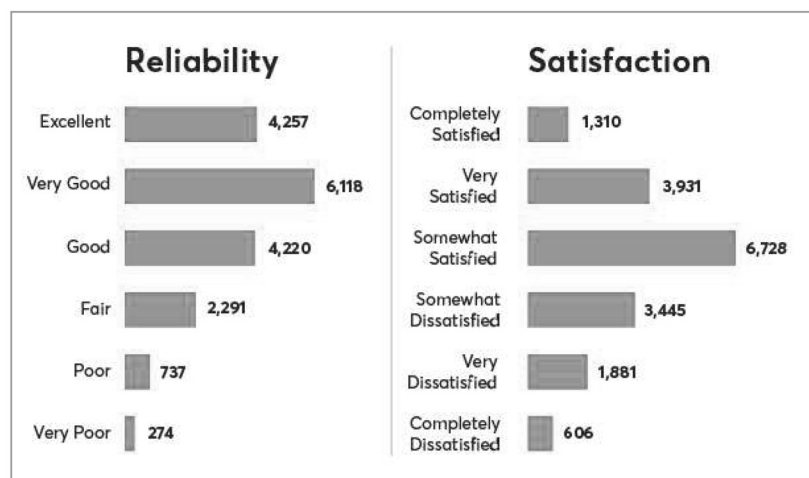
The results of this survey are shown in Figure 5.1, below.

³⁵The introduction of data caps in Comcast's Northeastern service territory was first reported by the online publication *Stop the Cap!* on November 23, 2020, citing new language on Comcast's customer service FAQ page: "Customers in select markets can take the months of January and February to understand how the new 1.2TB Internet Data Plan affects them without additional charges," Comcast wrote on its new customer FAQ page. "We'll credit your bill for any additional data usage charges over 1.2TB during those months if you're not on an unlimited data plan. It does not apply to Xfinity Internet customers on our Gigabit Pro tier of service, Business Internet customers, customers with Prepaid Internet, or customers on Bulk Internet agreements." Available at <https://stopthecap.com/2020/11/23/breaking-news-comcast-introducing-1-2-tb-data-cap-in-northeast-mid-atlantic-regions/>. See also Kim Lyons, "Comcast to impose home Internet data cap of 1.2TB in more than a dozen U.S. states next year," *The Verge*, November 23, 2020, <https://www.theverge.com/2020/11/23/21591420/comcast-cap-data-1-2tb-home-users-internet-xfinity>.

³⁶"At AG Shapiro's Urging, Comcast Delays New Data Thresholds," press release, Office of Attorney General Josh Shapiro, February 3, 2021, <https://www.attorneygeneral.gov/taking-action/at-ag-shapiros-urging-comcast-delays-new-data-thresholds>; see also Sean Hollister, "Comcast delays new data caps for at least another year, which is weird because it should be forever," *The Verge*, December 16, 2021, <https://www.theverge.com/2021/12/16/22840165/comcast-data-cap-delay-isp-dec-2021>; see also Jeff Baumgartner, "Comcast will keep data caps out of the Northeast in 2022," *Light Reading*, December 15, 2021, <https://www.lightreading.com/cable-tech/comcast-will-keep-data-caps-out-of-the-northeast-in-2022/d/d-id/774117>.

³⁷Jacob Passy, "Comcast won't charge if you go over your Internet data limit—but only if you live in this part of the country," *MarketWatch*, February 4, 2021, <https://www.marketwatch.com/story/comcast-will-delay-caps-on-home-internet-use-but-only-if-you-live-in-this-part-of-the-country-11612378152>.

³⁸Ry Crist, "Xfinity vs. Verizon Fios: Comparing Home Internet Services for Your Household," *CNET*, June 2, 2022, <https://www.cnet.com/home/internet/comcast-xfinity-vs-verizon-fios/>.

Figure 5.1

These numbers give a generally positive impression of the industry, with a large majority (82 percent) of consumers rating the reliability of their Internet connection good or better and 66 percent saying they are “somewhat” or more satisfied.

Some interesting nuances emerged when we plotted the relationship between the two questions, with the satisfaction values on the y-axis and the reliability values on the x-axis, as shown in Figure 5.2 below.

Figure 5.2

Reliability vs. Satisfaction							
Counts of responses							
		Satisfaction					
		Completely Dissatisfied	Very Dissatisfied	Somewhat Dissatisfied	Somewhat Satisfied	Very Satisfied	Completely Satisfied
Reliability	Excellent	14	77	225	1,023	1,705	1,213
	Very Good	43	269	852	2,893	1,967	94
	Good	77	421	1,186	2,291	242	3
	Fair	120	614	1,035	505	17	0
	Poor	144	432	145	16	0	0
	Very Poor	204	68	2	0	0	0

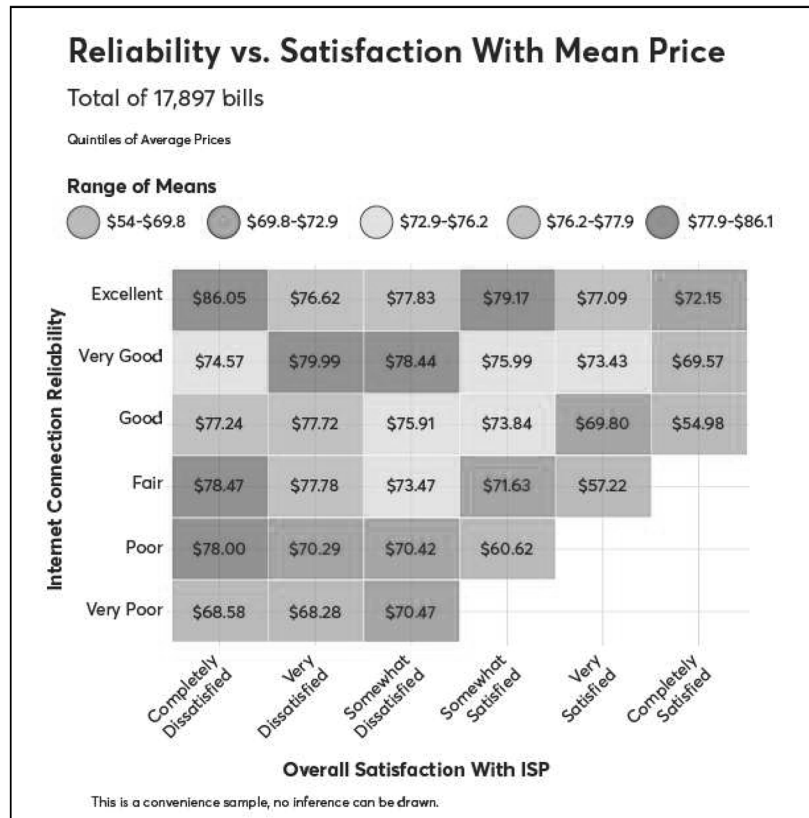
This allows one to see, for example, that 204 respondents characterized the reliability of the service as “very poor” and their satisfaction level as “completely dissatisfied”—a correspondence that makes intuitive sense. The lower right and upper right quadrants similarly make intuitive sense: It’s easy to understand why no deep-

ly satisfied respondents reported poor or very poor reliability, and why many customers with excellent reliability would report being completely or very satisfied.

The upper left quadrant, however, where low satisfaction scores overlap with high reliability ratings, is harder to understand. One would think reliable service would correspond with relatively high satisfaction levels, but in fact more than 3,000 respondents rated the reliability of their Internet connection as “good” or better but overall were “somewhat dissatisfied” or worse. Why would that be?

Price seems to have been an important factor. When we broke the price ranges into quintiles and color-coded the same grid by the average price paid by the respondents in each box (see Figure 5.3), it became clear that most of the high reliability/low satisfaction quadrant paid among the highest prices for their broadband service. To be more precise, eight out of the nine boxes in the quadrant were paying an average of \$75 or more a month for Internet service.

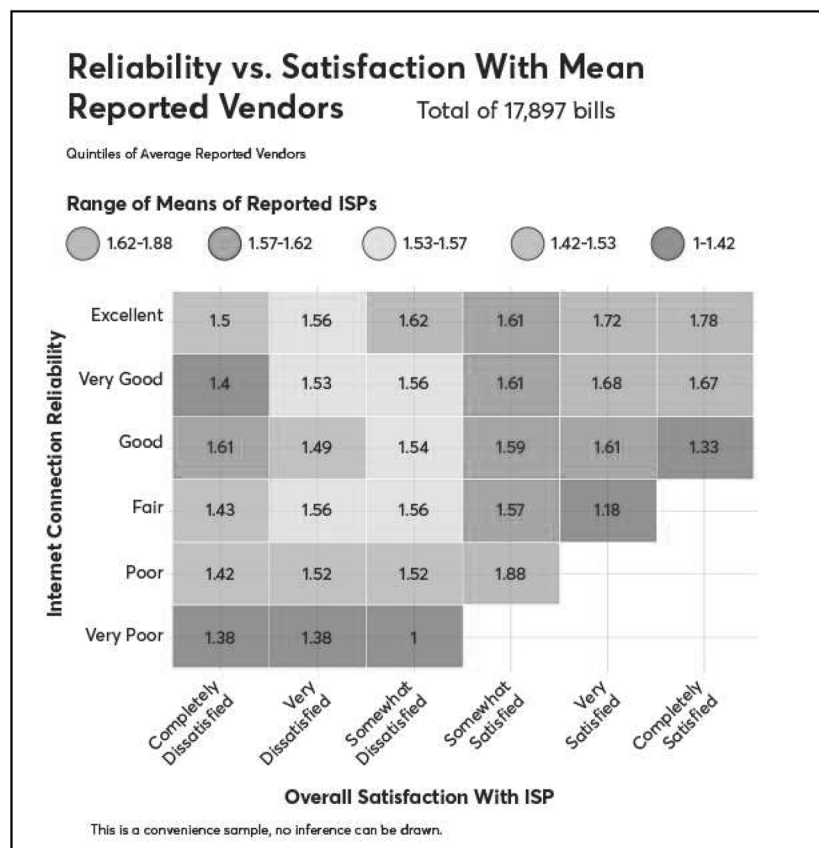
Figure 5.3



Consumer choice—or lack thereof—also seems to be a factor, which isn’t surprising given what we previously noted about the relationship between competition and price. When we color code the grid using the average number of ISPs competing for the respondents in that square (see Figure 5.4), the high reliability/low satisfaction quadrant (upper left) is populated by consumers with relatively few choices—while the high satisfaction/high reliability quadrant (the upper right) shows consumers who, on average, have more choice of ISPs.

It is worth noting that the overwhelming majority of the bills we analyzed were from ZIP codes with only one or two ISPs (16,389 out of 18,191 bills with identifiable ZIP codes, see Figure 4.3), so although these averages may seem close in value, the differences are statistically meaningful.

Figure 5.4



To summarize, these findings suggest that:

- many consumers who rate their service as relatively reliable are, at the same time, relatively dissatisfied overall with their Internet service, and this pattern correlates with relatively high service prices and a relative lack of local broadband competition; and
- consumers who rated their broadband service as highly reliable and were “very satisfied” or “completely satisfied” overall with their service generally live in areas with relatively robust broadband competition and generally pay lower prices for their broadband service.

Combined with the evidence that broadband competition leads to lower prices, we assert that competition can lead to happier consumers as well.

VI. Policy Implications

The COVID-19 pandemic not only increased the importance of broadband access and affordability but also spurred the Federal government to make historic investments to expand Internet service in unserved and underserved areas, and launch efforts to help all consumers afford broadband. Care should be taken to ensure the money is spent wisely and addresses the problems—high prices, confusing bills, scarce competition, lack of regulatory oversight—present in the broadband marketplace.

CR recommends the following as potential solutions:

Make the broadband “nutrition” label easier to find

Last year, Congress mandated that the FCC develop and implement a standardized consumer broadband label with the goal of bringing greater price transparency and uniformity to the broadband market. The label is to be based on an earlier version proposed by the Commission in 2016, which in turn had been modeled on the standardized nutrition label created by the U.S. Food and Drug Administration. The law will require ISPs to display the label “to disclose information” to consumers regarding their broadband plans. CR has long supported the effort.

Will the FCC’s consumer broadband “nutrition” label help clear up some of the billing confusion identified in this report? Because the label will require clear disclosures of pricing information, discounts, fees, and Internet performance, it may.

The single best way the Commission could ensure that the maximum number of consumers will see and benefit from the label would be to require it to appear on every monthly broadband bill. If the label is displayed only on ISP websites and marketing materials—and not on monthly bills—CR and other consumer advocates fear that many existing customers will never see or derive any benefit from the label. The same could be true if the label is buried in fine print or merely linked to by hyperlink. For that reason—and especially in light of this report’s findings about confusing billing practices and the lack of information on ISP bills—the FCC should adopt our recommendation to require the label on monthly ISP bills. The agency clearly has the authority to do so.

CR also argues that the labels should be machine-readable. A machine-readable label would better enable regulators, researchers, consumer advocates, and others to track and compare pricing across hundreds of ISPs, and potentially make it easier for consumers to compare the prices and service offerings of competitors in their communities.

For more on CR’s broadband nutrition label recommendations, see our comments in the FCC docket.³⁹

Require data cap justification

Data caps that lack a clear justification unnecessarily discourage Internet use and increase prices, both by overage fees when caps are exceeded or by unlimited data allowance charges (sometimes as high as \$50) that consumers choose to pay to avoid worrying that their data use could trigger overage fees. To tackle the harms posed by data caps in the fixed broadband market, CR publicly supported the introduction of the Uncap America Act, introduced by Sens. Ben Luján and Cory Booker earlier this year.⁴⁰ The legislation would, among other things, forbid ISPs from imposing data caps unless they could supply a technical justification to the FCC.

Encourage broadband competition

There is no easy way to increase competition in areas where consumers are saddled with a monopoly provider and high prices. But two widely discussed policy changes could begin to address the problem: One, policymakers could permit and support the creation of municipal broadband networks; and two, they can more thoroughly scrutinize—and, where appropriate, put a stop to—legal challenges and other efforts by incumbent ISPs to thwart new competition in underserved areas.

Strengthen FCC oversight

Finally, the FCC should reassert its regulatory authority over the broadband Internet service industry. The Commission could do this on its own, or Congress could intervene. Many of the ills identified in our study could be better addressed if the FCC asserted jurisdiction over broadband as a telecommunications service, which would give the Commission broader powers to ensure non-discriminatory access to broadband, monitor price-gouging, bar anti-consumer business practices, and better address price and fee transparency.

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³⁹ Comments of Consumer Reports (with Public Knowledge and Common Sense Media), CG Docket No. 22–2 (March 9, 2022). Available at: <https://www.fcc.gov/ecfs/document/1030968554762/1>.

⁴⁰ Jonathan Schwantes, “Consumer Reports supports the Uncap America Act to limit unnecessary Internet data caps,” press release, Consumer Reports Advocacy, July 21, 2022, https://advocacy.consumerreports.org/press_release/consumer-reports-supports-the-uncap-america-act-to-limit-unnecessary-internet-data-caps.

lead this cross-functional effort from the very start. Jen Shecter, Senior Director and Acting Head of Content, also played a vital leadership role in making this work possible. Suman Veeramalla, Senior Director and Chief Data Officer, led the data engineering work. Amira Dhalla, Director of Impact Partnership, and Alan Smith, Manager of Community Leadership, helped build and organize the coalition of partner organizations who supported and participated in the Fight for Fair Internet campaign. David Butler, Senior Director, and Cyrus Rassool, Associate Director, coordinated and led the strategic communications work. Andy Bergmann, Director of Design and Data, and Chris Griggs, Associate Director, were responsible for all the data visualization and graphics included in this report.

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Appendix A: Detailed Methodology

Consumer Reports' Fight for Fair Internet campaign collected a sample of more than 22,000 Internet service provider (ISP) bills with corresponding Internet speed tests and surveys from volunteers across the country. Bills were collected between July 2021 through December 2021. Although the sample is impressive and groundbreaking—it includes bills from every state and territory in the United States and covers nearly 700 Internet service providers—it is a convenience sample, and as such, no statistical inference can be drawn, only observations.

We extracted the data from the collected bills using an OCR machine. This first capture of the data provided sufficient descriptions of bill line itemizations and corresponding charges to enable robust feature engineering. Thus, we employed this data to investigate vendors, the features of their advertised packages, and the corresponding charges on consumers' bills. Wherever possible, we verified and augmented our data with publicly available information provided by our partners at *broadbandnow.com*.

From this work, we identified hundreds of ISPs and captured as much corresponding information for each as possible.

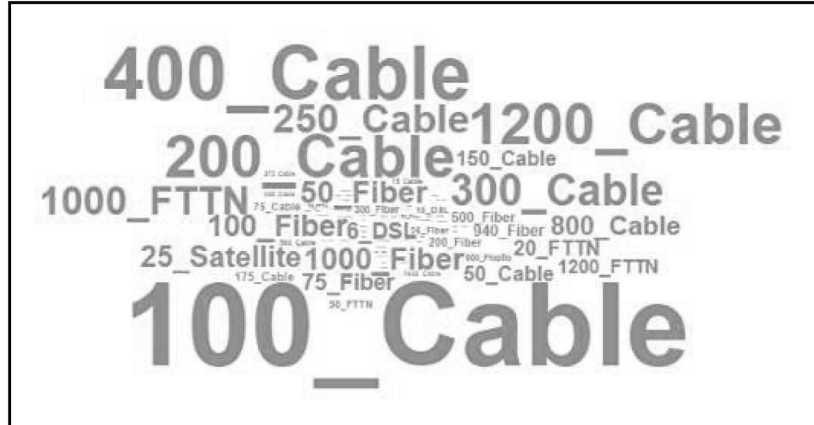
Upon completion of this intense investigation into providers, we built a hierarchical classification structure for the bill line itemizations in the sample with the goal of finding and extracting all charges relating to wired internet. To this end, our internal subject matter expert and data science team collaborated closely to ensure all charges relating to TV, video, wireless internet, fixed wireless internet, landline phones, and special Internet services (*e.g.*, business and seasonal internet) were classified accordingly for easy removal from the sample data prior to analysis. Although we encountered many taxes and government-imposed fees, both general and relating to specific services, we classified them accordingly and removed them from the sample data prior to analysis, because they are often not itemized or allocated to a specific service.

Through this classification work, we discovered hundreds of Internet packages offered to consumers, ranging from 0.8 Mbps download speed DSL packages to 2GB per second download speed fiber packages. In total, we found more than 10 Internet connection types, *e.g.*, fiber, fiber-coax, satellite, DSL, etc., corresponding to more than 50 Internet download speeds in the sample, which highlighted the presence of more than 160 combinations of connection types and download speeds for Internet packages.

Figure 1 below displays a word-cloud of the combinations of connection types and speeds found in the sample. We isolated all Internet package prices whenever an

itemization of the service charges were provided on the bill—we considered the package charge plus any additional charge for increased speeds as the Internet package price—and classified them accordingly. Note that we classified and removed bundle charges and do not have corresponding Internet prices for bills for a bundled service where an itemization of the service charges was not provided on the bill.

Figure 1



In addition to identification and subsequent second-level classification of Internet prices, we created second-level classifications of equipment fees and company-imposed fees. The Internet equipment fees were further split into satellite equipment fees and modem, router, and related WiFi fees. The company-imposed fees subset consists of data and usage fees; DNS and IP fees; miscellaneous fees like activation fees, late fees, and shipping and handling fees; and Internet and network fees. Each charge classified as an Internet and network fee was thoroughly investigated by our internal subject matter expert and data science team prior to being classified as such. We chose to exclude Internet support fees, Internet protection fees, wire maintenance fees, and wire protection plan fees from company-imposed fees because we believe most are optional services.

See Figure 2 below for the full classification structure we built to capture such fees; Internet equipment is its own classification. In particular, see Table 1 below to see which vendors are charging Internet and network fees (which are explained in the report).

Figure 2

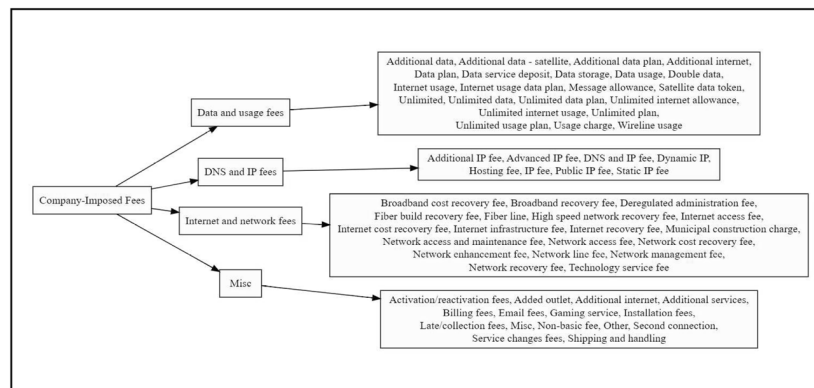


Table 1

Vendor	Count of Bills With Fee	Name of Fee
Frontier Communications	525	Internet Infrastructure Fee
Optimum	438	Network Enhancement Fee, Network Access Fee
RCN	298	Network access and maintenance fee, Municipal construction charge
Suddenlink	264	Network enhancement fee
Verizon	230	Municipal construction charge
Wave Broadband	140	Internet infrastructure fee
Windstream	109	Deregulated administration fee
Metronet	98	Technology service fee
Atlantic Broadband	65	High speed network recovery fee, Network recovery fee
Consolidated Communications	61	Broadband cost recovery fee, Fiber build recovery fee
Centurylink	52	Broadband cost recovery fee, Internet cost recovery fee
Grande Communications	35	Network access and maintenance fee
Service Electric	30	Network access fee
GCI Communication	11	Network access fee
ImOn Communications	8	Internet infrastructure fee, Network access fee
South Slope Cooperative Communications	6	Internet infrastructure fee
WOW!	4	Network line fee
Blue Stream	3	Network recovery fee
Mtco Cable	3	Technology service fee
TDS Telecom	3	Broadband recovery fee
North State	2	Internet recovery fee
The Computer Works	2	Technology service fee
Vexus	2	Network access fee
Atla	1	High speed network recovery fee
CC Communications	1	Fiber line
Dfn	1	Network recovery fee
Homeland Optical Technology	1	Internet access fee
MTA Solutions	1	Network access fee
Solarus	1	Network enhancement fee
Total Highspeed	1	Network cost recovery fee
West Carolina Rural Telephone Cooperative- Inc.	1	Broadband recovery fee
Ziply Fiber	1	Network enhancement fee

While building the hierarchical classification structure outlined above, we manually extracted data from all bills in the sample to ensure robustness and accuracy of the data. We used the classified machine-extracted data to build ensemble classification models to quickly and efficiently classify the manually extracted data.

For model-building, model-classification, and all subsequent analyses and reports, we used the programming language *R* and its corresponding *IDE RStudio*. In particular, we employed the *tidymodels* package to build an ensemble of local binary classifiers for speed and accuracy. We included Logistic, KNN, Random Forest, and XGBoost classifiers in the ensemble. Each was individually tuned to the first-level classification of Internet and then put into the ensemble, which was again tuned and then applied to each of the nine first-level binary classifications. See the resultant confusion matrices in Figures 3 and 4 below that show the performance of the models on the manually extracted data for two of the first-level classifications.

Figure 3

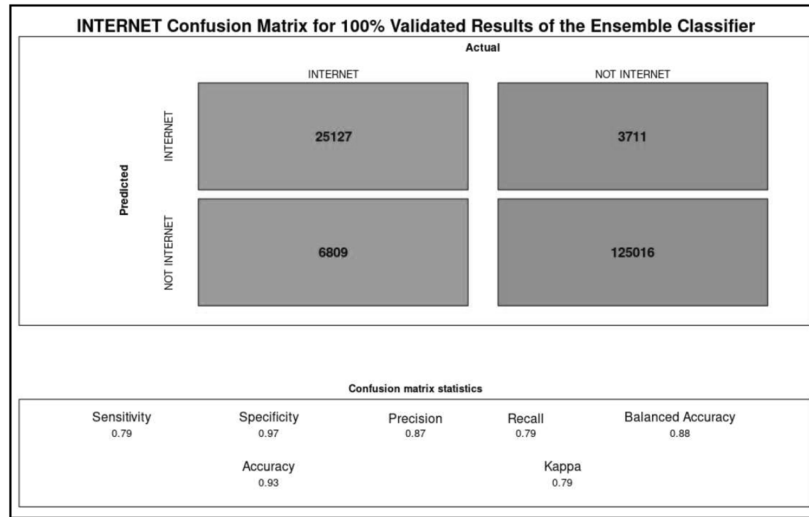
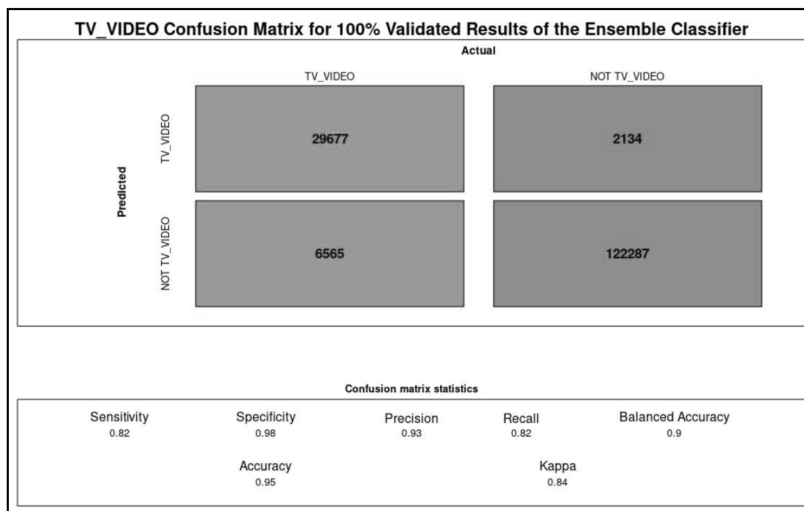


Figure 4



Given the results of the first-level classifiers and that the classification structure was engineered to have the same few second-level classifications for each provided service, we chose to build only an XGBoost model for the second-level classifier. Al-

though via subsequent validation, we extracted, further classified, and analyzed only Internet data, we tuned this second-level classifier using all of the machine-extracted data and applied it to all of the manually extracted data.

Due to sample size constraints given the complexity of the remaining structure, our data science team completed the bottom-level classifications manually. This process included 100 percent manual validation of the model classifications for the first two classification levels, followed by manual classification of the next two classification levels. Note all classification work on the manually extracted data was done by the same team that built the initial structure from the machine-extracted data to ensure consistency and accuracy of data classification and subsequent representation.

All analyses for resultant reports are completed with the validated ML-classified manually extracted data.

Appendix B: List of Partner Organizations

The following organizations help launch the Fight for Fair Internet campaign in 2021.

- American Economic Liberties Project
- American Library Association
- Amerind
- Benton Institute
- BroadbandNow
- Color of Change
- Connect Humanity
- Consortium for School Networking (CoSN)
- Detroit Community Technology Project
- Fair Count
- Impremedia
- Institute for Local Self-Reliance (ILSR)
- Library Futures
- MediaJustice
- M-Lab
- Mozilla Foundation
- National Consumers League
- National Digital Inclusion Alliance
- Open Technology Institute at New America
- Next Century Cities
- NTEN: The Nonprofit Technology Enterprise Network
- Oishei Foundation
- Public Knowledge
- Public Utility Law Project of New York (PULP)
- Rural Assembly (Center for Rural Strategies)
- Southern California Tribal Chairman's Association
- State EdTech Directors Association (SETDA)
- United Church of Christ (Media Justice Ministry)
- X-Lab

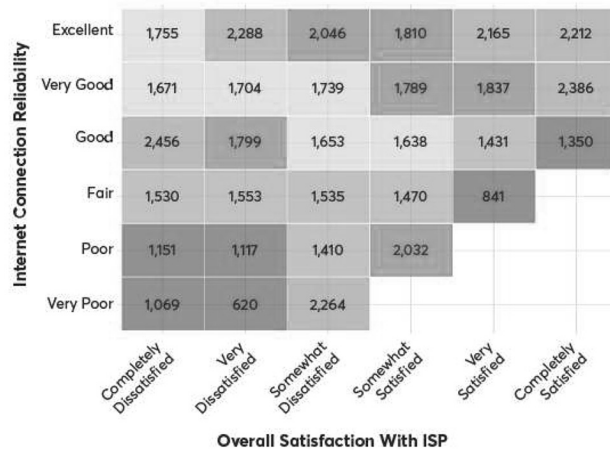
Appendix C: Comparing Rural vs. Urban Satisfaction and Reliability Ratings

Rural vs. Urban Analysis: Satisfaction and Reliability Ratings

Total of 17,897 bills

Mean reported vendor cuts are determined by the quintiles of the mean reported vendor averages.
Recall that nearly 16K bills are from a ZIP code where there is only 1 or 2 reported vendors.

Mean Density



This is a convenience sample, no inference can be drawn.

Appendix D: Comparing Satellite Internet Service Providers

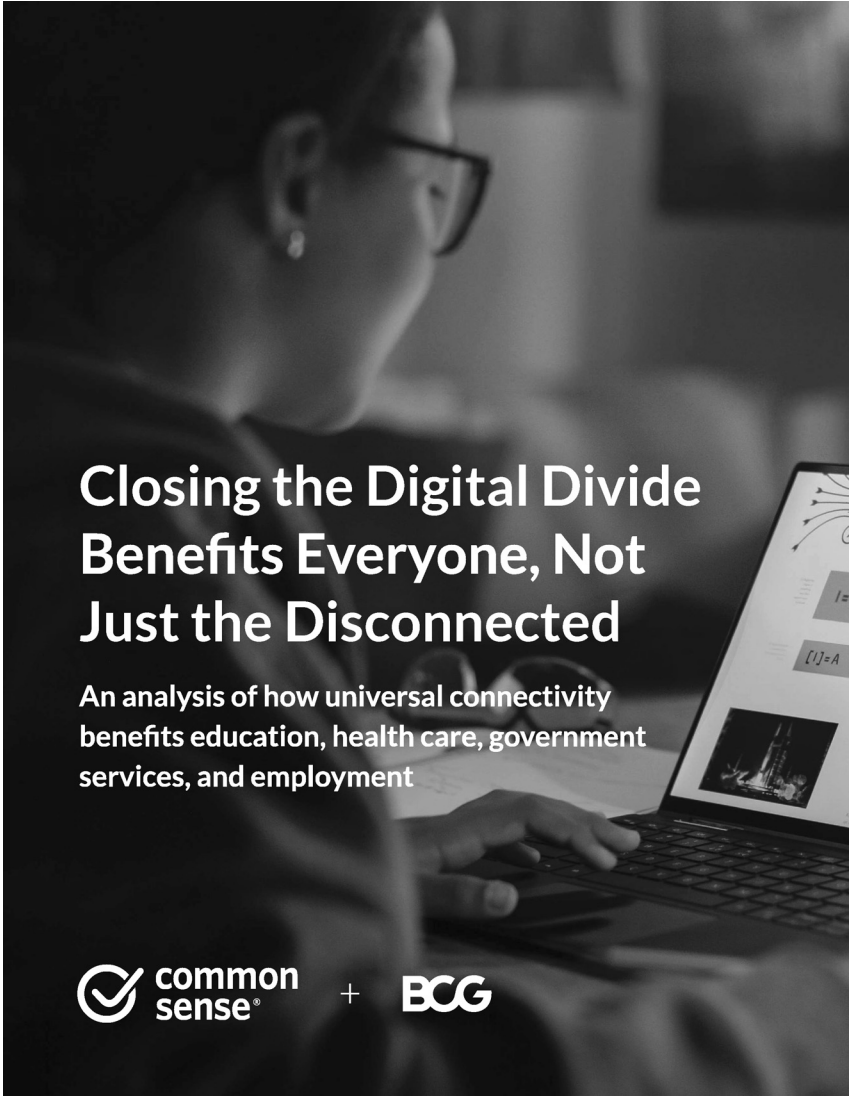
Monthly Price for Internet Service

ISP	Mean Price	Median Price
Viasat	\$117	\$100
Starlink	\$99	\$99
HughesNet	\$88	\$70

Monthly Cost of Equipment Fees

ISP	Percent of Bills With Equipment Charge	Mean Price	Median Price
Viasat	87%	\$10	\$10
HughesNet	61%	\$14	\$15
Starlink	0%	\$0	\$0

Note: At the time of this publication, Starlink was charging a one-time \$599 equipment charge in lieu of a monthly rental fee. See <https://www.starlink.com/> for more information.



Closing the Digital Divide Benefits Everyone, Not Just the Disconnected

An analysis of how universal connectivity
benefits education, health care, government
services, and employment



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ABSTRACT

Institutions, including schools, hospitals, and governments, have a duty to make their services universally accessible. This duty means that these institutions are unable to fully integrate internet-based technologies into their services because doing so would effectively deny service to people who cannot access the internet.

However, if states can ensure that all people have access to the internet, then institutions will be able to integrate internet-based technologies into their services, improving them for the benefit of all. In this way, closing the digital divide benefits everyone, even households that already have connectivity. Moreover, by shifting the majority of their users online, institutions will be able to specialize their remaining offline services to the unique needs of their most vulnerable and disconnected users.

Closing the digital divide benefits everyone, even households that already have connectivity.

This report explores how this dynamic affects four institutional services: education, health care, government services, and employment. Specifically, the report examines how these services are improved through the integration of internet-based technologies; which types of Internet infrastructure result in the greatest improvements to institutional services; and how universal access to high-quality internet—the pre-condition to allow integration of internet-based technologies—can be achieved using recent Federal funding opportunities.

The passage of the American Rescue Plan Act and Infrastructure Investment and Jobs Act has given state governments the opportunity to close their digital divides once and for all. If states are successful, they will not only bring connectivity to the disconnected, they will allow institutions to improve the services that are central to much of our lives. This report is designed to give state governments the information they need to make this a reality.

INTRODUCTION

The Internet is valuable because of what it enables

Imagine you're the administrator of a school district. Your goal is to help students recover from pandemic-era learning loss and prepare them for success in the modern, digital world. You've identified a promising new curriculum that uses online modules to tailor lessons to individual student needs. This curriculum has proven very successful in other districts—students find it engaging and educational, administrators find it easy to use and customize, and teachers find that it lessens their workloads, allowing them to spend more time with students who need individual attention. However, research has shown that at least 16 million students are caught in the persistent digital divide,¹ including nearly a quarter of the students in your district. These students don't have access to home internet service, which is needed to use this curriculum's online assignments, modules, and other internet-based features. What do you do?

If you use the curriculum, the majority of students will benefit. Average scores will improve, family satisfaction will increase, and the need for tutoring and summer programs will decline. However, the benefits will not be equitably distributed, and students without home Internet will struggle. These students will have to use their parents' or caregivers' phones as an Internet hotspot, which can be prohibi-

¹ Common Sense Media and Boston Consulting Group. (2020). *Closing the K–12 digital divide in the age of distance learning*. https://www.common SenseMedia.org/sites/default/files/featured-content/files/common_sense_media_report_final_7_1_3pm_web.pdf.

tively expensive; find free public Wi-Fi, which can mean hours spent in libraries or parking lots; or simply resign themselves to missing parts of the curriculum. These students will fall behind while their more connected peers make rapid progress.

On the other hand, if you don't use the curriculum, then all students will suffer from the missed opportunity. Your district may fall behind others that adopt the curriculum, your teachers will struggle to meet the disparate impact of learning loss, and your students will spend their time learning to use textbooks rather than computers. In short, all students will be denied the best education available at a time when it is needed most.

Both options have downsides, and yet these are the choices many school administrators face because the best educational tools require the internet.

Luckily, there is now a third option: give every student home Internet access. Challenging as it may sound, this option is now possible because of a series of Federal laws passed in 2021. These laws have the potential to ensure that every single student has access to high-quality Internet at home. If this is achieved, school administrators can implement the best and most cutting-edge curricula available without leaving any students behind.

This report explores how to make this third option a reality. The central point of the report is that, by ensuring every household is connected to high-quality internet, public institutions—like schools, but also health care providers, governments, and employers—can make full use of internet-based technologies, improving both online and offline services for the benefit of everyone.

The report is separated into three sections:

Section 1: How Institutions Use Connectivity

In the first section, we highlight how the digital divide affects four essential services—education, health care, government services, and employment—and the institutions that provide them. We find that, despite the potential for service improvements and cost savings, institutions do not make full use of internet-based technologies because institutions cannot expect the populations they serve to have universal access to high-quality internet. Conversely, when institutions are confident that their populations have Internet access, they improve their services using internet-based technologies. In this way, closing the digital divide benefits everyone, not just the disconnected.

Institutions do not make full use of internet-based technologies because institutions cannot expect the populations they serve to have universal access to high-quality internet.

Section 2: The Infrastructure Required to Innovate Essential Services

In the second section, we analyze how government decisions about the infrastructure of the Internet affect the services offered by institutions. When the physical infrastructure of the internet—wires, switches, and towers—are of low quality, then the services carried by this infrastructure suffer. *We find that fiber infrastructure delivers the highest-quality services at a level of scale, consistency, and affordability that ensures institutional services remain universally accessible.* Fiber should be the first choice for deployment where it is not cost prohibitive. If fiber cannot be deployed, cable should be used. Only when neither is viable should fixed wireless be considered. In general, wired technologies, such as fiber and cable, have better reliability, lower ongoing operating costs, and faster latency than fixed wireless technologies.

Fiber should be the first choice for deployment where it is not cost prohibitive.

Section 3: How Federal Funds Can Close the Digital Divide and Ensure Equitable Access to Essential Services

In the third section, we explain how recent Federal laws make it possible for states to give all households access to high-quality Internet services. We focus on the two most prominent laws: the American Rescue Plan Act (ARPA) and the Infrastructure Investment and Jobs Act (IIJA). *We find states can best implement these acts' more than \$80 billion in broadband funding by taking five key actions.* States should 1) build state administrative capacity in preparation for the programs; 2) collect data on the size, locations, causes, and consequences of the state's digital divide; 3) incorporate community stakeholders and institutions into the broadband planning process; 4) promote benefit programs that enable lower-income and digitally divided households to get online; and 5) ensure the state's legal and regulatory systems are conducive for sustainable broadband adoption.

Recent Federal laws make it possible for states to give all households access to high-quality Internet services.

SECTION 1: HOW INSTITUTIONS USE CONNECTIVITY

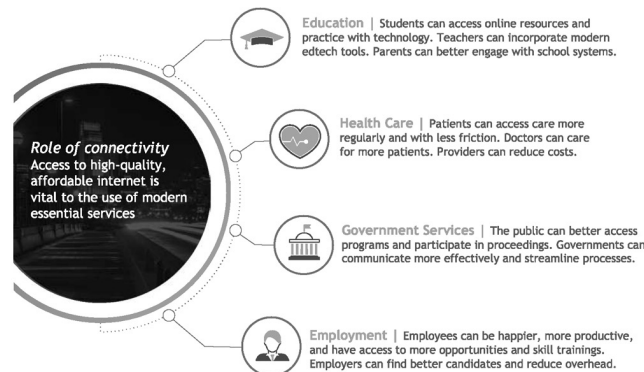
The Internet at its best

From the perspective of governments, there are strong equity and economic reasons to close the digital divide, and the long-term financial returns of connectivity far exceed the cost to provide it. At the national level, addressing the digital divide would increase labor productivity by 1.1 percent—a \$160 billion boost to annual GDP.² Locally, broadband deployment can generate three- to four-fold economic returns over the initial cost of investment.³

At the institutional level, universal access to affordable, high-speed Internet can allow governments and institutions to modernize essential public services while also ensuring equitable access throughout a community, city, or state. The central benefit is that internet-based services facilitate human-to-human interactions. Whether through video calls, collaborative software, VR, or other applications, high-quality Internet makes it easier for people to connect with those who can provide essential services. As highlighted in Figure 1, this section explores how connectivity affects four such services:

1. Education
2. Health Care
3. Government Services
4. Employment

FIGURE 1. The four essential institutional services



Education. Students have better access to teachers, tutors, information sources, platforms for content creation and sharing, and collaborative workspaces. Teachers can employ edtech tools and advanced technology (AR/VR), individualized curricula, and comprehensive grading and feedback systems, and they can better collaborate with parents and caregivers. Schools can better accommodate computers and modern student data systems, student mobility, disability access, and disruptions during emergencies.

“Achieving universal broadband coverage will make communities more competitive economically, make them healthier, and improve educational access. If we are serious about competing in today’s global economy and recruiting the best talent to come to our state and keeping our children where they grew

²National Bureau of Economic Research. (2021). *Internet access and its implications for productivity, inequality, and resilience*. <https://www.nber.org/papers/w29102>.

³Grant, A., Tyner, W. & DeBoer, L. (2018). *Estimation of the net benefits of Indiana statewide adoption of rural broadband*. Purdue University and Center for Regional Development. <https://perd.purdue.edu/wp-content/uploads/2018/12/006-RPINsights-Indiana-Broadband-Study.pdf>.

up, then we must do everything in our power to end the digital divide.”—
Governor Laura Kelly of Kansas

Health Care. Patients have better access to services, telemedicine, medication maintenance, and appointment scheduling, and these conveniences increase health care usage. Doctors, particularly mental health specialists, are able to see more patients, serve more remote areas, and interact with patients on a more regular basis. Clinics and hospitals can integrate remote health monitoring technologies, reduce costs, increase likelihood of early diagnosis, and decrease wait times.

Government Services. Households can more easily use benefit programs, submit service requests, and participate in government proceedings. Governments can improve the speed and efficiency of their services, improve mass communication and program awareness, and reduce reliance on costly in-person infrastructure. These improvements increase trust in government.

“In today’s world, reliable broadband is as essential as water and electricity. This expansion will be transformative for Tennessee families and businesses by removing barriers to commerce, health care, and educational opportunities, as well as other necessities of modern life.”—State Representative Patsy Hazlewood

Employment. Remote workers are more satisfied and productive, and easier to retain. Job seekers have more opportunities, and employers can find better candidates. Connectivity has been shown to increase employment rates, earnings, job skills, and corporate diversity.

“This round of improvements will help people who need high-speed Internet to work remotely, allow students to do their homework, give our seniors access to the telehealth options they need, and businesses the ability to compete on the world stage. The possibilities go on and on, and West Virginians everywhere deserve the best access possible.”—Governor Jim Justice of West Virginia

The Role of Offline Solutions

The transition to universal Internet service will take time, and during this period, institutions must continue to offer robust offline services to ensure equitable access. But even if every home eventually gets access to high-quality internet, persistent income inequality and barriers to acquiring digital skills will mean that there will always be some portion of the population that needs offline services (see Figure 2).

However, if institutions can shift the majority of their users to online services, then they can specialize their offline services to the unique needs of this persistently offline population, which often has additional challenges beyond a lack of connectivity. In this way, universal connectivity allows institutions to improve both their online and offline services by more efficiently allocating resources.

In this way, universal connectivity allows institutions to improve both their online and offline services by more efficiently allocating resources.

Additionally, institutions may encounter disruptions in internet service that require them to use offline services. For example, Internet service may be disrupted due to natural disasters, requiring students to quickly shift to offline learning. In such cases, the offline options should have a similar user experience to the online option to ensure that students can easily continue their studies without requiring training in a new system.

Similarly, an inability to afford service can disrupt a home’s connectivity. Educators know that the rising cost of Internet service and fluctuations in a home’s income can mean that some families will not be able to consistently afford a level of service that supports online education. New Federal programs will reduce this possibility, but until these programs are fully implemented, any online curricula should be supplemented with offline or low-bandwidth material. This alternative should be downloadable while on a school or library network or by distributing laptops with preloaded content.

It is important to stress that institutions have a strong preference for online solutions, as they are more flexible, effective, and enable multidirectional communication between the institutions and their audience. However, even in a fully connected world, offline solutions will have a role to play, but they will evolve from their current role as a generalized stopgap for anyone in the digital divide and instead become specialized services for those with low digital literacy and as emergency alternatives when Internet disruptions occur.

FIGURE 2. Offline solutions will continue to play a role in ensuring equitable access

Use case	Examples
 Broadband stopgap	- No broadband infrastructure exists - Broadband service is not affordable - Lack of affordable or adequate online services (e.g., edtech platforms)
 Complement to online	- Hybrid online platforms and downloadable content (e.g., in education) - Integrated UX to allow seamless switching & usage in low bandwidth - Expanded range of mechanisms for engagement - Pre-downloaded content to shift easily offline (e.g., during travel) - Specialized or enhanced services (e.g., health care, education)
 Emergency situations	- Disruptions to internet access - Natural disasters (e.g., fires, earthquakes) - Need for immediate assistance

Education

Long before the pandemic, classrooms had increasingly embraced the role of technology. By 2019, investments in global edtech were nearly \$19 billion, and they are projected to reach \$350 billion by 2025.⁴ Pre-COVID-19, one-fifth of U.S. public schools already offered courses entirely online.⁵

The growth of online education in K–12 is expected to continue and become a permanent fixture in many schools. Between 20–30 percent of parents have expressed interest in continuing remote learning for their children post-COVID,⁶ and 30 percent of school districts and charter management organizations are considering or in the process of implementing an online or hybrid approach post-pandemic.⁷ *Even for students who are returning to traditional in-person classrooms, the use of online curricula and edtech tools will necessitate high-quality connectivity at home.*

This increased interest in online curricula is warranted, given the potential to positively impact student outcomes, particularly in core reading and numeracy skills.⁸ Online curricula are effective because they adapt lessons to individual student needs, integrate one-on-one tutoring, and improve student engagement through interactivity and gamification.⁹ Moreover, the tools of online curricula are computers and the internet, not paper and textbooks, and so students develop skills with technology and digital citizenship that will benefit them for the rest of their lives.¹⁰ Online curricula also expand access to teachers and can address teacher shortages. For example, Tucson, Arizona, may hire remote math instructors to teach students in online classrooms for part of the day.¹¹ While not an optimal solution, this would allow the city to continue education until in-person teachers become available.

Online curricula also allow schools to respond to emergencies. This was exemplified prominently during the pandemic, but it can happen for numerous reasons. In New Jersey, schools went online in response to long-term storm damage to the

⁴Li, C. & Lalani, F. (2020). *The COVID-19 pandemic has changed education forever*. This is how. World Economic Forum. <https://www.weforum.org/agenda/2020/04/coronavirus-education-global-covid19-online-digital-learning/>.

⁵National Center for Education Statistics. (n.d.). *Fast facts: Distance learning*. <https://nces.ed.gov/fastfacts/display.asp?id=79>.

⁶Torchia, R. (2021). *Is virtual learning here to stay for K–12?* EdTech Magazine. <https://edtechmagazine.com/k12/article/2021/04/virtual-learning-here-stay-k-12-perfcon>.

⁷Congressional Research Service. (2021). *Remote learning for K–12 schools during the COVID-19 pandemic*. <https://sgp.fas.org/crs/misc/R46883.pdf>.

⁸Ganimian, A., Vegas, E. & Hess, F. (2020). *Realizing the promise: How can education technology improve learning for all?* Center for Universal Education at Brookings. <https://www.brookings.edu/essay/realizing-the-promise-how-can-education-technology-improve-learning-for-all/>.

⁹Vegas, E. (2022). *Education technology post-COVID-19: A missed opportunity?* Brookings. <https://www.brookings.edu/blog/education-plus-development/2022/03/11/education-technology-post-covid-19-a-missed-opportunity/>.

¹⁰PowerSchool. (2021). *The classroom guide to digital literacy in K–12 education*. <https://www.powerschool.com/blog/the-classroom-guide-to-digital-literacy-in-k-12-education>.

¹¹Natanson, H. (2022). *Never seen it this bad: America faces catastrophic teacher shortage*. Washington Post. <https://www.washingtonpost.com/education/2022/08/03/school-teacher-shortage/>.

school buildings;¹² in Philadelphia, they went online due to heat; and, in Jackson, Mississippi, they went online during a water crisis. When schools know their students have home Internet access, they can be more adaptable.

From an administrative perspective, universal connectivity allows schools to achieve a number of benefits. By purchasing at scale, districts can benefit from the cost efficiencies of bulk procurement and invest in enhanced procurement systems.¹³ For example, when the Maine Learning Technology Initiative (MLTI) conducted a procurement to connect all students, they established service-level agreements that included maintenance and repairs, ensuring greater sustainability of results and a provider focus on performance. Connecting all students through the same hardware and software enables better systems integration, better data-tracking of student usage and technology needs, and better student mobility between schools in the system. Technology integration even extends to student transportation—Wi-Fi-enabled school buses contribute to fewer behavioral incidents, safer bus rides, and lower driver turnover for student transportation.¹⁴ However, without universal connectivity, schools cannot reap these benefits.

This loss is particularly acute in the present climate, where many schools are implementing rigorous programs for learning recovery and remediation. Students in some districts may have lost the equivalent of 22 weeks of instruction,¹⁵ and this is expected to decrease their lifetime earnings by 2.5 percent per year. Given the number of affected students, this equates to nearly 13 percent of annual GDP.¹⁶ Therefore, helping students catch up on instruction and critical academic skills is essential, and Internet connectivity can help students access online learning and tutoring tools.

Lack of universal connectivity also inhibits schools from exploring cutting-edge educational technologies, such as those that tailor instruction and assessment through AI and use virtual simulations. Schools and universities have used VR in role-playing education exercises involving negotiation, as well as virtual labs to engage students in hands-on learning environments, and virtual campus spaces for students around the world to interact. There are also ways to leverage these technologies to help teach students with functional needs; some districts, for example, are beginning to use VR to help students with functional needs transition to new school environments more easily by allowing them to tour these spaces online ahead of time.¹⁷

Over 40 percent of Title I teachers do not assign work that requires Internet access because they fear that doing so would exacerbate inequalities.

Far from cutting-edge technologies, schools will struggle even to implement simple online applications when they aren't confident that all of their students have home Internet service. Over 40 percent of Title I teachers do not assign work that requires Internet access because they fear that doing so would exacerbate inequalities, and nearly 60 percent report that a lack of home Internet and computers limits student learning.¹⁸ This hesitancy, though necessary to ensure fairness among students, prevents all students from using one of the best educational resources ever created: the internet.

Spotlight: Washoe County School District

This Nevada district provides another example of the benefits of widespread connectivity in education settings. The district conducted a technology readiness survey and purchased 17,000 laptops and 6,000 hotspots for the disconnected fami-

¹²Grom, C. (2021). *1 of N.J.'s largest school districts to delay start after Ida flooding*. NJ.com. <https://www.nj.com/news/2021/09/1-of-njs-largest-school-districts-to-delay-start-after-ida-flooding.html>.

¹³Bazzaz, D. (2020). *Washington is buying \$24M worth of computer technology for students*. Seattle Times. <https://www.seattletimes.com/seattle-news/education/washington-is-purchasing-24-million-worth-of-computer-technology-for-students/>.

¹⁴School Transportation News. (2022). *Recorded webinar: Decrease behavior incidents & improve driver retention with school bus Wi-Fi*. <https://stnonline.com/multimedia/free-webinar-decrease-behavior-incidents-improve-driver-retention-with-school-bus-wifi/>.

¹⁵Kane, T. (2022). *Kids are far, far behind in school*. The Atlantic. <https://www.theatlantic.com/ideas/archive/2022/05/schools-learning-loss-remote-covid-education/629938/>.

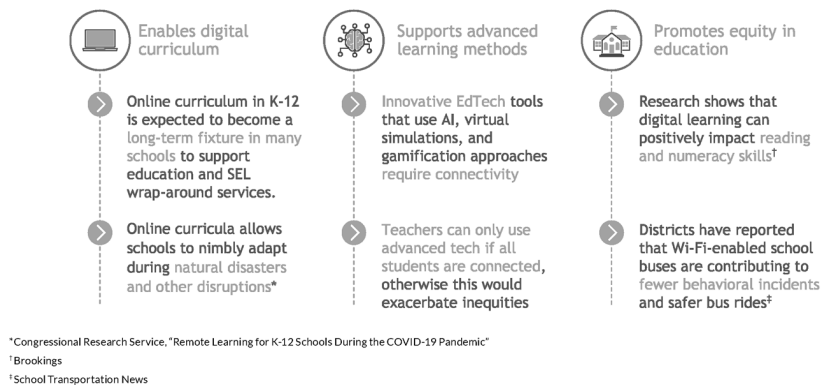
¹⁶Psacharopoulos, G., Patrinos, H., Collis, V. & Vegas, E. (2020). *The COVID-19 cost of school closures*. Brookings. <https://www.brookings.edu/blog/education-plus-development/2020/04/29/the-covid-19-cost-of-school-closures/>.

¹⁷Lynch, M. (2021). *Virtual reality matures in the K-12 classroom*. The Tech Advocate. <https://www.thetechadvocate.org/virtual-reality-matures-in-the-k-12-classroom/>.

¹⁸Fazlullah, A. & Ong, S. (2019). *The homework gap: Teacher perspectives on closing the digital divide*. Common Sense Media. <https://www.common Sense Media.org/sites/default/files/featured-content/files/homework-gap-report-2019.pdf>.

lies the survey identified. This widespread technology distribution unlocked substantial collaboration across the district; as classes shifted back to hybrid and in-person formats in 2021, students and teachers continued using the devices to access communication portals and digital learning materials. In addition, the district implemented a long-term Laptop Refresh Program, which aims to standardize district-wide technology and enable bulk device purchasing, creating pricing efficiencies. For students, standardization also means that families need to be familiarized with fewer devices and applications, which is proving especially helpful in non-English-speaking homes.

FIGURE 3. Education: Benefits of widespread broadband adoption



Health Care

Like education, health care is similarly undermined by a lack of universal, high-quality connectivity. Before the pandemic, less than 1 percent of outpatient appointments were held remotely. More recently, that number has climbed to 8 percent.¹⁹ The share of Medicare visits conducted through telehealth increased from less than one million in 2019 to over 50 million in 2020.²⁰ This trend continued with patients with disabilities and dually eligible for Medicare and Medicaid as more likely to use telehealth in 2021.²¹

While this surge is due largely to the pandemic, telehealth participation remains high, in 2021 rates of telehealth utilization remained 40 percent higher than pre-pandemic levels.²¹ In a recent survey, 68 percent of physicians said they would like to further increase the use of telehealth in their practice.²² Among patients who recently used telehealth, 73 percent reported they would continue to use telehealth services in the future, and 41 percent reported they would have chosen telehealth over an in-person appointment, even if both required a co-pay.²³

Telehealth is especially prominent for particular disciplines, such as mental health. In 2020, telehealth visits comprised a third of total visits to mental health specialists, compared to 8 percent of visits to primary care providers and 3 percent of visits to other specialists.²⁴ In 2021, according to a report from the Bipartisan

¹⁹ Rae, M., Amin, K., Cox, C., Panchal, N. & Miller, B. (2022). *Telehealth has played an outsized role meeting mental health needs during the COVID-19 pandemic*. Kaiser Family Foundation. <https://www.kff.org/coronavirus-covid-19/issue-brief/telehealth-has-played-an-outsized-role-meeting-mental-health-needs-during-the-covid-19-pandemic/>.

²⁰ U.S. Department of Health & Human Services. (2021). *New HHS study shows 63-fold increase in Medicare telehealth utilization during the pandemic*. <https://www.hhs.gov/about/news/2021/12/03/new-hhs-study-shows-63-fold-increase-in-medicare-telehealth-utilization-during-pandemic.html>.

²¹ Citation: Bipartisan Policy Center. (2022). *The Future of Telehealth After COVID-19*. <https://bipartisanpolicy.org/download/?file=/wp-content/uploads/2022/09/BPC-The-Future-of-Telehealth-After-COVID-19-October-2022.pdf>.

²² Charleson, K. (2022). *Telehealth statistics and telemedicine trends 2022*. SingleCare. <https://www.singlecare.com/blog/news/telehealth-statistics/>.

²³ Henry, T.A. (2021). *Patients, doctors like telehealth. Here's what should come next*. AMA. <https://www.ama-assn.org/practice-management/digital/patients-doctors-telehealth-here-s-what-should-come-next>.

²⁴ U.S. Department of Health & Human Services. (2021). *New HHS study shows 63-fold increase in Medicare telehealth utilization during the pandemic*. <https://www.hhs.gov/about/news/2021/12/03/new-hhs-study-shows-63-fold-increase-in-medicare-telehealth-utilization-during-pandemic.html>.

Policy Center, 44 percent of all telehealth visits were for behavioral health services.²¹ According to the surgeon general, COVID-19 has exposed a youth mental health crisis,²⁵ and telehealth can help families access providers.

Telehealth also enables remote patient monitoring for patients with chronic health conditions or those using controlled substances, which improves disease management and decreases misuse of medication and unnecessary emergency room visits.²⁶ Telehealth can also improve ongoing care by reducing the chance of missed visits.²¹

Research also shows that telehealth may expedite speed of care. Telehealth appointments via phone and video have shorter wait times than in-person options (from scheduling to appointment).²⁷ The reduced wait time not only means that more people are likely to visit physicians, it also allows for earlier diagnoses and treatment, which improves patient outcomes.

Telehealth could impact costs. Cigna data shows that the average cost of a non-urgent virtual care visit is \$93 less than the average cost of an in-person visit (see Figure 4). The cost to see a specialist was \$120 less for a virtual visit than an in-person visit, and a virtual urgent-care visit was \$141 less than an urgent-care clinic.²⁸

Telehealth also expands the reach of medical professionals. One-quarter of Americans live in rural areas, but less than 10 percent of physicians practice in rural communities.²⁹ Telemedicine offers a way to bridge this distribution. A recent large-scale survey found that 45 percent of adults believe that inadequate access to technology, including broadband and computers, is a barrier to telehealth, and this was especially prominent among rural residents and adults over the age of 65.³⁰ This underscores the need not only for connectivity and device access, but also for digital literacy programs that can maximize the effectiveness of digital health care for certain populations.

news/2021/12/03/new-hhs-study-shows-63-fold-increase-in-medicare-telehealth-utilization-during-pandemic.html.

²⁵ U.S. Department of Health & Human Services. (2022). *Fact sheet: Surgeon general to speak at Youth Mental Wellness Now! Summit and applaud commitments in response to his call to action on youth mental health crisis.* <https://www.hhs.gov/about/news/2022/06/17/fact-sheet-surgeon-general-to-speak-at-youth-mental-wellness-now.html>.

²⁶ Gajarawala, S. & Pelkowski, J. (2020). *Telehealth benefits and barriers.* The Journal for Nurse Practitioners. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7577680/>.

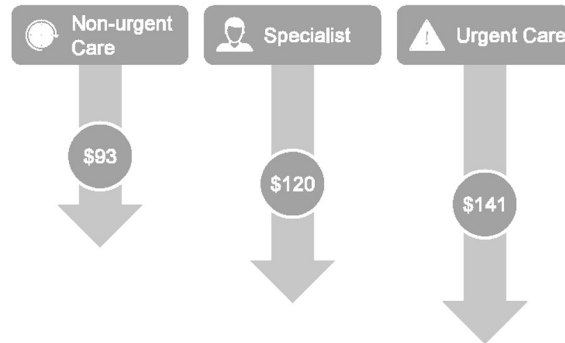
²⁷ Diaz, N. (2022). *Telemedicine grants quicker access to primary care: study.* Becker's Hospital Review. <https://www.beckershospitalreview.com/telehealth/telemedicine-grants-quicker-access-to-primary-care-study.html>.

²⁸ Cigna. (n.d.). *Convenient, cost-effective, and high-quality virtual care is here to stay.* <https://newsroom.cigna.com/convenient-cost-effective-and-high-quality-virtual-care-is-here-to-stay>.

²⁹ Landi, H. (2019). *Poor broadband access in rural areas limits telemedicine use: study.* Fierce Healthcare. <https://www.fiercehealthcare.com/tech/poor-broadband-access-rural-areas-limits-telemedicine-use-study>.

³⁰ Bailey, V. (2021). *Limited broadband poses a significant barrier to telehealth access.* MHealthIntelligence. <https://mhealthintelligence.com/news/limited-broadband-poses-a-significant-barrier-to-telehealth-access>.

FIGURE 4. Cost savings from virtual health care visits, by type of visit



Source: Cigna Report. *Does virtual care save money?*

Spotlight: Together Growing Strong

Due to the enormous benefits for patients and health care providers, some institutions have even begun investing in digital inclusion and digital skills training to help their patients take better advantage of telehealth. Together Growing Strong (TGS), an NYU Langone initiative in Sunset Park, New York, conducted surveys to understand the broadband needs of their community, developed technology literacy workshops, and established a digital equity working group. They also added in-person digital skill training as part of their pilot program for postpartum depression prevention, providing the participating women with the skills needed to access and use platforms for telehealth delivery. Given the maternal health crisis in the U.S., such applications of telehealth to maternal care can have a profound impact on maternal health outcomes.³¹ These investments, innovative for a health care institution, are a testament to how essential broad adoption of telehealth is for the future of the health care system.

FIGURE 5. Health Care: Benefits of widespread broadband adoption



*Becker Hospital Review

†Fierce Healthcare

‡Cigna

³¹Gregory, B. (2022). *Changing our (virtual) reality: Telehealth the United States maternal health crisis*. <https://nextcenturycities.org/wp-content/uploads/2021/05/Changing-Our-Virtual-Reality-Telehealth-the-US-Maternal-Health-Crisis-by-Brittany-Rae-Gregory-.pdf>.

Government Services

Online services enable individuals to access the government at all hours of the day and with fewer barriers (e.g., taking time off, finding transportation, obtaining child care). This, in turn, makes government services more useful and accessible to underserved communities. Not only do a majority of Americans expect services to be offered online, nearly nine in ten say that a great online experience can increase their trust in government overall.³²

Online services are also more cost effective and allow governments to more efficiently allocate existing labor and resources. The U.K. government, for example, estimated that by shifting 80 percent of public services online, \$2.2 billion per year could be saved, with the cost of digital transactions 20 times lower than by phone and 50 times lower than face to face.³³ Other projects, including an online birth-certificate initiative in Mexico and a public data exchange system in South Korea, have resulted in increased service adoption, higher customer satisfaction, savings in cost and staff time, and economic benefit to industry.³⁴

Online government services can also spur job creation and economic growth. For example, when new businesses have a simple path for filing documents and obtaining licenses, barriers to entry are lowered and growth increases.³⁵ The same can be true for individuals navigating major life events, such as the birth of a child or retirement, which often require services across multiple agencies in an arduous process that takes up both time and energy.

Oklahoma, for example, has prioritized taking a customer-centric approach to government services. During the COVID-19 pandemic, the state revamped its unemployment system and set up a digital portal for residents to apply and track their unemployment benefits. *This initiative resulted in the state being able to process 30,000 claims per week and deliver more than \$2 billion in unemployment checks.* Individuals were able to receive benefits quicker and the state was able to save money by not needing to hire additional customer service representatives.³⁶

Many local government proceedings (e.g., council and neighborhood meetings) have gone online, which has the potential to increase resident participation and engagement. Several states and cities are considering measures to require remote options for government hearings, even after the pandemic, citing the benefits for older Americans, people with disabilities, those who lack transportation, and those with family obligations that prevent them from attending in person.³⁷ In this way, virtual proceedings have the potential to diversify and democratize local government.³⁸

Online solutions have become so ubiquitous that there is significant risk if governments fail to shift services online. When the COVID-19 pandemic began, governments with strong digital infrastructures were able to rapidly adapt. The state government of California, for example, was able to leverage its early efforts to pursue cloud solutions to enable 90 percent of its state employees to seamlessly switch to telework.³⁹ *Without digitization, governments will struggle to remain effective and flexible when faced with future crises.*

Spotlight: Oregon Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) Program

WIC is a prevention-focused public health nutrition program serving lower-income pregnant, postpartum, and breastfeeding individuals, as well as infants and children under the age of 5.

³² Boston Consulting Group. (2020). *2020 digital government benchmark survey*. <https://www.bcg.com/en-us/industries/public-sector/digital-government>.

³³ Government of the United Kingdom. (2012). *Digital efficiency report*. <https://www.gov.uk/government/publications/digital-efficiency-report/digital-efficiency-report>.

³⁴ Red GEALC. (2018). *The value of digital government*. <https://www.redgealc.org/site/assets/files/7743/digital-government-english.pdf>.

³⁵ Awad, N., Brice, J., Ferrer, S., Kim, H. & Stuart, T. (2022). *Delivering government services like a digital native*. Boston Consulting Group. <https://www.bcg.com/publications/2022/delivering-customer-centric-digital-government-services>.

³⁶ Goldstein, P. (2020). *Governments embrace digital services amid the pandemic*. StateTech. <https://statetechmagazine.com/article/2020/09/governments-embrace-digital-services-amid-pandemic>.

³⁷ Altamari, D. (2022). *States and cities are moving to make virtual hearings permanent*. Route Fifty. <https://www.route-fifty.com/management/2022/04/pandemic-changed-way-americans-interact-government-now-some-states-want-make-those-changes-permanent/366276/>.

³⁸ CivicPlus. (n.d.). *Virtual meetings and the online imperative of local government*. <https://www.civicplus.com/blog/am/virtual-meetings-and-the-online-imperative-of-local-government>.

³⁹ Canning, M., Eggers, W., Mader, D. & Sullivan, M. (2021). *Propelled by the pandemic, digital government logs on*. Deloitte. <https://usj.com/articles/propelled-by-the-pandemic-digital-government-logs-on-01625079725>.

In response to COVID-19, Oregon's WIC program transitioned from in-person appointments to telephone-based appointments for its 80,000 participants. Alongside this transition, Oregon WIC also used surveys to understand readiness for video-based tele-WIC appointments. These surveys, conducted in collaboration with the Language, Literacy, and Technology Research Group at Portland State University, evaluated three populations: WIC participants, WIC staff, and information technology (IT) support staff.

WIC participants were sent a text message inviting them to complete a survey, which was available online and over the phone, and in English, Spanish, and Russian. Respondents were asked about access to broadband internet; device ownership; current interaction with technology for work, family, and personal tasks; experience with and feelings about telehealth; and comfort with video-based WIC appointments. More than 9,500 WIC participants responded, with key results highlighted in the first column of Figure 6. Notably, 300 mostly Spanish speakers completed the survey by phone, with most indicating a lack of Internet access or digital skills needed to complete the online survey.

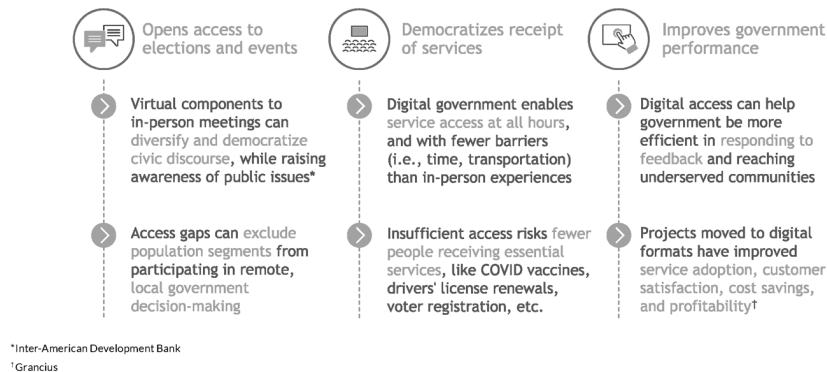
WIC staff were asked about their own telehealth experiences; perceived readiness for adoption of video-based telehealth in their WIC clinic; and advantages and disadvantages for WIC participants. IT support staff were asked about their current scope of responsibility; number of programs and staff supported; and barriers and supports in adopting video-based visits. Findings are featured in the second column of Figure 6.

FIGURE 6. Oregon WIC survey takeaways



The results indicate that there is a significant variability in the readiness and capacity among WIC participants, WIC staff, and IT support to implement tele-WIC visits. To ensure equitable implementation of tele-WIC, investments must be made to expand reliable, affordable broadband access; connect people to devices that match their technology needs; and provide education to improve digital literacy, privacy, and security. In addition, dedicated funding is needed to increase staffing, capacity, and acquisition of technology at the local health departments and community nonprofits that deliver the WIC program.

FIGURE 7. Government services: Benefits of widespread broadband adoption



Employment

COVID-19 sparked a fundamental change in the nature of work. Before the pandemic, fewer than 5 percent of workers worked remotely. During the pandemic, that number grew to over 60 percent. Now, it is stabilizing around 30 percent.⁴⁰ That is a sixfold increase from pre-pandemic levels.

From an employee's perspective, remote workers are happier and have a better work-life balance despite working more hours.⁴¹ Forty-one percent feel more productive when working from home, compared to 14 percent who feel less productive.⁴² In fact, four in ten remote workers would look for another job if their employer required a full return to the office.⁴³

From an employer perspective, remote work gives access to a broader talent pool, which can result in more qualified hires and support a company's diversity and inclusion goals. Job listings that allow remote work draw seven times more applicants,⁴⁴ and remote work flexibility reduced employee attrition by more than one-third.⁴⁵ In one study, 78 percent of respondents said that a remote work option was the most effective nonmonetary way to retain employees.⁴⁶ These advantages, coupled with lower real estate and operating costs, suggest that the shift to remote work may improve company profits.

Beyond remote work, connectivity also improves an individual's ability to find a job. For lower-income individuals, the introduction of home Internet service increases their likelihood of employment by 14 percent. Among these newly connected households, 62 percent cited the Internet as having helped them or a family member successfully find employment.⁴⁷ Similarly, a research synthesis by the World Bank finds that the relationship between Internet and employment is positive—for every

⁴⁰ Barrero, J.M., Bloom, N. & Davis, S. (2022). *SWAA August 2022 updates*. WFH Research. https://wfhresearch.com/wp-content/uploads/2022/08/WFHResearch_updates_August2022.pdf.

⁴¹ Apollo Technical. (2022). *Statistics on remote workers that will surprise you* (2022). <https://www.apollotechnical.com/statistics-on-remote-workers/>.

⁴² Barrero, J.M., Bloom, N. & Davis, S. (2021). *Internet access and its implications for productivity, inequality, and resilience*. National Bureau of Economic Research. https://www.nber.org/system/files/working_papers/w29102/w29102.pdf.

⁴³ Barrero, J.M., Bloom, N. & Davis, S. (2021). *Let me work from home, or I will find another job*. Becker Friedman Institute. https://bfi.uchicago.edu/wp-content/uploads/2021/07/BFI_WP_2021-87.pdf.

⁴⁴ Smith, M. (2022). *Remote and hybrid jobs are attracting 7 times more applicants than in-person roles*. CNBC. <https://www.cnbc.com/2022/03/04/flexible-jobs-are-attracting-7-times-more-applicants-than-in-person-jobs.html>.

⁴⁵ Bloom, N., Han, R. & Liang, J. (2022). *How hybrid working from home works out*. National Bureau of Economic Research. <https://www.nber.org/papers/w30292>.

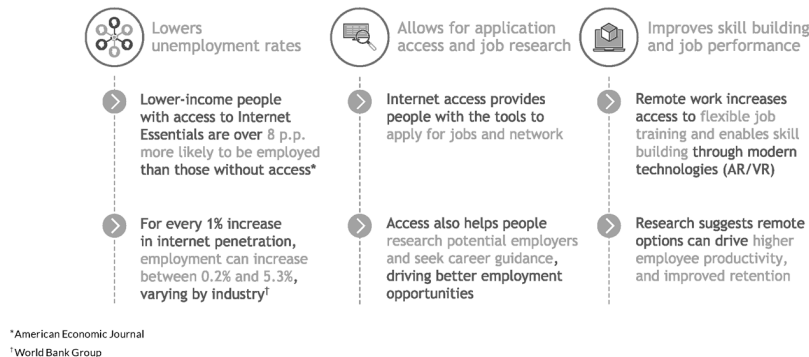
⁴⁶ Crain's Content Studio. (2019). *Work-life integration: the customized approach*. <https://www.craigslist.com/sponsored-future-work/work-life-integration-customized-approach>.

⁴⁷ Zuo, G. (2021). *Wired and hired: Employment effects of subsidized broadband Internet for low-income Americans*. American Economic Journal: Economic Policy. <https://www.aeaweb.org/articles?id=10.1257/pol.20190648>

1 percent increase in Internet penetration, employment increases between 0.2 percent and 5.3 percent, with variation by study and by industry.⁴⁸

“It’s nearly impossible to both recruit new businesses and in many cases keep existing businesses in areas that do not have stable high-speed internet.”—Governor Laura Kelly of Kansas

FIGURE 8. Employment: Benefits of widespread broadband adoption



SECTION 2: THE INFRASTRUCTURE REQUIRED TO INNOVATE ESSENTIAL SERVICES

Decisions made today will affect the Internet for generations

There are many different types of infrastructure that can be used to build Internet networks, and the type of infrastructure used will affect the type of online services that institutions can offer. For institutions to offer the best online services, internet infrastructure must support Internet service that is fast, stable, scalable, affordable, and universally available. When this is achieved, institutions can confidently invest in their online services, knowing they will be of high quality and available to all.

As states receive unprecedented broadband funding, understanding the advantages and use cases for each type of infrastructure is imperative. In this section, we provide an overview and analysis of three types of broadband infrastructure, summarized in Figure 9. First, we discuss two wireline solutions, fiber-optic infrastructure and hybrid fiber-coaxial (HFC) infrastructure (commonly called “cable internet”), both of which use physical wires to connect premises to the internet. Second, we discuss fixed wireless access (FWA) infrastructure, which is a wireless, cellular-based technology that transmits Internet through radio waves from an off-site access tower to individual receivers installed on-premises.

⁴⁸ World Bank Group. (2012). *Broadband strategies toolkit*. <https://ddtoolkits.worldbankgroup.org/broadband-strategies/driving-demand/broadband-firms-and-employment#:~:text=According%20to%20this%20research%2C%20the,increase%20inpercent201%25%20of%20penetration.>

FIGURE 9. Assessment of broadband infrastructure deployment paths

	 Fiber-Optic	 Cable/HFC	 FWA
Typical download / upload speed	250-2000/250-2000 Mbps	10-1500/5-100 Mbps	30-300/5-20 Mbps [†]
Typical one-time costs (per home) [*]	• Cost to pass \$600-4,000 • Cost to connect \$300-400	• Cost to pass \$500-3,000 • Cost to connect \$200-300	• Base station: ~\$125 [‡] • Cust. premises equip.: ~\$400-1,000 [§]
Ongoing annual operating costs	\$55	\$105	\$95-450 [¶]
Scalability	High cost of material/mile with low to moderate existing infrastructure, well suited for dense urban & suburban areas, tech supports long-term viability	Moderate to high existing infrastructure is available across urban, suburban & some rural areas, upload speed ceiling requires upgrades over time	Easily deployable base station infrastructure, economical & scalable in rural and suburban areas
Benefits & limitations	➊ Highest speed/capacity ➋ Highest reliability, less susceptible to signal interference ➌ Lowest latency (10-15 ms) ➍ Lowest ongoing operating expense ➎ Longest useful life (~40yr.) ➏ Highest up-front capital expense ➐ Most complex to deploy	➊ Less up-front capital investment ➋ High speed/capacity ➌ Total capacity shared with other homes (can impact speed) ➍ Continued investment required to scale capacity	➊ Fastest time to deploy, does not require last-mile infrastructure ➋ Lowest up-front CapEx requirements ➌ Less reliable signal, dependent on distance, spectrum, foliage, etc. ➍ Highest OPEX, given electrical, network & maintenance costs ➎ Highest latency (30-40 ms)

^{*} Cost to pass variable based on household density, with lower cost figures associated with urban areas; estimates based on MoffettNathanson, Fiber Broadband Association & BCG analysis.

[†] Download speeds based on current T-Mobile and Verizon offerings; upload speeds provided by 10,000-participant survey conducted by Evercore Research and reflect 5G service; Evercore survey results also show download speeds of on average >100 Mbps.

[‡] Electronic Frontier Foundation.

[§] Based on T-Mobile & Verizon FWA offerings.

[¶] Based on Macrocell CAPEX of \$250,000, serving ~2,000 homes; homes reached varies by spectrum, base tower infrastructure, population density, etc.

The Pros and Cons of Broadband Infrastructure Technologies

Wired Technologies

Generally, infrastructure built with wired technology is faster and more reliable, has lower latency and operating costs, and can accommodate more users. However, wired infrastructure can also cost more to build per mile.

Wired Technologies: Fiber-Optic Infrastructure

Fiber-optic technology uses physical cables that contain up to a few hundred bundled strands of glass to carry data to a premises in the form of light pulses. Fiber is recognized as a future-proof, technologically superior infrastructure compared to alternatives, driven by its fast speed, low latency, unconstrained capacity, and limited susceptibility to signal noise. Fiber is the fastest broadband infrastructure available, with typical symmetrical speeds of approximately 250–2,000 Mbps. While this represents an average speed, world-record fiber transmissions have reached 319 Tbps.⁴⁹

The Electronic Frontier Foundation estimates that typical fiber-optic cable has approximately 10,000 times more usable bandwidth than a standard coaxial cable.⁵⁰ While cable captures the majority market share, fiber (20 percent market share) continues to eat into this figure.⁵¹ As advanced technologies are developed and Internet usage grows, fiber will be positioned to support vastly higher speeds per premise with upgrades to existing infrastructure. Fiber also has the lowest latency (10–15 ms compared to alternative types of infrastructure), making it best positioned to support technologies like AR/VR.⁵² Unlike HFC networks, where speeds are determined by local network congestion, fiber networks are scalable and have nearly unconstrained capacity, with speeds independent of consumption across other

⁴⁹ Sakharkar, A. (2021). *World record: Internet speed of 319 Tb/s over 3,001 km*. Tech Explorist. <https://www.techexplorist.com/world-record-internet-speed-319-tb-s-over-3001-km/40257/>.

⁵⁰ Cyphers, B. (2019). *The case for fiber to the home, today: Why fiber is a superior medium for 21st century broadband*. Electronic Frontier Foundation. <https://www.eff.org/wp/case-fiber-home-today-why-fiber-superior-medium-21st-century-broadband>.

⁵¹ Goovaerts, D. (2022). *FBA report: 43 percent of U.S. households now have access to fiber*. Fierce Telecom. <https://www.fiercetelecom.com/broadband/fba-report-43-us-households-now-have-access-fiber>.

⁵² Federal Communications Commissions. (2020). *A report on consumer fixed broadband performance in the United States*. <https://www.fcc.gov/reports-research/reports/measuring-broadband-america/measuring-fixed-broadband-ninth-report>.

premises. *Fiber has the strongest technological capability relative to all other broadband technologies.*

Fiber's structural advantage has spurred an explosion of infrastructure deployment across the U.S. over the past few years. Despite accelerated adoption, cable captures the lion's share of existing infrastructure in the U.S., making fiber most economically suitable for greenfield network buildouts. Fiber networks also have the longest time to market and highest up-front capital costs per mile, though elevated up-front costs are offset by fiber's scalability and lower ongoing operating costs compared to alternative types of infrastructure. These cost reductions are driven largely by fiber's superior performance compared to other networks, as this yields higher customer satisfaction and lower ongoing maintenance expense relative to other technologies. Given this, fiber is best suited for denser urban and suburban environments, where up-front capital costs are mitigated by higher population density.

It is important to note that fiber's main downside—its high up-front cost—can be offset or even eliminated entirely by recent Federal funding programs. This is discussed further in Section 3.

"Fiber is what you want, no matter what. If we have that, we have unlimited capacity to increase speeds. If we are building something over wireless, or copper or even cable, none of those can be future-proofed the way fiber can."—Deb Socia, President and CEO, The Enterprise Center

Wired Technologies: Cable Hybrid (Fiber-Coaxial) Infrastructure

Cable uses a hybrid of fiber-optic and coaxial cables (HFC) to connect premises to broadband. This technology gained rapid adoption in the early 1990s and has since become the most extensively deployed broadband infrastructure. Cable accounted for ~50 percent of broadband market share in 2021. Given the high volume of legacy HFC infrastructure, cable is best suited for brownfield edge-outs, where upgrading existing cable avoids the high up-front capital costs associated with new network builds.

From a technological perspective, HFC first delivers signals through fiber cables, which are connected to a node. Traditional coaxial cables then connect to the node and provide the final transmission to about 50 to 200 homes on average. Today, HFC offers typical speeds of 10–1,500/10–100 Mbps. While this speed is generally sufficient to meet typical household usage today, it is dependent on local network specific congestion, and lacks the symmetry of fiber. Symmetry becomes increasingly important as interactive services become more prevalent. Such services, which include health care, education, and work, rely on video streaming and data uploads, which require fast, symmetrical download and upload speeds. To illustrate the importance of symmetry, consider how during a telehealth appointment it is just as important for the doctor to have a clear view of the patient as it is for the patient to have a clear view of the doctor.

To illustrate the importance of symmetry, consider how during a telehealth appointment it is just as important for the doctor to have a clear view of the patient as it is for the patient to have a clear view of the doctor.

Cable is also more susceptible to signal noise than fiber, meaning it is more likely to experience unintended signal modifications. Overall, fiber's technological superiority makes it a more future-proof option compared to HFC as Internet usage continues to accelerate. However, HFC is anticipated to migrate to an upgraded operating standard beginning in 2022. This specification is expected to have measurably faster latency and speeds, but will likely take a few years to be fully tested and scaled.

While cable also has generally lower average annual operating costs per home than FWA, these average costs of \$105 are approximately double that of fiber.⁵³ Operating costs are higher for two primary reasons. First, cable networks have a larger volume of network-issue calls to operators than fiber-optic networks, which adds incremental expense per user. Secondly, cable users have historically been less satisfied with the technology's performance compared to fiber, which drives a higher churn rate for cable.

Ultimately, cable could be well suited for brownfield edge-outs of existing network infrastructure in denser urban and suburban environments, where up-front capital costs are mitigated by higher population density.

⁵³Fiber Broadband Association. (2020). *Access Network OpEx Analysis white paper*. <https://www.fiberbroadband.org/page/fiber-research>.

Wireless Technologies: Fixed Wireless Access Infrastructure

Fixed wireless access (FWA) is a cellular-based connection that transmits Internet to premises through radio waves, making the technology independent of cable. A lack of cable means that FWA can be deployed across rougher terrain and at vastly accelerated speeds relative to fixed wired technologies, particularly in suburban and rural areas where existing fixed wired infrastructure is either limited or non-existent. Rather than digging into the ground and laying cable, FWA relies on the implementation of a base tower to transmit radio signals. This drives lower up-front capital costs of approximately \$525–1,125 per household compared to competing technologies.⁵⁴ This cost accounts for an average macro cell deployment and includes base tower infrastructure and customer premises equipment (CPE) expenses. Today, the majority of up-front capital is typically composed of CPE costs, which are anticipated to decline in the coming years as FWA undergoes further technological innovation. Costs per household also vary based on a range of factors, such as the size of the base tower, spectrum availability and interference, average usage per household, and population density within the coverage area.

While FWA has notable advantages in time to market and cost of initial deployment compared to fixed wired technologies, the infrastructure has higher ongoing operating costs and is typically relatively limited in terms of network capacity, signal reliability, speed, and latency. Higher costs for network upgrades, maintenance, and electrical usage yield increased ongoing operating costs for FWA compared to competing technologies. These ongoing costs can range from ~\$95–450 per household.⁵⁵ Meanwhile, signal reliability and consistency continue to be a hurdle for FWA technology compared to fixed wired solutions. Line-of-sight connection between the base tower and an on-premises antenna is necessary to ensure a strong signal. Foliage, inclement weather, and less porous building materials at the end premise can all interfere with signal transmission. Signal quality is a function of a premise's distance to the base tower, and weaker signals can be expected at more distant premises or those lacking line of sight to the base tower. Capacity is also dependent on available spectrum, network density, and others' consumption within the network area. If household density within the coverage area is high and a large volume of consumers use the network at the same time, network capacity may be impeded.

In terms of typical speed, FWA is the lowest at 30–300/5–20 Mbps, making it a less suitable option for high-usage households and more poorly positioned to accommodate increased usage per household over time, barring further innovation. Latency is also the longest for this technology, at 30–40 ms. This makes FWA the least suitable option for applications like VR/AR and gaming that rely on low latency for operation. *When service is unstable and prone to disruption, education lessons can be derailed and learning is lost; health care delivery can be interrupted; or government services may not be used. A stable, uninterrupted online experience is critical to incentivizing investment in and adoption of essential services.*

Ultimately, FWA is best positioned for use cases in rural and suburban geographies where low infrastructure requirements position the technology as an economical and quickly scalable solution, or in urban areas where it can be used for supplementary coverage in addition to existing fixed wired infrastructure. Additionally, it should be noted that the Broadband Equity, Access, and Deployment program (BEAD), which is the largest of the upcoming Federal funding opportunities, considers most forms of FWA technologies to be unreliable and therefore ineligible for BEAD outside of extreme circumstances.⁵⁶

Summary

Fiber's superior capacity, speed, scalability, and reliability relative to alternative types of infrastructure position it as the most future-proof technology. For this reason, *fiber should be the first choice for deployment where it is not cost prohibitive. It should also be noted that the BEAD Notice of Funding Opportunity is written such that states must consider fiber projects as "priority projects."*

As a category, fixed wired broadband is recognized for increased signal reliability, lower ongoing operating costs, and faster latency than FWA. If fiber cannot be deployed because the economic or logistical case is restrictive, cable could be used. Where these options are not viable, FWA can then be considered. FWA's lower up-front capital requirements and faster time to market have driven increasing adoption in rural and suburban areas where wired infrastructure either does not exist

⁵⁴ Analysis assumes deployment of a \$250,000 macrocell, serving on average 2,000 households. This is subject to change based on base tower technology, household density, etc.

⁵⁵ Estimate from current industry experts.

⁵⁶ Broadband Equity, Access, and Deployment Program. (2022). *Notice of funding opportunity*. <https://broadbandusa.ntia.doc.gov/sites/default/files/2022-05/BEAD%20NOFO.pdf>.

or cannot sufficiently support local communities. While FWA's less capital intensive and easily deployable base station infrastructure makes it well suited for these use cases, lack of signal reliability, reduced speed, and slower latency compared to fixed wired options make it a technologically inferior option, particularly for higher-density use cases.

SECTION 3: HOW FEDERAL FUNDS CAN CLOSE THE DIGITAL DIVIDE AND ENSURE EQUITABLE ACCESS TO ESSENTIAL SERVICES

The once-in-a-generation opportunity

In 2021, Congress committed more than \$80 billion for broadband through two major Federal laws: the American Rescue Plan Act (ARPA) and the Infrastructure Investment and Jobs Act (IIJA). The programs these laws created are unique for five main reasons:

- *Large size*—they are the largest single investment in broadband in America's history;
- *Strong infrastructure requirements*—recipients must prioritize high-quality, fiber networks;
- *Focus on affordability*—subsidizes Internet service for low-income households and requires networks to offer affordable Internet service;
- *Support for inclusion*—the funds prioritize digital equity initiatives and stakeholder engagement;
- *Administrative processes*—individual states, rather than Federal agencies, are in charge of implementation.

See Figure 10 for a comprehensive look at funding amounts, uses, and timelines.

FIGURE 10. Federal funding guide

						☒ Primary impact ☒ Secondary impact			
	Program name	Agency	Type	Amount	Timing	Access	Affordability	Adoption/Awareness	Planning
IIJA	Broadband Equity, Access, and Deployment Program (BEAD)		Formula allocation	\$42.5B	Letter of intent due 7/18/22	☒	☒	☒	☒
	State Digital Equity and Capacity Grant Program		Formula allocation	\$1.5B	Planning application due 7/12/22		☒	☒	☒
	Digital Equity Competitive Grant Program		Competitive grant	\$1.3B	Estimated mid 2024		☒	☒	
	Middle Mile Broadband Infrastructure Grant Program (MMBI)		Competitive grant	\$1B	Application due 9/30/22	☒			
	Affordable Connectivity Program (ACP)		Consumer subsidy	\$14.2B	Transition from EBB 12/21; lasts until funds exhausted		☒	☒	
	Affordable Connectivity Program Outreach Grants (ACP)		Competitive grant	\$100M*	Undefined; proposed multi-year program with annual grant cycles			☒	
	Private Activity Bonds (PAB)		Tax-exempt bond	\$335M [†]	Vary by state and locality	☒			
ARPA	Coronavirus Capital Projects Fund		Formula allocation	\$10B	Funding request due 12/27/21	☒	☒	☒	☒
	Coronavirus State and Local Fiscal Recovery Fund (SLFRF)		Formula allocation	\$350B	Treasury accepting requests	☒	☒	☒	☒
	Emergency Connectivity Fund (ECF)		Competitive grant	\$7.2B	Application window closed 5/13/22	☒	☒	☒	

* IIJA allows the FCC to spend up to \$100M on this program, but the amount has not been finalized.

[†] The limit for each state is the greater of either (i) \$110 multiplied by the state's population or (ii) \$335,000,000. Publicly owned projects do not count against the limit; privately owned projects do (but only 25% of their amount).

The Infrastructure Investment and Jobs Act

The Broadband Equity, Access, and Deployment Program

The bulk of the IIJA's broadband funding comes through the Broadband Equity, Access, and Deployment program (BEAD), which is designed to deploy (*i.e.*, build) broadband infrastructure in areas that lack it. Critically, networks built with BEAD money must prioritize fiber infrastructure, offer speeds of at least 100/20 Mbps, meet affordability standards, and provide service to all households in a funded area. *If BEAD's requirements are met, the resulting networks will likely be sufficient for institutions to confidently invest in internet-based technologies.*

BEAD funds will be allocated to each state based on the size of their digital divide, as measured according to the Federal Communications Commission (FCC)'s broadband availability map. BEAD requires states to sequence projects in a series of tiers, and a state must complete (or have a plan to complete) each tier before pro-

gressing to the next. Tier 1 consists of deployment in “unserved” areas where residents lack service of at least 25/3 Mbps. Tier 2 consists of deployment in “underserved” areas where residents lack service of at least 100/20 Mbps. And Tier 3 includes both deployment to community anchor institutions with service below 1/1 Gbps and/or other connectivity projects, like device programs. For most states, the majority of BEAD funds are expected to be absorbed by Tiers 1 and 2.

The Digital Equity Act Programs

The IIJA created a suite of first-of-their-kind programs to fund digital literacy and inclusion initiatives. These programs—the State Digital Equity Planning and Capacity Grant Program and the Digital Equity Competitive Grant Program—fund non-infrastructure initiatives like digital navigators and digital skill training. The State Digital Equity Planning and Capacity Grant Program, like BEAD, allocates money to states based on the size of their digital divide, and states then use this money to create and implement Digital Equity Plans. Conversely, the Competitive Grant Program awards funds directly to nonstate entities, like nonprofits and local institutions, through a competitive grant process.

From an institutional perspective, these programs are important because many disconnected individuals are unfamiliar with technology, and this can prevent them from using an institution’s online services. Access to the Internet and devices, by itself, is not sufficient; people must also be trained in the use of these technologies. Helping vulnerable populations develop these skills is the purpose of Digital Equity Act programs.

The Affordable Connectivity Program

The Affordable Connectivity Program (ACP) is a consumer subsidy to help individual households afford Internet service and devices. It is a continuation and modification of the Emergency Broadband Benefit, which was created during the pandemic. The ACP gives eligible households \$30 per month for Internet service (\$75 for households on tribal lands) and a one-time \$100 discount for a device. Critically, the monthly discount can result in free Internet service when combined with ISPs’ low-cost (*i.e.*, \$30 or less) plans. Approximately 48 million households (40 percent of U.S. households) qualify. Qualification requires a household income below 200 percent of the Federal poverty line and/or participation in certain government assistance programs, such as SNAP, Medicaid, and Free and Reduced-Price School Lunch.

Research has shown that, among un- and under-connected households, cost is cited as one of, if not *the* main barriers to Internet adoption.^{57,58} The ACP can help these households overcome this barrier. Institutions can leverage the ACP by raising awareness and helping households enroll. Notably, the ACP does not currently have a permanent source of funding, and, unless additional funding is secured, the ACP will exist only until its original appropriation is depleted, which may be as early as 2024 or 2025.⁵⁹ Given the importance of affordable connectivity, institutions should consider advocating for additional ACP funding or an equivalent state program.

The American Rescue Plan Act

The Capital Projects Fund

The Capital Projects Fund (CPF) is the most flexible of all the available broadband programs. Like BEAD, it is allocated to states according to a formula,⁶⁰ and states are in charge of implementation. Unlike BEAD, it does not prioritize deployment in unserved areas. Rather, it can be used in a wider range of locations and on a variety of initiatives, such as devices programs, affordability programs, and community centers. Moreover, where it is used for deployment, the resulting networks should offer 100/100 Mbps where feasible, which is a higher standard than

⁵⁷ California Emerging Technology Fund and University of Southern California. (2021). *Statewide Survey on Broadband Adoption 2021*. https://www.cetfund.org/wp-content/uploads/2021/03/Annual_Survey_2021_CETF_USC_Final_Summary_Report_CETF_A.pdf#page=20.

⁵⁸ Pew Research Center. (2021).—Mobile Technology and Home Broadband 2021.—https://www.pewresearch.org/internet/wp-content/uploads/sites/9/2021/06/PI_2021.06.03_Mobile-Broadband_FINAL.pdf.

⁵⁹ Institute for Local Self-Reliance. (2022). *Affordable connectivity program dashboard*. <https://apps.communitynets.org/acpdashboard/>.

⁶⁰ U.S. Department of the Treasury. (2021). *Coronavirus capital projects fund allocations for states, District of Columbia, and Puerto Rico*. <https://home.treasury.gov/system/files/136/Allocations-States.pdf>.

BEAD. As of early September 2022, the U.S. Department of Treasury had announced approval of grants for 13 states and over 50 tribal plans.⁶¹

States should consider how they coordinate CPF with BEAD and other funds. Due to its flexibility, CPF is a good program for connecting areas that do not meet the technical definition of “unserved” (which is BEAD’s focus). Similarly, CPF is a solution for non-deployment issues, such as a lack of devices. Certainly, access to Internet infrastructure is critical, but individuals must also be able to afford Internet service, have a device capable of running key applications, and have the skills to use these technologies. CPF is capable of addressing all of these needs.

Finally, as the deadline for CPF grant plans was September 24, 2022, state policy-makers should consider replicating the structure and the rules of the CPF at the state level. Once funding through BEAD is allocated to projects, states will have a clearer picture of which communities require additional support. The CPF program, with its strong requirements and flexibility, offers a good template for how to design a post-BEAD state grant program because it can address the majority of expected broadband costs, like expanding or upgrading infrastructure networks, making home connectivity and devices more affordable, and sustaining digital inclusion programming.

The Emergency Connectivity Fund

The Emergency Connectivity Fund (ECF) was created to ensure continuing access to education despite pandemic induced disruptions to learning. It did this by giving schools and libraries funds to purchase Internet service and devices for students and teachers to use at home—a use not covered by existing Federal programs.

The ECF has proven incredibly effective. As of September 2022, it has enabled schools and libraries in every U.S. state and territory to purchase a combined 11.5 million devices and 7.5 million Internet service connections. Moreover, it has done this in a way that ensures quality and cost efficiency. It allows institutions to:

- Engage in bulk purchasing, lowering the average price per device;
- Choose which technologies are procured (for both devices and Internet service), ensuring the technologies can support the curriculum, are suitable for student connectivity needs, and integrate with existing technology and tech support;
- Ensure that all students and teachers have connectivity and devices, enabling institutions to incorporate internet-based technologies into their standard educational services without leaving anyone behind.

However, the ECF’s funding will soon be depleted, and when it is, the 13 million students it is connecting will be at risk of falling back into the digital divide. States and their institutional partners can prevent this by using state resources, such as the CPF or other funding sources, to implement state versions of the ECF. This would allow the state to maintain connectivity afforded by ECF and potentially improve the program to incorporate teacher training, IT resources, and digital inclusion programming.

What families can accomplish with 100/20 Mbps broadband speeds

As detailed above, Federal programs are designed to deploy broadband infrastructure that meets or exceeds speeds of 100/20 Mbps. 100/20 Mbps is sufficient for many current uses, but it may struggle to support future applications and/or multiple simultaneous users. States should therefore build infrastructure with the understanding that 100/20 Mbps is the minimum speed that households need for current uses, but future uses may require higher speeds. As explained in Section 2, fiber infrastructure has the advantage of being able to easily meet higher speed requirements.

States should therefore build infrastructure with the understanding that 100/20 Mbps is the minimum speed that households need for current uses, but future uses may require higher speeds.

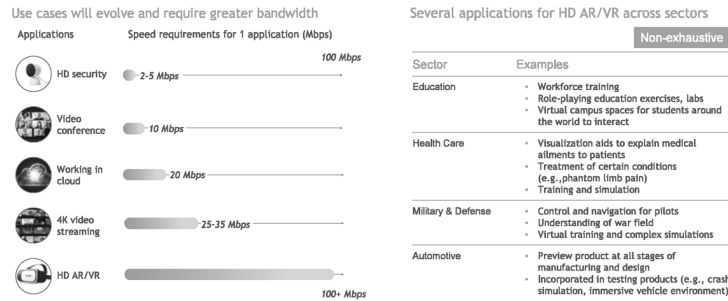
In 2015, the FCC set 25/3 Mbps as the minimum speed required to be considered “served” by broadband.⁶² However, usage has since increased, especially as a result of the pandemic. And this usage is not expected to wane; online activities have become a routine part of everyday life, and adoption of AR/VR and data streaming

⁶¹ U.S. Department of the Treasury. (2022). *Capital projects fund*. <https://home.treasury.gov/policy-issues/coronavirus/assistance-for-state-local-and-tribal-governments/capital-projects-fund>.

⁶² Fung, B. (2015). *The FCC has set a new, faster definition for broadband*. Washington Post. <https://www.washingtonpost.com/news/the-switch/wp/2015/01/29/the-fcc-has-set-a-new-faster-definition-for-broadband/>.

technologies will demand increased speeds. See Figure 11 for examples of the bandwidth requirements and applications.

FIGURE 11. Examples of speed requirements by application

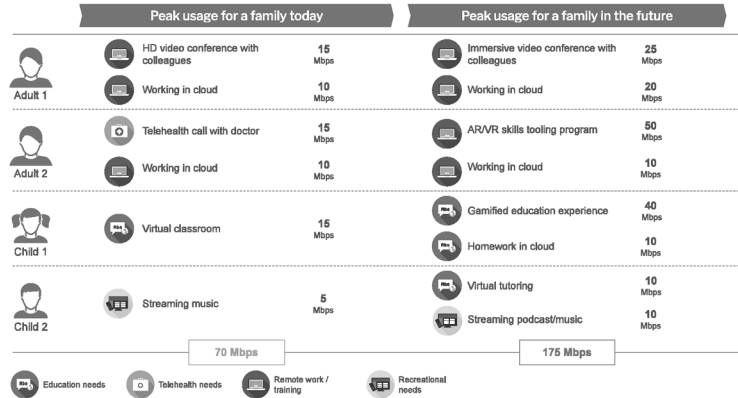


Sources: Cisco Annual Internet Report, 2018-2023; company websites; BCG Megatrends Overview of Augmented Reality, Virtual Reality, and Mixed Reality; BCG analysis

Figure 12 shows typical broadband usage of a four-person family both now and in the future. Households require access to at least 100/20 Mbps to seamlessly complete everyday tasks. While this is the minimum speed required today, the use of AR/VR and similar applications will quickly push speed demands beyond a 100/20 Mbps standard. As public entities think about future broadband infrastructure, this growth needs to be considered. This finding underscores the conclusion of Section 2: Fiber's superior capacity, speed, and reliability position it as the most future-proof technology. Fiber should thus be the first choice for deployment where it is not cost prohibitive.

FIGURE 12. A day in the life of a family (2 adults, 2 kids)

Innovation required to meet increased bandwidth needs for a family in the future



Source: Bandwidth requirements based on industry averages

How States Should Use Federal Funds

To reach universal connectivity and ensure that all households have access to the Internet with speeds of at least 100/20 Mbps, states should take action to effectively deploy the funds. Doing so ensures the highest return on investment and sets states up for continued investment and adoption of essential services. Prior Common Sense reports have discussed high-level policy actions that states can take to invest in

closing the digital divide.⁶³ As summarized in Figure 13, this section builds on that work with more in-depth steps and recommendations for states in light of the recent legislation and influx of funding.

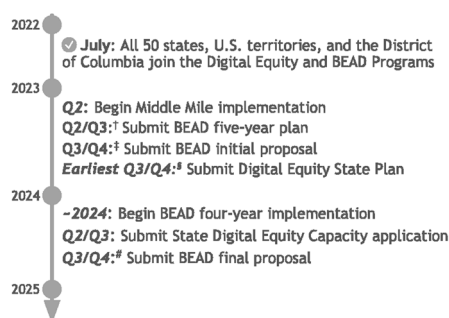
FIGURE 13. Actions states should take to maximize impact

01		Build State Capacity Understand the requirements of IJJA programs and develop fully staffed broadband and digital equity offices.
02		Map the Divide Use institutions to collect data on key connectivity metrics, such as broadband availability, speed, and cost, as well as device ownership and digital literacy. Prepare to challenge FCC maps.
03		Plan with Institutions Include institutional stakeholders in the BEAD and Digital Equity planning process to ensure that infrastructure, service arrangements, and digital equity programming supports institutional needs.
04		Promote the ACP Use the ACP as a tool to boost the number of potential subscribers in low-income areas and connect households to digital inclusion resources.
05		Create Sustainable Funding and Policy Ensure state policy supports competition, consumer protections, and ongoing funding for connectivity.

1. Build State Capacity

First, states should work to understand the funding and technical requirements of the IJJA. The IJJA's programs are complicated and require states to comply with rules that cover a range of subjects, from labor laws to climate impact and cybersecurity. An approximate time line of next steps follows in Figure 14. For up-to-date guidance on submission requirements, see the NTIA's Internet for All website.⁶⁴

FIGURE 14. Funding timelines



* EEs that receive Initial Planning Funds must submit Five-Year Action Plans.

¹ Due 270 days after planning funds received.

² Due 180 days after new DATA maps and notice of funding amounts issued.

³ Due within one year of the date on which a state is awarded DE Planning Grant Program funds.

⁴ Due 365 days after initial proposal approval.

Note: Estimated timelines based on information provided in NTIA overviews.

Successful implementation of these programs will require a dedicated and fully staffed broadband office. In addition to program implementation, offices will serve as central hubs to share best practices and technical assistance, convene stakeholders, and hold forums for sharing ideas with other regions. An ideal broadband

⁶³ Ali, T., Chandra, S., Cherukumilli, S., Fazlullah, A., Galicia, E., Hill, H., McAlpine, N., McBride, L., Vaduganathan, N., Weiss, D. & Wu, M. (2021). *Looking back, looking forward: What it will take to permanently close the K-12 digital divide*. Common Sense Media. https://www.common Sense Media.org/sites/default/files/featured-content/files/final_-_what_it_will_take_to_permanently_close_the_k-12_digital_divide_vfeb3.pdf.

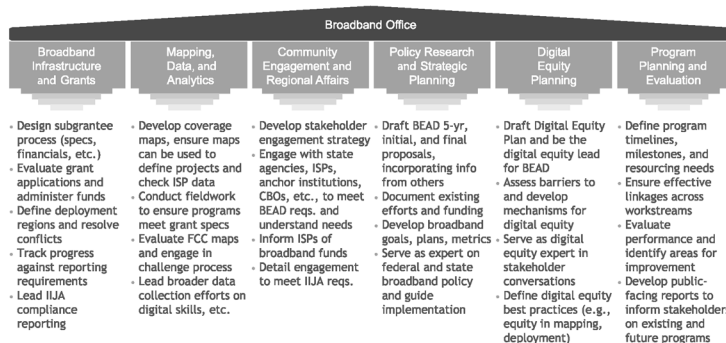
⁶⁴ National Telecommunications and Information Administration (NTIA) Internet for All website. <https://www.internetforall.gov/programs>.

office requires expertise that spans a range of roles, as demonstrated in Figure 15. These roles are illustrative of the practices and responsibilities of an ideal broadband office, but they should be adapted to the unique needs of each state.

The roles and responsibilities within an ideal broadband office include:

- **Broadband Office Director.** Acts as a central resource hub and strategy coordinator, overseeing all director and manager roles within the broadband office. Institutes working groups across stakeholders to facilitate discussions that can inform policy, strategy, and planning. Builds the office's capabilities and capacity, and supervises the launch, pilot, and expansion of major broadband programs.
- **Broadband Infrastructure and Grants Manager.** Identifies geographies for broadband infrastructure projects. Oversees the design of a subgrantee and grants management process, understanding that grants evaluation will require technical, financial, and legal expertise to expertly vet grantees for award. Leads the grants evaluation team and administers funding according to the principles established by the office's broadband strategy. Establishes internal reporting requirements against which grant performance will need to be tracked, and leads Federal funding reporting to ensure successful program delivery and compliance.
- **Community Engagement Manager.** Designs a strategy to engage with stakeholders across the full digital equity ecosystem, including public entities, ISPs, anchor institutions, and CBOs. Understands the needs and local expertise of these stakeholders, which will be critical in ensuring successful broadband program delivery. Prepares proposals for the use of BEAD funds in collaboration with these stakeholders, as collaboration is a requirement of the BEAD application process. Leads technical assistance with the implementation of community-level digital equity plans, and acts as a point of state support for local leaders. Participates in stakeholder program planning; helps stakeholders understand how they are impacted by the digital divide, where they have programmatic or funding needs, and what goals need to be established to ensure shortfalls are addressed. Helps build capacity to ensure broadband projects are successfully delivered at the local level.
- **Strategic Planning Director.** Spearheads the development of statewide broadband plans, which should incorporate clear metrics, KPIs, and time lines to ensure successful delivery. Serves as an expert on Federal developments in broadband policy, while also analyzing developments in the programs and policies of peer states to ensure continued implementation of best practices. (This will be critical in ensuring that best practices are incorporated in the planning process.) Uses expertise to inform and write BEAD and other funding proposals, while documenting existing funding and program efforts across the state.

FIGURE 15. Six key role archetypes of the ideal broadband office



- **Digital Equity Planning Director.** Spearheads and builds long-term digital equity plans, programming, and capacity. Establishes clear goals and KPIs for programs to ensure continued year-over-year measurement. Serves as a strategy and policy expert for ongoing digital equity projects and engages stakeholders across the full ecosystem to ensure expertise represents various perspectives. Works closely with the Strategic Planning Director to build programming, and sets best practices related to digital equity across the broadband office.

NDIA provides a list of suggested activities for digital equity offices,⁶⁵ including coordinating digital inclusion activities; developing digital equity policy; coordinating funding; strengthening digital equity ecosystems; educating policy-makers, local governments, and stakeholders on digital equity and inclusion; guiding digital equity research and data use; and piloting scalable digital inclusion models.

- *Program Planning and Evaluation Director*. Serves as a leader in ensuring that the state's broadband plan is adopted and implemented. Evaluates the performance of the program against predetermined goals and identifies areas to refine and build out future programs. Collaborates with other directors and managers within the office based on findings to ensure that their respective initiatives are lean and on track for success. Prepares public-facing reports in concert with this evaluation to inform stakeholders of existing program progress and include plans for future program development.

North Carolina offers an example of a broadband office that is investing in helping counties with their own digital equity efforts. The state established the Nation's first state Office of Digital Equity and Literacy, which is housed within the Department of Information Technology, Division of Broadband and Digital Equity (DBDE). In addition to investing substantially in digital infrastructure, the state allocated \$50 million in a digital literacy awareness campaign. It is also providing an important technical assistance role, helping 18 counties in the state to develop their own digital equity plans and providing a digital inclusion plan template to guide county-level digital inclusion planning.⁶⁶

Governor Kelly of Kansas also created an Office of Broadband Development housed in the Kansas Department of Commerce to deliver a coordinated statewide approach to broadband strategy. In the creation of this office, the governor emphasized the importance of connectivity for economic development, education, and healthcare. The governor also noted that the promise of telemedicine to transform health care would be undermined without sufficient internet.⁶⁷

2. Map the Divide

In late 2022, the FCC is expected to release new broadband maps that will show, down to the address level, where broadband is available and where it is not. The NTIA will then use these FCC maps to do two things: allocate BEAD funding to each state based on the relative size of their digital divide, and determine where a state should prioritize BEAD deployment. However, the existence of these FCC maps does not negate the need for states to create their own state maps. In fact, the need for state maps is perhaps greater than ever.

State maps have several uses that will be vital to the success of Federal programs. First, state maps can help verify the accuracy of the FCC's maps. The FCC maps, like all new maps, will have flaws, and so the FCC will open a challenge process by which states and the general public can suggest corrections. If a state has its own maps and data, it will be more effective in the challenge process and thereby ensure a better implementation of BEAD. Second, state maps can capture details which will not be included in the FCC maps, such as broadband access within multi-dwelling units (*e.g.*, apartment buildings), the cost of available Internet services, the prevalence of digital skills and devices, and other such barriers to adoption. These additional metrics will be useful to understand all aspects of the digital divide and inform Digital Equity Act goals. Third, the state mapping process can provide a venue for states, ISPs, and community organizations to build a shared vision of the digital divide and align on priority projects. Finally, state maps will help states to independently anticipate project costs, evaluate the progress, and hold grantees accountable.

We recognize that obtaining household-level connectivity data can be difficult. To collect community-level data, states should enable and partner with community institutions that have a close relationship with households (*e.g.*, schools, public housing, and public health). One of the simplest ways to do this is by incorporating questions about connectivity into existing surveys. Such questions, also known as digital needs assessments (DNAs), can provide a snapshot of a community's connectivity.

⁶⁵ Huffman, A. (2021). *Defining a state digital equity office*. National Digital Inclusion Alliance. <https://www.digitalinclusion.org/defining-a-state-digital-equity-office/>

⁶⁶ Bergson-Shilcock, A. (2022). *States are leading the way on digital equity*. National Skills Coalition. <https://nationalskillscoalition.org/blog/digital-equity/states-are-leading-the-way-on-digital-equity/>.

⁶⁷ Carpenter, T. (2020). *Gov. Laura Kelly signals new wave of broadband development in Kansas*. Kansas Reflector. <https://kansasreflector.com/2020/10/08/gov-laura-kelly-signals-new-wave-of-broadband-development-in-kansas/>.

DNAs should measure a variety of metrics, including the availability, quality, and price of devices and Internet service; an individual's comfort and skills with technology; and an individual's reliance on public Wi-Fi.⁶⁸ DNAs should also be conducted on a recurring basis and, where possible, tied to location and demographic information.

As an example, in 2022 Virginia passed S.B. 724,⁶⁹ which requires schools to add questions about home connectivity to their existing student surveys. *Schools already routinely survey their students, and so, by adding questions about household connectivity, Virginia has found a simple way to collect broadband data.* This will be useful for communities looking to unlock Federal funds. Similarly, the Colorado Office of the Future of Work collaborated with the Department of Public Health & Environment to include questions on digital skills in a health survey.⁷⁰

Beyond DNAs, states can collect data using more specialized institutional tools.⁷¹ In California, the nonprofit California Emerging Technology Fund (CETF) administers a "Statewide Survey on Broadband Adoption." This helps California understand statewide trends in adoption among vulnerable communities.⁷² Similarly, North Carolina has a set of visual dashboards that track a range of connectivity indicators, including fixed and cellular coverage, service cost, and upload and download speeds. The dashboards are updated daily and can be disaggregated by county to show areas of specific need.⁷³

3. Plan with Institutions

To unlock their full funding, the BEAD program and the State Digital Equity and Capacity Grant program both require states to develop detailed plans and submit them for Federal approval. Each of these plans will require states to describe planned uses of the funds and establish measurable goals.

One of the major requirements of these plans is that states collaborate with community stakeholders. Specifically, BEAD's Five-Year Action Plan and State Digital Equity Plans must describe a comprehensive community engagement process, showing collaboration with local, regional, and tribal entities. NTIA has released guidance on Setting Up Initial Stakeholder Engagement⁷⁴ and Planning a Stakeholder Engagement Strategy.⁷⁵

These plans should also incorporate a vision for how broad-band infrastructure and digital equity initiatives will enhance institutional services. To ensure plans meet institutional needs, states should include institutional stakeholders in the planning process as early as possible. For example, a state broadband office might collaborate with the state's Department of Education to understand connectivity requirements for online learning in the state.⁷⁶ Similarly, the state could work with the Department of Health to understand the connectivity requirements for innovations in public health. States can also connect with nonprofit organizations, like the School, Health, and Libraries Broadband Coalition (SHLB)⁷⁷ and the National

⁶⁸ Council of Chief State School Officers. (2020). *Home digital access data collection: Blueprint for state education leaders*. https://ccsso.org/sites/default/files/2020-07/7.22.20_CCSSO%20Home%20Digital%20Access%20Data%20Collection%20Blueprint%20for%20State%20Leaders.pdf.

⁶⁹ Text of Virginia State Bill 724. <https://lis.virginia.gov/cgi-bin/legp604.exe?221+ful+SB724>.

⁷⁰ Bergson-Shilcock, A. (2022). *States are leading the way on digital equity*. National Skills Coalition. <https://nationalskillscoalition.org/blog/digital-equity/states-are-leading-the-way-on-digital-equity/>.

⁷¹ Ritzo, C., Rhinesmith, C., & Jiang, J. (2022). *Measuring library broadband networks to address knowledge gaps and data caps*. Information Technology and Libraries, 41(3). <https://doi.org/10.6017/ital.v41i3.13775>.

⁷² California Emerging Technology Fund. (n.d.) *Statewide surveys: California broadband adoption by the numbers*. <https://www.cetfund.org/action-and-results/statewide-surveys/#:~:text=CETF%20developed%20and%20sponsors%20the,from%2055%25%20to%2090%25>.

⁷³ North Carolina Department of Information Technology. (n.d.) *Broadband survey dashboards*. <https://www.ncbroadband.gov/broadband-survey/broadband-survey-dashboards>.

⁷⁴ National Telecommunications and Information Administration (NTIA). (2022). *Setting up initial stakeholder engagement*. <https://broadbandusa.ntia.doc.gov/sites/default/files/2022-04/Initiating%20Stakeholder%20Engagement.pdf>.

⁷⁵ NTIA. (2022). *Planning a stakeholder engagement strategy*. <https://broadbandusa.ntia.doc.gov/sites/default/files/2022-04/Planning%20a%20Stakeholder%20Engagement%20Strategy.pdf>.

⁷⁶ Common Sense Media's prior report, *Closing the K-12 digital divide in the age of distance learning*, provides a guide on technical requirements for various elements of digital learning. https://www.common SenseMedia.org/sites/default/files/featured-content/files/common_sense_media_report_final_7_1_3pm_web.pdf

⁷⁷ School, Health, and Libraries Broadband Coalition (SHLB) website. <https://www.shlb.org/>

League of Cities (NLC),⁷⁸ to understand the unique needs of their institutional members and the communities they serve.

Institutions can help build state broadband plans in a variety of ways, including but not limited to:

- Defining technical requirements (*e.g.*, broadband speeds, latency, jitter, and device capabilities) needed for current and future internet-based services;
- Articulating the digital skills needed to use internet-based institutional services. Clearly defined skills will help states create comprehensive digital equity plans;
- Including local communities in digital divide efforts. For example, by distributing resources and surveys (as detailed above), promoting ACP adoption (as detailed below), or encouraging public participation in the planning process;
- Conducting research on the impact of broadband connectivity on education, healthcare, and other essential services.

Once stakeholders align on strategy, states should develop public-facing documentation of the goals and road map. This will increase transparency, allow for more informed public feedback, and promote accountability. New York,⁷⁹ North Carolina,⁸⁰ Texas,⁸¹ and other states⁸² offer good examples of a comprehensive, transparent planning process.

4. Promote the ACP

Historically, ISPs have prioritized investments in areas with a high concentration of potential customers. These areas, typically populous and/or affluent, are more likely to generate return on investment (ROI), an important consideration when building something with high up-front cost like a broadband network. However, this pursuit of reliable ROI has meant that ISPs neglect lower-income and rural areas, which have unreliable ROI.

The ACP can change this calculation. With widespread enrollment, the ACP could turn lower-income communities into a reliable source of ROI. This would make them attractive to existing ISPs and could even support the development of new ISPs. By doing so, the ACP could bring connectivity to digitally redlined communities and potentially foster competition in the broadband market (see Figure 16, page 31).

However, research shows that there is a general lack of awareness of the ACP, and the application processes can discourage enrollment, especially among individuals with low digital literacy.⁸³ *Therefore, states should support institutions and other community-based organizations to promote enrollment in the ACP as a means of incentivizing infrastructure investment in digitally redlined communities.* This will be especially important in the coming years as ISPs decide where to apply for BEAD grants.

Figure 17 (see page 270) shows how the ACP improves ROI calculations for ISPs. *Our analysis finds that the ACP reduces the per-household subsidy required to incentivize ISP investment by \$500.*

⁷⁸ National League of Cities website. <https://www.nlc.org/topic/technology/>.

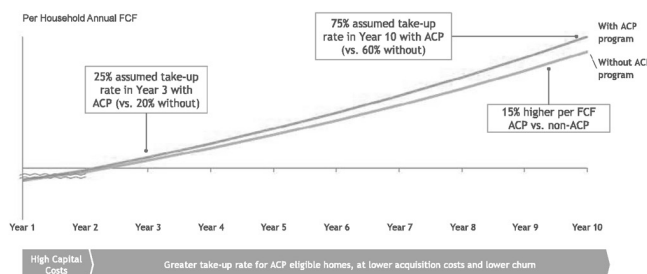
⁷⁹ New York State ConnectALL Initiative website. <https://broadband.ny.gov/>.

⁸⁰ North Carolina Department of Information Technology. (n.d.) *North Carolina's digital divide*. <https://www.ncbroadband.gov/digital-divide>.

⁸¹ Texas Broadband Development Office. (2022). *Texas broadband plan*. <https://comptroller.texas.gov/programs/broadband/plan.php>.

⁸² A full list of state broadband plans is available on the NTIA website: <https://broadbandusa.ntia.doc.gov/resources/states>.

⁸³ Goodchild, C., Hill, H., Kalmus, M., Lee, J. & Webb, D. (2022). *Boosting broadband adoption and remote K–12 education in low-income households*. Boston Consulting Group. <https://mkt-bcg-com-public-pdfs.s3.amazonaws.com/prod/accelerating-broadband-adoption-for-remote-education-low-income-households.pdf>.

FIGURE 16. Network deployments in regions with ACP-eligible homes realize higher cash flows, faster

Note: See economic case for full details on model structure and assumptions.

Sources: Expert and ISP interviews, Benton Institute; BCG analysis

FIGURE 17. Existence of ACP reduces by 25% the per-household subsidy needed to incentivize providers to build in rural areas

Greenfield rural opportunity economics, in a world...				
	...Without ACP	...With ACP		Rationale (for figures in a world with ACP)
	Total	Total ¹	ACP Segment ²	
% take-up ²	+5% (Y1) +20% (Y3)	+7% (Y1) +25% (Y3)	+2% (Y1) +5% (Y3)	Higher due to lower cost to consumer and additional adoption support
Monthly churn	2%	1.5%	1%	Lower given lower involuntary churn and less price-driven churn at lower cost to consumers, coupled with additional barriers to switching (e.g., new forms)
ARPU	\$70	\$60	\$35	Lower given limited spend above subsidy (e.g., those w/large adoption barriers on <\$30 plan; others w/greater digital literacy pick a higher plan w/\$30 subsidy)
Ancillary margin	\$10	\$10	\$10	Equivalent ancillary margin given equivalent likelihood to need hardware, etc.
Operating costs ³	\$140	\$130	\$100	Lower operating costs as some costs are borne by community organizations (e.g., marketing and promo) and somewhat lower cost to serve (e.g., help desk)
Cost to pass ⁴	\$5,500	\$5,500	\$5,500	Equivalent in line with cost to pass fiber in a rural area
Cost to connect ⁵	\$800	\$800	\$800	Equivalent in line with customer installation costs in a rural area
Per-household FCF in year 10 ⁶	\$435	\$495		Higher given larger subscriber base, lower acquisition and lower churn; somewhat offset by lower ARPU
Per-household passed break-even subsidy ⁶	\$2,200	\$1,700		The existence of ACP, which subsidizes subscriber service fees up to \$360 per year, reduces the per-household subsidy required to incentivize ISP investment by \$500, generating benefit for the government and increasing the market attractiveness for new entrants and incumbent providers.

* Estimates 30% of subs are ACP enrollees.

¹ Percent of households that subscribe to broadband (net of churn); estimates 60% take-up in year 10 in the world without ACP, 75% in the world with ACP.

² Includes one-time acquisition costs and ongoing cost to serve equivalent to 35% of ARPU.

³ Cost of construction, design, and electronics; "low" rural costs, per Benton.

⁴ Cost of customer installation; "low" rural costs, per Benton.

⁵ FCF in year 10 represents perpetuity CF; estimates 4% inflation YoY.

⁶ NPV based on 20% WACC and 4% perpetuity growth. Note: Some numbers rounded for ease of reading.

Sources: Expert and ISP interviews, Benton Institute; BCG analysis

The ACP improves the economic case for deployment for several reasons:

1. It effectively lowers the cost of service and thereby increases the take-up rate (*i.e.*, the percentage of households that subscribe to Internet service).
2. ACP subscribers have lower churn (*i.e.*, fewer cancellations per month). Because their bill is subsidized by the government, an ACP household's ability to subscribe is less contingent on income and employment. For similar reasons, ACP households are also less likely to voluntarily churn because some price sensitivity is removed. Moreover, ACP customers are less likely to switch service providers because the burden of signing up with a government benefit is higher.
3. ACP subscribers are easier for ISPs to acquire. Governments and philanthropies are funding awareness campaigns, and community organizations are assisting with enrollment. These activities reduce the marketing costs needed to acquire ACP subscribers.⁸⁴

⁸⁴ Kalmus, M., Hill, H., Lee, J., Goodchild, C. & Webb, D. (2022). *A human approach to closing the digital divide*. Boston Consulting Group. <https://www.bcg.com/publications/2022/how-to-close-digital-divide-with-human-approach>.



States should work with institutions to promote enrollment in the ACP. Common Sense, in partnership with the Digital Equity Institute and Arizona State University (ASU), demonstrates one way this can be done. Together, these partners are running an ACP marketing campaign in Phoenix, Arizona, that is designed to overcome the three main barriers to ACP adoption:⁸⁵

1. Lack of awareness of and trust in the ACP;
2. The ACP's complicated enrollment process, particularly for disconnected households;
3. Lack of digital skills among the ACP's target population.

The campaign uses traditional marketing (*e.g.*, TV, radio, digital, physical) to raise awareness in high-eligibility areas. The marketing highlights the potential for free Internet and/or cost savings. The marketing is co-branded with trusted local organizations to differentiate the ACP from similar sounding but less trusted ISP offers. It also emphasizes the ACP's status as a new federally guaranteed benefit and highlights the potential to get free Internet service.

Interested individuals are offered two methods to enroll: a website and a phone hotline. The website allows individuals to quickly and easily enroll themselves. But, being an online website, it requires an Internet connection and digital skills to access, which the ACP's target population may not have. The hotline is designed to provide an offline alternative. It allows callers—both those without connectivity and those who simply need extra help—to get customized, one-on-one guidance from an ACP enrollment specialist. This level of support can be critical to overcoming the myriad issues that can arise during the enrollment process. Finally, both the website and the hotline offer users digital inclusion resources, which help newly connected individuals successfully use the internet. In this way, the ACP can be used to attract disconnected and low-income households into the digital inclusion ecosystem.

⁸⁵ Common Sense Media. (2022). *Common Sense Media launches campaign in Arizona to help families apply for free internet*. <https://www.common sense media.org/press-releases/common-sense-media-launches-campaign-in-arizona-to-help-families-apply-for-free-internet>.

The California Emerging Technology Fund (CETF) is leading a similar campaign in California.⁸⁶ CETF's goal is to achieve 90 percent enrollment, and they are tracking their progress through a partnership with the University of Southern California (USC). CETF and USC have built a data dashboard that calculates ACP eligibility and enrollment at the county and ZIP code level,⁸⁷ which allows CETF to precisely target its outreach and better coordinate with local partners.

These campaigns demonstrate how institutions can play a key role in promoting the ACP. ASU is using its tech support center as a hotline to provide the community with digital navigator services, and USC is using its capacity for data analysis to monitor and refine ACP outreach. *By promoting enrollment in the ACP, states and institutions can help connect low-income communities and potentially incentivize deployment in the areas that need it most.*

5. Create Sustainable Funding and Policy

To ensure the current broadband opportunity results in lasting progress, states should create policy ecosystems that incentivize competition, sustainable funding, and consumer protections.

States can encourage competition by making nontraditional broadband providers (e.g., community broadband providers, electric cooperatives, and public-private partnerships) eligible for current and future broadband programs.⁸⁸ While their eligibility will not guarantee that communities build their own networks, it will allow the possibility where communities are interested. And often, the simple act of allowing robust competition and new market entrants is enough to result in higher-quality projects from existing providers.

States should also ensure that they have sustainable sources of funding for local broadband initiatives. To date, funding for such initiatives has been insufficient to close the digital divide.⁸⁹ One reason is that funding opportunities, including recent Federal programs, are often time limited. While the upcoming funds provide an unprecedented amount of support, states should also identify and/or create more long-term sources that are not reliant on stimulus or short-term grants. In addition, states should seek to maximize available funding. For example, combine Capital Project Funds with BEAD funds to achieve more comprehensive projects.

One example is the Connect Illinois program, which is making an over \$400 million investment to bring universal broadband access to the state by 2024. It is doing this by leveraging a combination of public, private, nonprofit, and philanthropic funding opportunities. Similarly, the California Department of Education raised over \$18 million from 138 donors, enabling the state to distribute 1.1 million devices and 100,000 hotspots to students across 97 percent of counties.⁹⁰ Finally, the New York Digital Inclusion Fund, which is funded by Schmidt Futures and managed by NDIA, will support digital inclusion coalitions and innovative partnerships to increase connectivity.⁹¹

States should also expand digital consumer protections to ensure that, as broadband expands and online activities become increasingly common, individuals' data and welfare is protected. To do this, states should empower existing consumer protection agencies, such as public utility commissions (PUCs) and offices of the attorney general (AG), to track and audit broadband service offered by ISPs. This will help states consider future broadband projects and identify ISPs that fail to meet promised service obligations. Similarly, states should pass and enforce measures to prevent ISPs from exploiting market dominance. For example, the California Public Utilities Commission (CPUC) mandated, by way of executive order, the elimination of data caps and overage charges by ISPs. Additionally, to ensure privacy-protective

⁸⁶ Walters, S. (2022). *How Los Angeles county is boosting broadband subsidy enrollment*. California Emerging Technology Fund. <https://www.cetfund.org/how-los-angeles-county-is-boosting-broadband-subsidy-enrollment/>.

⁸⁷ California Affordable Connectivity Program (ACP) Enrollment dashboard. <https://www.arcgis.com/apps/dashboards/8c0249a9de8d404a9b49966fb824b728>.

⁸⁸ Weng, S. (2022). *Could investments in community broadband bridge the digital divide?* Urban Institute. <https://www.urban.org/urban-wire/could-investments-community-broadband-bridge-digital-divide>.

⁸⁹ Ali, T., Chandra, S., Cherukumilli, S., Fazlullah, A., Galicia, E., Hill, H., McAlpine, N., McBride, L., Vaduganathan, N., Weiss, D. & Wu, M. (2021). *Looking back, looking forward: What it will take to permanently close the K-12 digital divide*. Common Sense Media. https://www.common Sense Media.org/sites/default/files/featured-content/files/final_-_what_it_will_take_to_permanently_close_the_k-12_digital_divide_vfeb3.pdf.

⁹⁰ CDE Foundation. (n.d.). *CA digital divide fund*. <https://cdefoundation.org/digitaldivide/support/>.

⁹¹ Benjamin, G.C. (2021). *New York Digital Inclusion Fund opens requests for proposals*. National Digital Inclusion Alliance. <https://www.digitalinclusion.org/blog/2021/09/16/new-york-digital-inclusion-fund-opens-requests-for-proposals/>.

practices for data, state policymakers should provide clear guidance to ISPs, schools, and other institutions as to how they should collect and share data for government purposes (e.g., mapping, DNAs).⁹² Examples include privacy protections such as those found in the California Consumer Privacy Act⁹³ and the Illinois Biometric Information Privacy Act,⁹⁴ and platform accountability legislation like the California Age Appropriate Design Code Act,⁹⁵ which will protect vulnerable new users from predatory online practices.

CONCLUSION

For decades, leaders in education, health care, workforce development, and government have been cautious about integrating internet-based technologies into institutional services, in part because the benefit of these technologies—cost savings, service improvement, expanded access—cannot be fully realized without causing harm to those caught in the digital divide. Now, by making it possible to close the divide, the IIJA and ARPA could unlock innovation within these institutions for the benefit of all.

To take advantage of this opportunity, state leaders should:

- *Ensure that populations served by institutions are fully connected*. This means universal home access to fast, reliable, and affordable Internet service and high-quality devices as well as training in the skills to use them. If these conditions are not met, then institutions will not be able to comprehensively integrate internet-based technologies into their services, and the entire public will suffer from the missed opportunity.
- *Include institutions responsible for essential services in the planning process for BEAD and the Digital Equity Act*. To ensure these plans meet the requirements of institutional services, states should specifically include schools, health care providers, local governments, business, and related community organizations in their broadband planning processes. These institutions can help define the technical specifications (e.g., speeds, reliability, cost, device capabilities) and technical skills needed to use their services.
- *Consider both online and offline services when drafting plans*. Plans that enable and encourage institutions to shift to online services should also ensure that offline services remain accessible, have similar functionality, and are specialized for the needs of offline users. Moreover, consider designing offline and low-bandwidth services so that they can be used during emergencies and major Internet disruptions.
- *Prioritize fiber*. The largest downside of fiber networks—their cost—can be offset by current Federal funding programs. Leverage this opportunity to build fiber networks that will last for generations. Fiber networks provide the fastest and most reliable service of any technology available; they have the lowest operating costs; they are simpler and relatively inexpensive to upgrade; and they are the most resilient to usage increases, signal interference, weather, and natural disasters.
- *Create broadband and digital equity funding programs at the state level*. Many current sources of funding are temporary. Programs tied to emergency designations, like the ECF, may end, and when they do, the connectivity they established could be lost. Similarly, the recent Federal funding programs, big as they are, are scheduled to end after five years. To maintain universal connectivity in the absence of Federal funding, states will need to create their own sources of state-level funding. The CPF and ECF provide good models for such funding programs. By funding devices, affordable service, flexible deployment, and digital inclusion, these programs cover the main ongoing costs of universal service.
- *Implement digital needs assessments through existing institutional networks*. Many institutions already collect data on their community. By adding DNAs to these existing surveys, states can easily collect data on connectivity, which can

⁹² Common Sense Media. (2022). *Maximizing Federal funding to close the K–12 digital divide*. https://www.common SenseMedia.org/sites/default/files/featured-content/files/homework_gap_state_policy_primer.pdf.

⁹³ California Consumer Privacy Act. <https://ccpa-info.com/california-consumer-privacy-act-full-text/>.

⁹⁴ Illinois Biometric Information Privacy Act. <https://www.ilga.gov/legislation/fulltext.asp?DocName=09500SB2400&GA=95&SessionId=51&DocTypeId=SB&LegID=&DocNum=2400&GAID=9&SpecSess=&Session=>

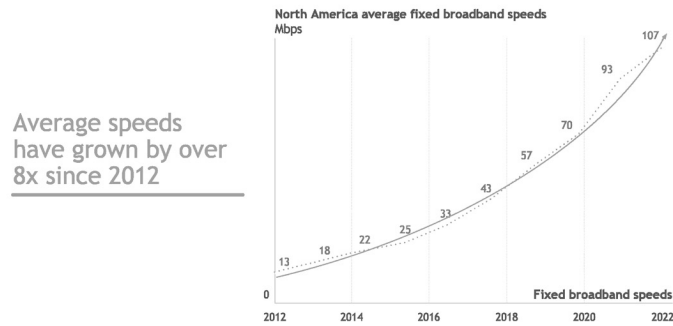
⁹⁵ California Age Appropriate Design Code Act. https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=20210220AB2273.

be used to challenge FCC maps, target broadband deployment, and measure the effectiveness of connectivity initiatives.

- *Use the ACP to incentivize deployment and competition*. High rates of ACP enrollment can make lower-income communities more attractive to ISPs, driving deployment and new market entrants. By promoting ACP enrollment, states can help to bring service to historically underserved communities, creating more service options and driving down prices for the whole community.
- *Use the ACP to drive high-quality, inclusive, and effective use of connectivity*. Use ACP awareness and enrollment campaigns as a way to encourage lower-income households to adopt high-quality Internet service and connect them to relevant digital inclusion resources.
- *Update consumer protections as more people and services move online*. Consumer protections should encompass data privacy and protect against abusive online practices. Empower existing consumer protection agencies (e.g., public utility commissions and the offices of the attorney general) to monitor, audit, and respond to unfair or deceptive practices undertaken by providers and other technology companies.

APPENDIX A: SUPPORT ANALYSIS

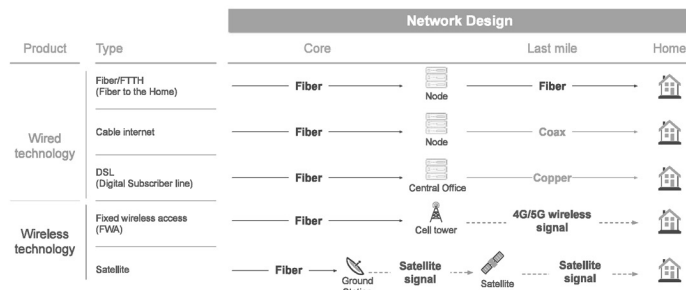
FIGURE A1. Growth in average broadband speed over time



Sources: Cisco; BCG analysis

FIGURE A2. Types of network design

Infrastructure Technologies | Technologies split across wired and wireless

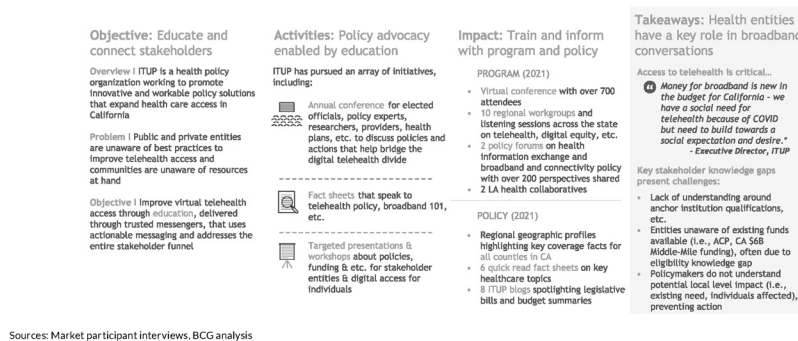


Sources: Texas Broadband Plan; BCG analysis

APPENDIX B: CASE STUDIES

FIGURE B1. Insure the Uninsured Project (ITUP):

Connecting and providing education to stakeholders is critical in bridging the digital divide

**FIGURE B2. Oregon's Special Supplemental Nutrition Program for Women, Infants, and Children (WIC):**

Survey to WIC community shows need for devices and connectivity in telehealth delivery; internally, IT lacks training and funding

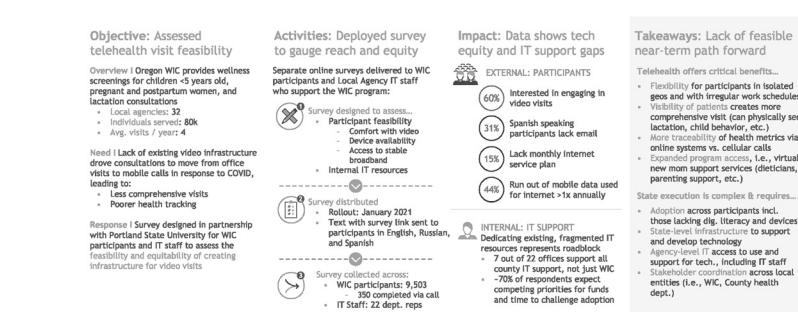
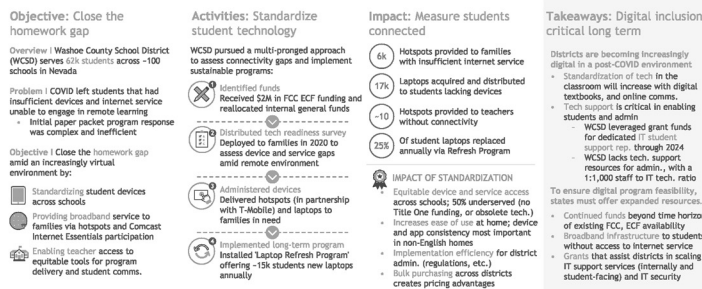


FIGURE B3. Washoe County School District:

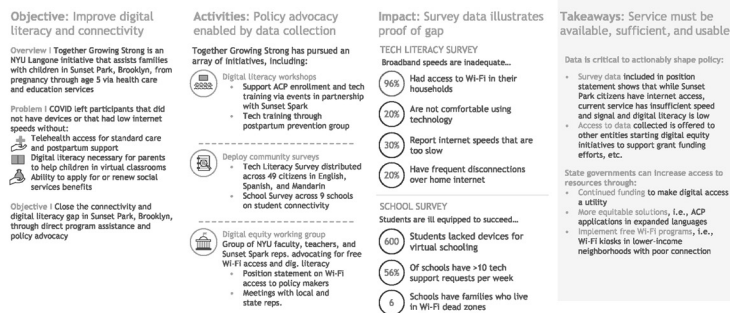
Tech standardization creates student learning and administrative efficiencies, narrowing the homework gap



Sources: Market participant interviews, BCG analysis

FIGURE B4. New York University (NYU) Langone Health, Together Growing Strong Initiative:

Residents are connected, but data demonstrates extensive digital literacy and service quality gaps



Sources: Market participant interviews, BCG analysis

FIGURE B5. Institute for Local Self-Reliance:

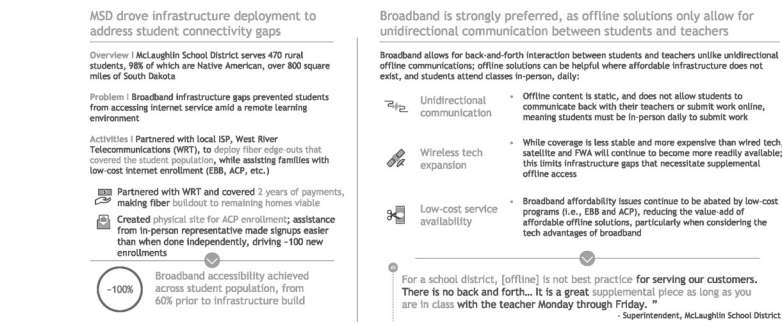
Funding and infrastructure access limit digital equity for tribal nations, but bootcamps facilitate network builds



Sources: Market participant interviews, BCG analysis

FIGURE B6. McLaughlin School District:

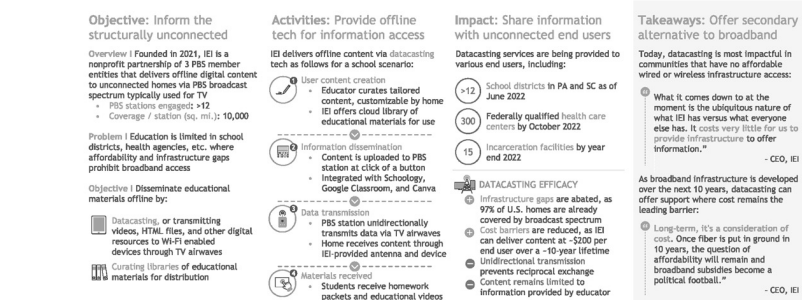
Offline use case is limited, and should only be viewed as supplemental option if students attend in-person classes



Sources: Market participant interviews, BCG analysis

FIGURE B7. Information Equity Initiative (IEI):

Offline datacasting offers digital content delivery alternative where infrastructure and affordability prohibit broadband



Sources: Market participant interviews, BCG analysis

APPENDIX C: INTERVIEWEES

Arizona State Library
 Arizona State University
 Baltimore Public Schools
 California Labor Federation Workforce and Economic Development Program
 Charlotte Regional Business Alliance
 City of Portland Comcast
 Connect Waukegan
 EducationSuperHighway
 Harvard Business School—Managing the Future of Work Project
 HCS EdConnect & The Enterprise Center
 Information Equity Initiative
 Institute for Local Self-Reliance
 Insure the Uninsured Project
 Land O'Lakes
 McLaughlin School District
 New York University Langone Health
 Oregon Employment Department
 Oregon Health Authority
 Purdue Center for Regional Development
 University of North Carolina at Chapel Hill School of Medicine
 Washoe County School District
 World Education

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. MARIA CANTWELL TO
KIMBALL SEKAQUAPTEWA

Middle Mile Infrastructure. In October, NTIA announced it received 235 applications asking for more than \$5.5 billion to deploy middle mile infrastructure. This existing middle mile program, however, only has \$1 billion in funding. Congress would need to provide additional middle mile funding to meet this demand.

In addition to this demand, we've seen examples where partnerships between electric utilities and broadband providers have used existing middle mile facilities from utilities to help push broadband deployment in Virginia, Ohio, Missouri, Tennessee, West Virginia, and Mississippi.

That is why, in the 117th Congress, Senator Capito and I introduced the GRID Broadband Act (S. 4763), which would leverage existing electrical grid infrastructure to produce cost-efficient, resilient, and future-proof networks that increase connectivity in unserved and underserved areas.

This legislation could create thousands of skilled jobs, enhance the capacity and resilience of our critical networks, reduce costs to providers and consumers, and set the stage for sustained long-term economic growth.

Question 1. How have middle mile network construction projects in your community brought to expanding broadband connectivity in your local communities?

Answer. It is a natural extension for electric utilities, especially coops, to enter broadband with their extensive pole line routes, not to mention billing systems, help desk, GIS databases, and trucks that can roll for installs or repairs. Some challenges include aging pole lines, which require replacement, or hunters' stray shots or mylar birthday balloons frying lines (that did take down one of our networks). Buried fiber is still king but given the cost, the role of existing utilities should be maximized. And the proximity to local memberships living and working in those communities creates a commitment to best serve local needs, whereas and in despite of high-cost FCC subsidies, the incumbent ISPs have not chosen to build out their networks in vast swaths of rural America.

In our experience, the existence of middle-mile networks begets last-mile deployments when the tribes act as ISPs. Our first two middle-mile networks connecting six tribes were lit in 2018. And it was these exact tribes that during the pandemic, were able to pivot and stand up last mile residential services—and those with utility departments can most easily transition for the above stated reasons. In fact, when our schools closed in March 2020, one of these tribes installed a fixed wireless network serving all homes for the start of school in August 2020, only five months

later. They were able to spend a few hundred thousand dollars as opposed to the millions because the middle mile network was already in place and the backhaul challenge was already solved. And instead of years of construction they were able to provide residential Internet access in a few months. During COVID-19 all six of the tribes with access to backhaul set up fixed wireless or fiber-to-the-home.

It is our experience that reliable and affordable middle mile service is vital to expanding and maintaining high quality, affordable broadband connectivity. The open network requirement for current and upcoming NTIA grants require reasonable access to middle mile network resources for transit and transport, providing ISPs, community networks, tribal networks, state education networks, etc. access to a variety of Internet services, including backhaul. When entities have access to middle-mile services they are able to implement their networks in a wide variety of ways to meet individual needs and network designs. This is opposed to the historic model that the incumbent ISPs had proprietary networks and sold a few services, which I believe to be an antiquated model in the evolution of the Internet. To prevent competition, incumbents restricted the middle-mile resources either through preventing access to dark fiber or charging extremely high prices especially in rural areas perpetuating, if not creating the digital divide. Breaking through that model with innovative new entrants into the broadband space such as electric coops provides a next generation approach to connect the least connected.

Question 2. Do you agree that additional investment in middle mile infrastructure deployment will help bridge the digital divide?

Answer. Yes—robust middle-mile availability creates options for all. In fact, I would say that the current IJA middle mile grant for \$1 billion is well intended but underfunded. My current tribal education middle mile project of 324 miles will be able to serve both tribal and non-tribal lands in New Mexico, connecting rural tribes to a carrier hotel in downtown Albuquerque. Along the way we can help connect some of the most rural communities in New Mexico, whether as community networks or to provide backhaul to ISPs serving those areas. In this way middle-mile projects serve beyond the stated tribes in the grant.

As New Mexico state efforts to inventory broadband assets are learning, the existing middle mile resources are not always adequate and therefore, are not robust enough or as resilient as we need for immediate and future needs, *i.e.*, scalability. A big piece of this puzzle is affordable, reliable middle mile service. In order to ensure all areas receive quality broadband service for everyone, it will be important to ensure adequate middle mile service exists (for example, to ensure all people are able to receive 100/100 Mbps at a minimum, a certain level of middle mile capacity will be necessary).

Efficient Use of Broadband Funds. My home state of Washington recently received substantial amounts of broadband funding, including \$64.3 million in Tribal Broadband grants to expand broadband access for the Lummi Nation and the Confederated Tribes of the Colville reservation.

However, as we know, receiving funding is only the first step. Coordinating broadband deployment and ensuring that funds are used effectively and quickly to provide connectivity to stakeholders are certainly challenges.

Question 3. What more should Congress and Federal agencies be doing to help communities with limited capacity use Federal broadband funds effectively?

Answer. This is a very important question, as many TBCP grant recipients will likely face challenges in the execution of the grants not to mention day forward sustainability of operations and management. From workforce training to management training, these new operations will need on-going support for financial sustainability. In fact, many are small operations where the revenue to provide home Internet access will not be enough to pay for the operations. Nor should they be expected to do so. The TBCP opportunity for tribes was created in response to the fact that the market did not bear the return on investment for private companies to invest in those areas, and for that reason, they did not build out. Tribes now are solving the digital divide on their own and new paths for sustainability funds need to be identified. Access to universal service funds, such as Lifeline could be made possible in the creation of broadband only ETC designations.

For Tribes, the Federal Communications Commission's most recent broadband progress report shows that while the digital divide gap is narrowing, it isn't narrowing at a fast enough pace to allow Tribal Communities to keep at par with the rest of the United States. In addition, middle mile infrastructure funding is only part of the equation. The National Tribal Telecommunications Association recently released a white paper entitled "Evaluating the Critical Need for Broadband Sustainability Funding on Rural Tribal Lands" which goes into detail about the need for Tribes to have the ability to sustain broadband networks after these networks

are constructed. Infrastructure and sustainability deployment go hand in hand and should be addressed cohesively.

For the recently awarded TBCP projects, Federal interagency coordination and prioritization of broadband infrastructure projects in the DOI and BIA are critical to successful on-time on-budget tribal deployments. New Mexico tribes, including the SFIS Pueblo Education Network (PEN), are proud to have recently earned nine TBCP grants to date. The implementation and agency support of the November 2022 Department of Interior-Federal Communications Commission, and Department of Commerce NTIA MOU is essential to the success of the NTIA TBCP grants because historically the required DOI and BIA agency approvals on infrastructure projects have had delays due to lack of personnel resources, financial resources, prioritization, and confusing/changing approval processes within the agency. If this MOU elevates the need for interagency coordination and prioritizes the required approvals, all tribes and tribal entities trying to implement and execute the projects efficiently and compliantly will benefit.

Relative to the BIA in New Mexico, it is important to provide the personnel and financial resources to the Southwest Regional Office (SWRO) and its agencies, which includes Southern Pueblos Agency and Zuni Agency. Those entities will need to engage with and work with the respective Pueblo governments regarding any real estate approvals, land title and records support, and environmental permitting approvals required for the compliant construction tribal projects. Nationally, all BIA regional offices and agencies need to be provisioned with the necessary resources to support the current (and only first) wave of TBCP projects that already should have started in the NEPA and Section 106 review processes.

Furthermore, the initial grant period for the TBCP program was a year, with the possibility of a one-year extension that could be included in the grant application. Given the real-world challenges of lengthy Federal environmental assessments and the global supply chain issues, the grant period can now be extended to four years. However, the administrative costs are capped at 2 percent per statute, well below tribal indirect cost rates, and cannot be increased in the budgets. Therefore, the tribal entities will need to carry the administrative costs for the extended grant period. As a result, TBCP projects may require gap funding to complete projects and Congress as well as NTIA could encourage state broadband planning to consider that the effective use of Federal funds includes successful implementation of these TBCP Federal grants in their state broadband planning and grant fund development.

With respect to the tribes that have yet to apply for broadband funding, namely the smaller less-resourced tribes, state outreach is critical. In these cases, it will be vital to provide Tribes and Tribally-owned or affiliated entities with the resources they can use to prepare for grant-funded deployment. One example of this type of assistance is California's Local Agency Technical Assistance program and the Tribal Technical Assistance program, both of which provide assistance for entities for pre-construction activities such as engineering designs and feasibility analyses. Grant writers and post-award compliance and Federal grant reporting professionals are in short supply, requiring special attention as a workforce that needs to be developed.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. BRIAN SCHATZ TO
KIMBALL SEKAUAPTEWA

Question 1. When the United States auctions spectrum located over the lands of an Indian tribe it does not share any portion of the proceeds with the tribe. Should it?

Answer. Given that Tribal governments are sovereign over their lands, it seems that proceeds from the sale of spectrum over Tribal lands should at least be shared with the Tribe. Senator Schatz's "Tribal Spectrum Trust Fund Act of 2022" certainly seems like a good first step in repairing this historical inequity. If you think of the airwaves as roadways, would not a fair market value to use the asset be reasonable? Financial exchange in the form of profit sharing and right-of-way and leases costs could motivate lessees to use the spectrum and expand network services. Too often we see lessees or secondary market lessees sitting on spectrum over tribal land neither providing services nor allowing for tribes to use the spectrum for their own operations.

Also important is for tribes to have sovereign control over the airwaves above us as with our other natural resources. That said, the spectrum is currently leased and/or earmarked for specialized applications, such as public safety, therefore requiring a dynamic response to the issue at hand. At a minimum, the tribe should benefit from services such as public safety services traversing their airwaves, which might

not always be a given. Before any FCC public auction, tribes should be given the opportunity to lease the spectrum, such as that which occurred for the first time ever in the 2020 Tribal Priority Window for the 2.5 GHz band, formerly known as EBS. Tribes should also be provided the first right of refusal for potential lessees through meaningful tribal engagement ahead of, not after, the auctions.

Question 2. Please provide your analysis of how well the FCC's new broadband maps portray the availability of broadband on tribal lands. Should the FCC display tribal boundaries just as it displays state boundaries, or at least allow that as an optional layer on its nationwide map? Should the FCC provide the number of locations associated with individual tribal areas, in addition to offering an aggregated rollup of the number of tribal locations and tribal broadband availability nationwide? Are there changes you believe the FCC needs to adopt with respect to how it displays broadband availability on tribal lands?

Answer. While the new National Broadband Map does allow for the display of Tribal boundaries as an optional layer, there should be an indication, that is easily accessible, of the number of locations served and unserved with X speeds. In addition, it has been reported that the locations included in the broadband fabric used in developing the National Broadband Map is significantly less accurate in Tribal areas than in other areas (for a variety of factors, including the lack of USPS addresses). These issues need to be resolved before the National Broadband Map can be relied upon to accurately reflect the status of broadband deployment in Tribal areas.

In addition to the mapping interface and database features, the workflow to engage in the mapping process is also important to consider. Yes, the FCC map allows for individuals to challenge availability, but putting this burden on the populace is less effective than a Tribe completing batch challenges—a skill Tribes need help to develop. In New Mexico, as part of the state BEAD planning, we have a tribal outreach program. In brainstorming the most effective way to improve tribal data, we skipped the webinar and the how-to videos. Instead, we provided a day-long work session inviting the Tribes and their designees from utility departments, housing departments, IT staff, and GIS staff to bring a laptop to complete the location and availability challenges. After an overview of the broadband mapping goals and an introduction to the tools, we had state broadband office GIS staff work with each tribe to see what the map currently showed and identify a strategic path to complete the challenges. There was significant variety in the best approach for the different Tribes and the work is ongoing, but this level of support was required to improve the accuracy of the National Broadband Map by the people who know their communities the best.

In workforce training discussions relative to broadband infrastructure, we often hear about fiber-optic technicians or tower climbers but increasingly we need GIS specialists for Tribes to participate advanced data efforts. The expert use of data is critical to maximize funding eligibility, and less-resourced tribes without this capability will be excluded from the process.

The NTIA Tribal Broadband Connectivity Program NOFO allowed for tribal self-certification, providing tribes the chance to articulate their access to affordable high-speed Internet on their lands. Internet adoption in Tribal areas, often low-income, is also an affordability issue not just an availability issue. One variable that the FCC broadband map doesn't quite capture yet is affordability. Until such time, companion documentation such as tribal self-certification, should be accepted in Federal programs.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. AMY KLOBUCHAR TO
KIMBALL SEKAQUAPTEWA

Effective and Efficient Deployment of Federal Funds. The *Infrastructure Investment and Jobs Act* invested \$65 billion in broadband infrastructure, the largest investment our country has ever made in broadband. We must now ensure that these funds are used efficiently to get our communities connected quickly.

Question. What steps do you think Congress should take to ensure that the historic investment in broadband that we made is deployed efficiently and effectively?

Answer. For the upcoming allocation of the Broadband Equity, Access and Deployment (BEAD) program funding, it appears that the NTIA and states are moving forward prudently, and only time will tell if the funding is effective. The most accurate data on FCC National Broadband Map used to determine national formula funding for states is important for effective use of the funds. To achieve the best data, balanced with speedy allocation of the funds, an additional window to add location challenges would add a lot of missing broadband serviceable locations to the map.

However, this is not likely before June 2023, NTIA's formula funding deadline. Part of the challenge is that both the FCC and NTIA have different statute-bound accountabilities calling into question the expectations for interagency cooperation. Congress monitoring interagency cooperation is an important piece of the puzzle.

A challenge of BEAD is that local governments and tribes are eligible to apply but will find the eligibility requirements functionally prevent successful participation. These barriers include a minimum 25 percent match, audited financials, letters of credit, etc. The prescriptive requirements in the development of the BEAD and Digital Equity state plans, coupled with BEAD NOFO requirements foreshadow what we can expect from the program. I believe that we will find that BEAD is designed for the existing private sector who will pick their next best markets as their preferred grant areas. I fear that the most expensive rural and low-income communities will too easily be missed because the application process is difficult and requires both financial and personnel resources that may not be available.

BEAD is not the only Federal broadband fund. For the effective and efficient deployment of Federal funds, the GAO's "Broadband: National Strategy Needed to Guide Federal Efforts to Reduce Digital Divide Appendix II: Inventory of Federal Broadband Programs" identifies broadband opportunities that may fit a specialized need such health care or provide a broadband related planning for communities that are not currently competitive for BEAD funding. Although difficult for applicants to navigate the myriad of grants, there is a need for a diversity of funds to provide for multi-faced broadband needs from special sectors such education and health care to governmental and business functions to adoption. There is a need for alignment of grant processes but not at the cost of forcing a singular solution to a highly complex and dynamic landscape.

Considering the Tribal digital divide, while narrowing, still exists, the states should ensure that engagement with the Tribes occurs to ensure Tribal broadband needs are met. In addition, please see above as it relates to the effectiveness of infrastructure investment and the interplay with sustainability funding. Effective investment cannot be accomplished without considering how Tribes will be able to maintain and sustain these networks into the future.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JACKY ROSEN TO
KIMBALL SEKAQUAPTEWA

Better Leveraging Broadband Funding for Tribal Communities. Nevada is home to 28 Tribal Nations, which are spread across our vast state. All of these Tribal communities have unique needs, but access to affordable, high-speed Internet can dramatically improve the quality of life and economic future of all Tribal Nations, especially those in rural areas—including better health outcomes and improved job prospects.

Question 1. Ms. Sekaquaptewa, under your leadership, New Mexico tribal schools and libraries leveraged E-Rate funds to get fiber to tribal schools and libraries. For Tribes across the country looking to benefit from the BEAD, E-Rate, and other broadband grant programs, how can they best leverage these funding sources to achieve more connectivity for tribal communities?

Answer. It will be very important for states, for example, to engage with Tribal governments when awarding BEAD grants to ensure Tribal needs are met. Please also see above for Tribal challenges in BEAD participation. Many states have begun this process, but there needs to be more effort in state planning grant efforts and NOFO development prior to BEAD funding awards.

We are fortunate that our New Mexico Office of Broadband Access and Expansion has a positive relationship with tribes and has proactively engaged tribes in the BEAD and Digital Equity planning. However, this is not true in all states that have tribal lands. I believe that the White House and NTIA are both responsible to hold states accountable to include tribes in the planning and awarding of grants as expected per statute. Unfortunately, while tribes and local governments are eligible to apply for the BEAD, the smaller less-resourced tribes will not have the resources or knowledge to engage in the BEAD process without consistent and direct outreach.

For E-Rate, a key to our success was to build a consortium of tribal schools and libraries. We took advantage of the E-rate self-provisioned network eligibility to build a middle-mile network. This is detailed in the American Library Association's, "Built by E-Rate: A Case Study of Two Tribally-Owned Fiber Networks and the Role of Libraries in Making It Happen." We built an economy of scale by clustering tribal communities within a geographic vicinity to apply together in a network design that connects small and rural school and libraries to higher education. Across the country, higher education participates in extensive research and education networks and

tapping into these resources using E-rate can solve for Internet access while also improving educational programming and potentially transforming K–12 education.

The FCC Emergency Connectivity Fund (ECF), a sister program to E-rate conceived as a response to COVID–19, merits a permanent funding stream. Unlike E-rate, ECF allows for schools to purchase devices and Internet access for students to use at home, in their residences. This was important during the COVID–19 lockdowns for remote learning. For tribal homes, school-provided Internet and devices were the only tools that students had to engage in learning. The pandemic has permanently changed the expectation that students will use mobile devices on and off campus every day. By virtue that ECF allows for schools to bulk purchase the Internet instead of individual families, it is a unique program that fills a critical niche. As rural tribal lands are well established to be the least connected in the United States, the role of education supported by ECF to connect tribal students as often their only Internet lifeline is vital.

The pandemic also uplifted the issue of digital inclusion, including digital equity and concepts of digital discrimination. The IIJA funding opportunity for digital equity grant funding is an opportunity for tribes. Tribes were eligible to apply for planning funds, similar to a state. To do so, tribes completed a Letter of Agency to NTIA to participate and will receive formula funding (TBD) to create a digital equity plan in advance of the grant window. Most tribes in the United States submitted the LOA. The success was a mixed blessing, as the amount of funding divided by the number of participating tribes reduced the expected allocation significantly. Furthermore, the prescriptive elements required by NTIA for the digital equity plan will be a challenge for small one staff libraries, small tribal governments, or their designees. Coordinating the tribal efforts for planning activities such as data collection will enable group success. Folding the tribal efforts into state digital equity planning is a strategy that would help the tribes and also help the state meet their requirements for outreach and data collection.

Question 2. Ms. Sekaquaptewa, I also understand you have advocated for leveraging E-Rate funding to construct middle-mile networks. As the author of NTIA's Middle Mile Infrastructure Grant, I understand the importance in investing in middle-mile networks and leveraging public-private partnerships to deploy last mile networks. How can communities use the Middle Mile Infrastructure Grant Program to tap into local expertise to deploy broadband to the home?

Answer. The challenge of using E-rate for middle mile networks is that the network use is limited to schools and libraries. In our NTIA Tribal Broadband Connectivity Program (TBCP) award, it can be used for all community needs. When we designed the middle-mile project connecting three tribes over 324 miles, we looked at the route and identified the municipalities, higher education, Federal research facilities, K–12 schools and libraries, and tribes and met with them during the planning period. Some heard of our project and sought us out because they were struggling with their own connectivity issues and were looking for opportunities and partnerships beyond what the current market offered them. Planning with the higher education institutions not just on routes, but collocation and network aggregation points resulted in new regional opportunities for all.

Please see the previous comments on how the tribal middle-mile network spring boarded the last mile deployments. For the TBCP program and the tribes, we designed the middle-mile facilities to hand-off transport Internet to the sovereign and independent last-mile networks. We also offered technical assistance to help design fiber-to-the-home networks and provide grant writing resources to the three tribes to meet their last mile needs. These sister projects were awarded and now the project teams meet as a cohort to achieve overall group success. Our project team is comprised of a fiber engineer, network engineer, environmental engineer, Federal grant specialist, attorney, and a project director, all local professionals who are invested in the well-being of our tribal communities and state. NTIA's Middle Mile Infrastructure Grant can tap local expertise by awarding points for the use of local vendors and building consortia that will naturally include local stakeholders, achieve economies of scale, and harness subject matter expertise.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. BRIAN SCHATZ TO
HON. MICHAEL POWELL

Question 1. When the United States auctions spectrum located over the lands of an Indian tribe it does not share any portion of the proceeds with the tribe. Should it?

Answer. Proceeds generated by spectrum auctions are deposited in the U.S. Treasury unless otherwise specified by Congress. This enables the expert technical agen-

cies that oversee spectrum to make decisions about spectrum allocation and access to spectrum in a manner that promotes new and diverse entrants, including Tribal entities.

Question 2. Please provide your analysis of how well the FCC's new broadband maps portray the availability of broadband on tribal lands. Should the FCC display tribal boundaries just as it displays state boundaries, or at least allow that as an optional layer on its nationwide map? Should the FCC provide the number of locations associated with individual tribal areas, in addition to offering an aggregated rollup of the number of tribal locations and tribal broadband availability nationwide? Are there changes you believe the FCC needs to adopt with respect to how it displays broadband availability on tribal lands?

Answer. The FCC met an important milestone with the release of the first draft of its new broadband map, a marked improvement over prior broadband availability maps. But it was only the first step and the FCC's process allows for iterations to correct errors and omissions. Additional information and data—such as tribal boundaries or areas subject to enforceable commitments to deploy broadband—could help Congress and other stakeholders evaluate the progress towards closing the digital divide.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. AMY KLOBUCHAR TO
HON. MICHAEL POWELL

Resilient Broadband Infrastructure. The best time to build resilience into a network is before a disaster occurs.

Question 1. How are your members ensuring that new deployments utilizing Federal funding will be able to withstand potential natural disasters?

Answer. For all deployment and upgrades, NCTA members design networks to be resilient by minimizing points of failure and ensuring redundancy. Moreover, in every jurisdiction they serve, each company has an emergency plan that includes preplanning for resiliency, plans for during communications outages, as well as post-event analysis. Given the variety of challenges confronted by NCTA members across the country—from blizzards to wildfires, hurricanes to volcanos—communications providers need the flexibility to tailor their preparation and response to likely events in their specific communities.

Question 2. How could current resilience rules be improved to ensure that outages are less likely to occur?

Answer. First, one-size-fits-all approaches will not be effective. Given the wide variety of scenarios that could affect network resiliency, there must be flexibility to respond to changing facts on the ground and apply best practices developed from previous occurrences.

Second, modern communications networks are engineered to operate with a commercial power source. Operators do have backup power systems in place and are committed to maintaining power to the networks to support first responders and critical facilities as long as conditions are safe. However, communications companies' networks are not designed to be a long-term replacement for commercial power and cannot replace electric utility networks.

In light of the above, continued progress in coordination and communication among service providers, electric utilities, and emergency officials is crucial to improvement of recovery efforts and prompt network restoration.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. JACKY ROSEN TO
HON. MICHAEL POWELL

Ensuring Success in Digital Affordability Programs. Most rural areas in Nevada have low Affordable Connectivity Program enrollment rates, despite being the areas where this support is needed most and could provide the greatest benefit.

Question. What do successful outreach and engagement strategies look like, beyond the usual “find trusted community partners and get the word out”? And how can strategies that have been successful elsewhere in the country be replicated in communities where enrollment rates have been low?

Answer. Successful outreach and engagement strategies will need to be tailored to the specific communities where enrollment rates are low. The number of households that could subscribe to broadband today but choose not to is significantly larger than the number of homes without broadband service available at all. Promoting awareness of existing adoption programs—like the Affordable Connectivity Program or providers' own programs—continues to be a necessary component of the strategy,

and outreach by trusted voices within the community is often more successful. But other barriers to adoption should also be addressed, including lack of digital skills, lack of perceived relevance, and the cost of obtaining and maintaining computer equipment. Therefore, initiatives that include trusted “digital navigators” (individuals trained to help people get online) can help build essential digital skills and the confidence needed to prepare and encourage non-adopters to take full advantage of digital opportunities. Our members actively support and participate in such programs, and such programs could be funded through either the Digital Equity Act or the Broadband Equity, Access, and Deployment program.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. BRIAN SCHATZ TO
JONATHAN SPALTER

Question 1. When the United States auctions spectrum located over the lands of an Indian tribe it does not share any portion of the proceeds with the tribe. Should it?

Answer. Spectrum is a national resource and as such, any proceeds from a spectrum auction should be spent on national priorities as determined by elected leaders.

Question 2. Please provide your analysis of how well the FCC’s new broadband maps portray the availability of broadband on tribal lands. Should the FCC display tribal boundaries just as it displays state boundaries, or at least allow that as an optional layer on its nationwide map? Should the FCC provide the number of locations associated with individual tribal areas, in addition to offering an aggregated rollup of the number of tribal locations and tribal broadband availability nationwide? Are there changes you believe the FCC needs to adopt with respect to how it displays broadband availability on tribal lands?

Answer. USTelecom and its members are committed to working closely with the FCC to get the broadband maps right. We thank Congress for its leadership in passing the Broadband DATA Act, and the FCC for its hard work in getting the first iterations of the maps released.

Tribal lands have been historically under-connected, and USTelecom and its members will continue to work with the FCC, NTIA, and tribal leaders, to ensure 100 percent connectivity is achieved. An optional layer in the FCC maps to display tribal boundaries, as the FCC does with state boundaries, could be helpful in order to understand the availability of broadband on tribal lands. However, as noted in Kimball Sekaquaptewa’s oral testimony, the FCC may not always have the ability to collect the number of serviceable locations associated with individual tribal areas unless tribes self-report.

USTelecom believes that good data are critical to ensuring the success of the FCC maps in reporting broadband availability on tribal lands and throughout the country. When it comes to tribal lands, it may require relying on self-reported raw data from the tribes themselves.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. AMY KLOBUCHAR TO
JONATHAN SPALTER

Resilient Broadband Infrastructure. The best time to build resilience into a network is before a disaster occurs.

Question 1. How are your members ensuring that new deployments utilizing Federal funding will be able to withstand potential natural disasters?

Answer. USTelecom members are committed to investing in redundancy and resiliency for wireline broadband services. They are transitioning away from legacy to next generation networks (*i.e.*, copper to fiber) wherever possible and laying fiber underground when the terrain allows.

USTelecom members are also spearheading voluntary initiatives aimed at increasing network resiliency and preventing the harms caused by disaster-driven outages. One such effort is the Cross-Sector Resiliency Forum, which brings together representatives from the communications and electric sectors to improve communication and coordination in preparing for and responding to natural disasters. USTelecom members also are proud to have been appointed to serve on President Biden’s National Infrastructure Advisory Council, which is focused on shaping effective resiliency policies and protocols across the range of our national critical infrastructure, including broadband.

Question 2. How could current resilience rules be improved to ensure that outages are less likely to occur?

Answer. Agencies such as the FCC should build upon existing voluntary frameworks and best practices to foster a flexible, rather than prescriptive, approach to network resiliency. Natural disasters are unpredictable and best addressed by allowing providers to respond to the situation on the ground rather than by mandating a set of rigid rules to which all must adhere regardless of changing conditions or the technologies involved. Promoting communication and cooperative practices, including encouraging participation in voluntary frameworks, facilitates optimal tailored responses to emergency scenarios.

To facilitate disaster response and recovery, the communications and power sectors have been collaborating through fora such as the Cross-Sector Resiliency Forum and the White House National Infrastructure Advisory Council on issues such as identifying critical sites for priority power restoration, coordination of emergency operations centers, distribution of local contact information, and debris-clearing. Federal and state officials should continue raising awareness about how electric companies should avoid inadvertent fiber cuts that otherwise create secondary network outages following a disaster and thereby undermine recovery efforts. And the FCC should continue to foster, promote, and facilitate voluntary measures that promote the coordination of the communications and power sectors.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. JACKY ROSEN TO
JONATHAN SPALTER

Ensuring Success in Digital Affordability Programs. Most rural areas in Nevada have low Affordable Connectivity Program enrollment rates, despite being the areas where this support is needed most and could provide the greatest benefit.

Question. What do successful outreach and engagement strategies look like, beyond the usual “find trusted community partners and get the word out”? And how can strategies that have been successful elsewhere in the country be replicated in communities where enrollment rates have been low?

Answer. In addition to partnering with community organizations and digital navigators to help address the multiple barriers to broadband adoption and raise awareness about the Affordable Connectivity Program (ACP), USTelecom members continue to invest in social media, mailings, newspaper ads, and other media and are working with State broadband offices on local outreach. We are encouraged that NTIA's Digital Equity Act grant programs and the FCC's Your Home, Your Internet Pilot Program and ACP Navigator Pilot Program will promote innovative and successful digital equity and adoption strategies that will also increase ACP enrollments.

Today, more than 1,300 broadband providers and more than 15 million households are participating in the program, which provides up to a \$30 discount on monthly broadband bills and enables qualified households to receive low-or no-cost high-speed internet. However, funding for this critical program could run out sometime in 2024. Congress should make permanent this commitment to connecting low-income households and ensure that everyone can connect to the power and promise of broadband.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. ROGER WICKER TO
JONATHAN SPALTER

Question. Is there still a shortage of well-trained telecommunications workers? Please describe what challenges you're facing to secure the workforce needed to deploy broadband infrastructure. What steps can Congress take to help develop a well-trained telecommunications workforce?

Answer. Yes, the Nation does indeed face a profound shortage of well-trained telecommunications workers. At the same time, however, with the proliferation of BEAD and other Federal and state broadband projects coming online, USTelecom members will need to have all skilled workers' hands-on-deck to deploy broadband as quickly as possible. A highly skilled broadband workforce goes hand in hand with maintaining our communications infrastructure and ensuring we stay connected. The broadband workforce that keeps our networks connected are essential frontline employees, and it is imperative that Congress encourages and funds programs aimed at strengthening the broadband workforce.

In the last Congress, USTelecom was pleased to support S. 996, the IMPACT Act as introduced by Senator Wicker that would award \$100 million in grants to historically black colleges and universities, tribal colleges and universities, and minority-serving institutions to develop job training programs to educate and train students

to participate in the telecommunications workforce. In addition, USTelecom also supported S.163, the Telecommunications Skilled Workforce Act as introduced by Senator Thune which establishes an FCC-led interagency working group that, in consultation with the Department of Labor will make recommendations to address workforce issues within the telecommunications industry. We strongly encourage the reintroduction and consideration of both pieces of legislation.

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. JOHN THUNE TO
JONATHAN SPALTER

Question. Concerns have been raised about potential fraud related to participation in the Affordable Connectivity Program (ACP). Do you think the FCC has adequate controls in place to prevent or detect fraud? Are there fraud-prevention measures the FCC should implement?

Answer. USTelecom members are active participants in and are committed to the success of the Affordable Connectivity Program (ACP). The FCC has taken steps to provide necessary oversight of the program, such as improving IT systems to better detect and prevent improper ACP enrollments. Overall, the ACP is proving successful. Today, more than 1,300 broadband providers and more than 15 million households are participating in the program, which provides up to a \$30 discount on monthly broadband bills and enables qualified households to receive low-or no-cost high-speed internet. However, funding for this critical program could run out sometime in 2024. Congress should make permanent this commitment to connecting low-income households and ensure that everyone can connect to the power and promise of broadband.

Question. What do you see as the role and key function for the FCC's Universal Service Fund programs and its statutory mission going forward as these grants are being distributed?

Answer. The Federal Universal Service Fund ("USF") High-Cost Program plays a unique role in connecting the millions of Americans living in rural America. Unlike the newly created BEAD Program, or the broadband programs at the Department of Agriculture that provide funding for building networks, the USF high-cost programs provides the ongoing operating expenses to keep rural networks viable and affordable. Often, municipalities and other new entrants emphasize network construction costs, but overlook the more critical costs of maintaining and upgrading the networks over time. Ultimately, they have been unable to upgrade and continue to operate the network.

A healthy USF program is the key to sustaining BEAD investments. As such, the USF contributions base should be expanded to include those companies that benefit the most from broadband connectivity, specifically dominant edge providers that drive the vast majority of Internet traffic but do not contribute to the Fund. Congress should quickly pass legislation that instructs the FCC to adopt an order that expands the base of contributors to include the edge.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. MARIA CANTWELL TO
ANGELA SIEFER

Efficient Use of Broadband Funds. My home state of Washington recently received substantial amounts of broadband funding, including \$64.3 million in Tribal Broadband grants to expand broadband access for the Lummi Nation and the Confederated Tribes of the Colville reservation.

However, as we know, receiving funding is only the first step. Coordinating broadband deployment and ensuring that funds are used effectively and quickly to provide connectivity to stakeholders are certainly challenges.

Question. What more should Congress and Federal agencies be doing to help communities with limited capacity use Federal broadband funds effectively?

Answer. Congress and Federal agencies should be allocating substantial efforts to understand the experiences, voices, and needs of communities with limited capacities.

For several of the IIJA programs, the agencies administering the programs have consulted with communities via public comment periods or focus groups. However, for small community-based organizations and resource strapped communities, the consolidated timelines, limited technical assistance, and the programs' complexity have inhibited them from participating in the programs. For the remaining programs that have yet to be established, we encourage Congress and the Federal agencies to simplify the application processes and ensure they are approachable and

accessible to the intended grantees. In addition, we encourage Federal agencies to provide robust technical assistance to organizations representing covered populations and communities with limited capacity and resources.

Individual members of Congress can also help these organizations connect to philanthropy and industries who benefit from increased broadband adoption. Collectively, Congress can establish the Digital Equity Foundation with spectrum proceeds, permanently fund the Affordable Connectivity Program and Emergency Connectivity Fund, and dedicate additional digital equity funding to Indian Country and Territories. Permanent solutions to broadband adoption must be holistic—taking into account digital skills training and device ownership. They’re key to broadband adoption, as is public education and outreach.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. BRIAN SCHATZ TO
ANGELA SIEFER

Many state agencies that administer Federal programs have not entered into data-sharing agreements with USAC.

Question. What challenges do eligible individuals who reside in these states face when they sign up for the Affordable Connectivity Program or Lifeline? How are their experiences different than those who reside in states where agencies have enrolled in data-sharing agreements? In your opinion, what impact does this have on enrollment numbers for these programs?

Answer. The application process for the Affordable Connectivity Program is already cumbersome and difficult for applicants and is causing many applicants to not complete their application and enroll in the program, despite being eligible for it. A lack of data-sharing agreements between Federal agencies, state governments and USAC adds an additional complication to the application process and makes it even more difficult for consumers to enroll in the program. Applicants attempting to verify their eligibility through their participation in one of the Federal or state programs that do not have a data-sharing agreement have a longer, more complicated enrollment process than those who can leverage information from the data sharing agreements. In these instances, applications require the applicant to identify and upload documentation to prove their participation in the program, and manual reviews of submitted documentation, which can slow down application approvals and benefits.

Computer matching agreements reduce the need for manual reviews, and this also makes the application process easier for consumers who would most benefit from ACP. NDIA recently hosted a roundtable discussion to learn more about the barriers for enrollment in ACP. One thing our digital navigators shared is that too much time is spent helping consumers find and learn how to use other systems just to get the documentation they need to submit supporting documents for ACP. Automatic database connections support both the accuracy of the verification process and minimize hurdles for consumers.

While we don’t have data on the number of households this process is inhibiting from enrolling in the program, in 2021 GAO found that 68 percent of applications for the Lifeline program were abandoned when they required manual review.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. AMY KLOBUCHAR TO
ANGELA SIEFER

Effective and Efficient Deployment of Federal Funds. The *Infrastructure Investment and Jobs Act* invested \$65 billion in broadband infrastructure, the largest investment our country has ever made in broadband. We must now ensure that these funds are used efficiently to get our communities connected quickly.

Question. How can the \$2.75 billion of funding Congress passed for Digital Equity Grants be used to help improve digital literacy?

Answer. The state digital equity capacity grants and the competitive grants embedded in the Digital Equity Act section of the Infrastructure Investment and Jobs Act have the potential to improve digital literacy and digital skills since programs that advance digital skills are an eligible expense for both grants. However, funding individual programs alone will not be enough if they do not support systems-level change. We need robust digital inclusion ecosystems across the country that allow us to continually adapt as technology changes.

The DEA grants have the potential to do this if meaningful community engagement is employed by both NTIA and the states, DC, and territories. Community

leaders who are closest to the problems are best suited to create innovative solutions tailored to their community.

While monumental—alone, the DEA programs will not be sufficient for closing the digital skills gaps across the country. We will need continued Federal support and long-term solutions, like the Digital Equity Foundation Act, to create systems that meet people where they are and provide opportunities to advance one's skills for future, unknown needs.

RESPONSE TO WRITTEN QUESTION SUBMITTED BY HON. JACKY ROSEN TO
ANGELA SIEFER

Ensuring Success in Digital Affordability Programs. Most rural areas in Nevada have low Affordable Connectivity Program enrollment rates, despite being the areas where this support is needed most and could provide the greatest benefit.

Question. What do successful outreach and engagement strategies look like, beyond the usual “find trusted community partners and get the word out”? And how can strategies that have been successful elsewhere in the country be replicated in communities where enrollment rates have been low?

Answer. To ensure those who need these programs have access, we need more training, simplicity, and continued funding for on-the-ground, person to person innovative enrollment support.

It's essential that both trusted organizations and providers are well-trained to properly enroll and serve households that need support with understanding the ACP process. Many NDIA affiliates have invested countless hours in understanding the unique nuances of the enrollment process, documenting the different paths to enrollment, and have formed a community of practice sharing best practices with each other. More formalized training and technical assistance and support from USAC would ensure more organizations have the tools and training they need to adequately serve their constituents.

Likewise, providers should ensure all their customer service personnel and their contracted or third-party customer service vendors are well-trained on ACP and the low-cost services they offer. In addition, accessing these low-cost services should be more simple and user friendly.

Finally, the on-the-ground, trusted partners need continued financial support. That support could come from Congress, but it can/should also come from the industries that benefit from their customers being online, philanthropy, and local/state governments. Educating constituents and providing one-on-one support is time and labor intensive but can take many forms. For example, one NDIA affiliate signed up over 600 participants to the program through street teams. Others have printed flyers, gone door-to-door to enroll participants, paid for ads in local news outlets, and advised individuals and households on the best options for their household. Another still hosted a community concert during Digital Inclusion Week where they advertised the ACP program amongst other digital inclusion programs. Initiatives like these—varied as they are—are crucial to ensuring people know of, understand, and can enroll in the program.