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Chairman Blumenauer, Ranking Member Buchanan, and distinguished members of the Ways and Means Subcommittee on Trade, thank you for the invitation to testify on the important issue of U.S. infrastructure, particularly high-speed broadband that must be as ubiquitously available and sustainable as our water, transport, and electricity systems. I am Nicol Turner Lee, Senior Fellow, Governance Studies and Director of the Center for Technology Innovation at the Brookings Institution. With a history of over 100 years, Brookings is committed to evidenced-based, nonpartisan research in a range of focus areas. My research expertise encompasses data collection and analysis around regulatory and legislative policies that govern telecommunications and high-tech industries, along with the impacts of digital exclusion, artificial intelligence, and machine-learning algorithms on vulnerable consumers. My forthcoming book, *Digitally invisible: How the internet is creating the new underclass*, addresses these topics and will be published by Brookings Press later this year.

Let me start my testimony by applauding Congress for recognizing access to high-speed broadband as one of the critical infrastructure assets in the U.S. Even before the pandemic, high-speed broadband networks have delivered significant benefits for citizens in areas like education, employment, health care, government services, and banking. Smart infrastructure that embeds technology into energy, waste, and transport systems have also been significant to the vitality of these grids, and, in some cases, have reduced environmental impacts, provided greater longevity to aging and eroding

assets, and helped to optimize investments and operating expenses through modernization. The utility of broadband for these various use cases makes the case for why high-speed broadband networks matter in the 21st century, especially when they are available, affordable, and widely adopted by America's most vulnerable populations and their communities.

In my testimony, I will touch upon **three points** of interest to this subcommittee as we think about the role of broadband in creating more viable options for economic revitalization and global competitiveness. *First*, digital infrastructure must be deployed equally and complementary to other essential infrastructure, including energy grids, water systems, transport, and other legacy systems in need of modernization. *Second*, consumer adoption, workforce training, job creation, and entrepreneurship are keys to making broadband not only readily available and adopted by a range of stakeholders, but also amplify its role in the production of opportunities for residents, business owners, and entrepreneurs who impacted by the rapid digitization of products and services. My *third* and final point is that broadband infrastructure must be equitably deployed and available throughout the U.S., especially in rural, urban, and tribal areas where the lack of access has essentially foreclosed on a range of socioeconomic opportunities to improve the quality of lives for these residents. Expansion of broadband infrastructure must also come with a promise to close the digital divide and not widen the disparities resulting from inconsistent and non-existent access, which now correlates with a range of other systemic inequalities, including racism, poverty, social isolation, and inadequate proximity to quality institutions (e.g., schools, hospitals, and workplaces).

Combined, these three points constitute what I have been referring to in current research and my forthcoming book as America's Tech New Deal¹, which deepens the investments already made by the private sector in high-speed broadband networks, while forging ahead with new models that

¹ Turner Lee, Nicol. "Why America Needs a Tech New Deal." Democracy Journal Spring 2021, no. 60 (March 11, 2021). <https://democracyjournal.org/magazine/60/why-america-needs-a-tech-new-deal/>.

leverage this critical infrastructure for job creation, small business expansion, and the reimagined delivery of services, including remote education, work, and health care provisions.

FDR's New Deal-era programs included many infrastructure projects, including the Rural Electrification Administration and the Tennessee Valley Authority, that brought electricity to rural areas that were previously unconnected to power grids. Meanwhile, jobs programs like the Works Progress Administration and the Civilian Conservation Corps employed millions of Americans to build schools, hospitals, roads, and other improvements across the country. The New Deal programs played a major role in reducing poverty and modernizing infrastructure during the Great Depression. It wouldn't be until the presidency of Harry Truman that the Fair Deal would be enabled, which would bolster equity, inclusion, expanded resources for workers, and put forth proposals for civil rights.²

In one of CTI's recent #TechTank podcasts on closing the digital divide,³ Majority Whip Jim Clyburn (D-SC) stated that the New Deal under Franklin Delano Roosevelt was a start for economic recovery after the Great Depression, but it was not necessarily fair to those most affected by economic downturns, especially people of color. To avoid past mistakes, America's Tech New Deal must follow the cadence of Truman and be fair, inclusive, equally accessible, and leverage the power of existing and emerging technologies, like broadband and AI applications, for all citizens to be part of the rebuilding process and facilitate the nation's global competitiveness – especially after the devastating economic impacts resulting from the pandemic.

I. Background

² US House of Representatives: History, Art & Archives. "President Harry S. Truman's Fair Deal Proposal to a Joint Session of Congress." Accessed April 27, 2021. <https://history.house.gov/Historical-Highlights/1901-1950/President-Harry-S--Truman-s-Fair-Deal-proposal-to-a-Joint-Session-of-Congress/>.

³ Turner-Lee, Nicol. "With New Investments in Broadband Infrastructure, Can We Finally Close the Digital Divide?" TechTank Podcast. Accessed April 23, 2021. <https://www.brookings.edu/blog/techtank/2021/04/19/techtank-podcast-episode-17-with-new-investments-in-broadband-infrastructure-can-we-finally-close-the-digital-divide/>.

The COVID-19 pandemic escalated the global importance of reliable internet access in a more compulsory digital world. Over the last 12 months, the pandemic has not only further disrupted legacy industries stricken by the public health consequences of a virulent virus, but also transitioned the everyday functions of work, school, health care, and various social activities online. In October 2020—seven months into the pandemic—an estimated 71 percent of employed adults worked remotely in the United States, up from approximately 20 percent prior to the COVID-19 outbreak.⁴ At the beginning of the fall 2020 semester, 73 out of the nation’s 100 largest K-12 public school districts—which encompass over nine million students—only offered remote classes, without hybrid or in-person options.⁵ By May 2020, the number of virtual telehealth appointments skyrocketed an estimated 50- to 175-fold compared to before the pandemic.⁶ Meanwhile, numerous aspects of people’s daily and social lives were adapted into digital experiences, including family gatherings, public events, religious or cultural traditions, dating, and funeral memorials.⁷

New cultural norms around all or most of these newly disrupted activities make it clear that broadband infrastructure will play an expansive, and seemingly permanent role in the everyday lives of ordinary Americans, even after the public health crisis is over. According to a survey conducted by the Atlanta Federal Reserve and University of Chicago, workers may spend 20 percent of their time working

⁴ Kim Parker, Juliana Menasce Horowitz, and Rachel Minkin, “How the coronavirus outbreak has—and hasn’t—changed the way Americans work,” Pew Research Center, December 9, 2020, <https://www.pewresearch.org/social-trends/2020/12/09/how-the-coronavirus-outbreak-has-and-hasnt-changed-the-way-americans-work/>.

⁵ “School districts’ reopening plans: a snapshot,” Education Week, October 16, 2020 (updated), <https://www.edweek.org/leadership/school-districts-reopening-plans-a-snapshot/2020/07>.

⁶ Oleg Bestsenyy, Greg Gilbert, Alex Harris, and Jennifer Rost, “Telehealth: A quarter-trillion-dollar post-COVID-19 reality?” McKinsey & Company, May 29, 2020, <https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/telehealth-a-quarter-trillion-dollar-post-covid-19-reality>.

⁷ “Americans oppose religious exemptions from coronavirus-related restrictions,” Pew Research Center, August 7, 2020, <https://www.pewforum.org/2020/08/07/americans-oppose-religious-exemptions-from-coronavirus-related-restrictions/>; Caitlin Chin and Mishaela Robison, “This cuffing season, it’s time to consider the privacy of dating apps,” The Brookings Institution, *TechTank*, November 20, 2020, <https://www.brookings.edu/blog/techtank/2020/11/20/this-cuffing-season-its-time-to-consider-the-privacy-of-dating-apps/>.

remotely after the coronavirus pandemic subsides, compared to an average of five percent prior to the outbreak.⁸ Meanwhile, U.S. e-commerce retailers are expected to see a 15 to 30 percent growth across many product categories after the pandemic, which will likely impact brick-and-mortar stores,⁹ and approximately one-third of K-12 public and charter school administrators are considering either a fully-online or hybrid learning options in the next academic year.¹⁰ The economic and social benefits that come with the various applications and devices enabled by broadband are reasons why the White House's American Jobs Plan has it prominently included.¹¹

The realities of increased innovation, research, and development will be distinguishing global factors in a country's agility and embrace of the next digital revolution, which are pertinent to the U.S.' standing when compared to countries like China, which has already made claims to win the races to 5G and AI deployments.¹² In particular, broadband infrastructure is a prerequisite to improving workforce readiness training, especially for digital and technical skills, which in turn sparks entrepreneurship and creates jobs.¹³ It also empowers individuals to pursue technical careers that lead to new software, patents, and standards, fundamentally helping the United States maintain a competitive edge in technological applications. Digital inclusion benefits both individuals and nations as a whole: a 2012

⁸ May Wong, "Stanford research provides a snapshot of a new working-from-home economy," Stanford News, June 29, 2020, <https://news.stanford.edu/2020/06/29/snapshot-new-working-home-economy/>.

⁹ Tamara Charm, Becca Coggins, Kelsey Robinson, and Jamie Wilkie, "The great consumer shift: Ten charts that show how US shopping behavior is changing," August 4, 2020, <https://www.mckinsey.com/business-functions/marketing-and-sales/our-insights/the-great-consumer-shift-ten-charts-that-show-how-us-shopping-behavior-is-changing>.

¹⁰ Heather L. Schwartz et al., "Remote learning is here to stay," 2020, https://www.rand.org/pubs/research_reports/RRA956-1.html.

¹¹ "FACT SHEET: The American Jobs Plan," The White House, March 31, 2021, <https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/31/fact-sheet-the-american-jobs-plan/>.

¹² "NSCAI Final Report." Washington, DC: National Security Commission on Artificial Intelligence, March 19, 2021. <https://www.nscai.gov/wp-content/uploads/2021/03/Full-Report-Digital-1.pdf>.

¹³ John B. Horrigan, "Adapting jobs programs for today and tomorrow," Benton Institute for Broadband & Society, August 3, 2020, <https://www.benton.org/publications/adapting-jobs-programs-today-and-tomorrow>.

International Telecommunication Union (ITU) study found that broadband has a direct, positive relationship with GDP growth, economic productivity, and employment rates.¹⁴

II. The Digitally Invisible

Despite the social and economic benefits of broadband, wide gaps in access, affordability, and availability exist among certain populations across the U.S. In my forthcoming book, I redefine the concept of the “digital divide” as being less binary when it comes to contemporary public policy interventions. The historic distinction between those that have online access or a device, and those without has become murkier as the technological revolution has altered the delivery of perfunctory activities like shopping or watching movies and become a differentiator around the attainment of social and economic achievements like higher wages in employment, entrepreneurship, STEM education, and other civil society benefits. The disparities were also amplified in students’ depressed engagements in distance learning without broadband access, or in patients’ frustrations in scheduling a vaccine appointment without internet or computer access.

In America, an old and new group of “digitally invisible” people are becoming more identifiable due to the lack of access, affordability, and adoption of broadband services within the U.S. Here is where people who live in rural or tribal areas, as well as some urban locations; who are low-income; who identify as Black, Latinx, or Native American; or who lack permanent housing are the most likely to lack access to high-speed home internet. As a result, they are disproportionately less likely to receive digital skills training,¹⁵ which both limits their individual opportunities in their workforce and harms overall U.S. economic productivity. The FCC’s Fourteenth Broadband Deployment Report found that only 79.1 percent of people living on tribal lands have access to fixed terrestrial broadband at 25/3 Mbps,

¹⁴ “Impact of broadband on the economy,” International Telecommunication Union (ITU), April 2012, https://www.itu.int/ITU-D/treg/broadband/ITU-BB-Reports_Impact-of-Broadband-on-the-Economy.pdf.

¹⁵ Amanda Bergson-Shilcock, “Applying a racial equity lens to digital literacy,” National Skills Coalition, April 21, 2020, <https://www.nationalskillscoalition.org/resource/publications/applying-a-racial-equity-lens-to-digital-literacy/>.

compared to 95.6 percent of the general U.S. population.¹⁶ In 2020, the Joint Center for Political and Economic Studies reported that 30.6 percent of Black households lack high-speed internet and 17.2 percent of Black households lack a computer or are “smartphone-only.”¹⁷ Income is also a major contributor to the digital divide; almost one-third of U.S. adults with incomes below \$30,000 do not own a smartphone, and over 40 percent do not own a computer or have home broadband.¹⁸ Housing stability is a factor as well; there are over half a million homeless individuals in the United States—over 50 percent of whom are Black—who face extreme challenges to accessing the internet in the absence of a nationwide government policy to deploy broadband to temporary shelters and federally subsidized housing.¹⁹ As a result, many Americans lack access to services that are essential to domestic and global competitiveness, which exemplifies why broadband is indeed a critical infrastructure asset.

Unfortunately, the full story on national broadband access is still unclear given the lack of precise and actual data reporting, which creates uneven and ambiguous estimates. Some researchers have argued that the Federal Communications Commission, the agency with oversight of advanced communications, has understated the number of people connected by upwards of 50%.²⁰ In line with this argument, companies like Microsoft have pointed to the data collected by Broadband Now that

¹⁶ “Fourteenth broadband deployment report,” Federal Communications Commission, January 19, 2021, <https://docs.fcc.gov/public/attachments/FCC-21-18A1.pdf>.

¹⁷ “Expand internet access among Black households,” Joint Center for Political and Economic Studies, August 4, 2020, <https://jointcenter.org/expand-internet-access-among-black-households/>.

¹⁸ Monica Anderson and Madhumitha Kumar, “Digital divide persists even as lower-income Americans make gains in tech adoption,” Pew Research Center, May 7, 2019, <https://www.pewresearch.org/fact-tank/2019/05/07/digital-divide-persists-even-as-lower-income-americans-make-gains-in-tech-adoption/>.

¹⁹ Nicol Turner Lee, “How courageous schools partnering with local communities can overcome digital inequalities during COVID-19,” The Brookings Institution, *TechTank*, September 17, 2020, <https://www.brookings.edu/blog/techtank/2020/09/17/how-courageous-schools-partnering-with-local-communities-can-overcome-digital-inequalities-during-covid-19/>; “The 2019 Annual Homeless Assessment Report (AHAR) to Congress,” U.S. Department of Housing and Urban Development, January 2020, <https://www.huduser.gov/portal/sites/default/files/pdf/2019-AHAR-Part-1.pdf>.

²⁰ Busby, John, Julia Tanberk, and BroadbandNow Team. “FCC Underestimates Americans Unserved by Broadband Internet by 50%” BroadbandNow Research, April 7, 2021. <https://broadbandnow.com/research/fcc-underestimates-unserved-by-50-percent>.

speculates more than 42 million Americans do not use the internet, especially those in rural areas.²¹

Added to estimates are data presented in the White House's American Jobs Plan reports, which reports that over 30 million Americans live in geographic locations that lack broadband infrastructure at "minimally acceptable speeds," including 35 percent of those who live in rural areas.²² In Wyoming, South Dakota, and Alaska, where the average population density is among the lowest in the United States, 27 percent, 28 percent, and 24.5 percent of residents respectively live in areas that lack broadband infrastructure at "minimally acceptable speeds."²³ Furthermore, 63.6 percent, 48 percent, and 68.8 percent of residents in these three states, respectively, live in areas with only one high-speed internet network. Congress has recently called on the FCC to generate more reliable national broadband maps and provided \$98 million to fund this effort.²⁴ Federal resources have also been allocated to the U.S. Department of Commerce's National Telecommunications and Information Administration (NTIA) to fund the National Broadband Availability Mapping project that is partnering states and third-party data sets to generate more accurate results.²⁵ These efforts highlight the urgency in gathering more precise and transparent national broadband mapping data prior to the deployment of new infrastructure to ensure that assets are deployed first in the areas with the most need, including high-poverty rural, urban, and tribal areas.

²¹ Ibid.

²² "FACT SHEET: The American Jobs Plan," The White House, March 31, 2021, <https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/31/fact-sheet-the-american-jobs-plan/>.

²³ Nathaniel Rakich, "How urban or rural is your state? And what does that mean for the 2020 election?" FiveThirtyEight, April 14, 2020, <https://fivethirtyeight.com/features/how-urban-or-rural-is-your-state-and-what-does-that-mean-for-the-2020-election/>; "White House releases state-by-state fact sheets to highlight nationwide need for the American Jobs Plan," The White House, April 12, 2021, <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/12/white-house-releases-state-by-state-fact-sheets-to-highlight-nationwide-need-for-the-american-jobs-plan/>.

²⁴ U.S. Senate Committee on Commerce, Science, & Transportation. "Committee Leaders Urge FCC to Quickly Produce Accurate Broadband Maps," March 8, 2021. <https://www.commerce.senate.gov/2021/3/committee-leaders-urge-fcc-to-quickly-produce-accurate-broadband-maps>.

²⁵ National Telecommunications and Information Administration. "National Broadband Availability Map." Accessed April 27, 2021. <https://www.ntia.doc.gov/category/national-broadband-availability-map>.

The cost of broadband services is also a frequent barrier to accessing the internet. To illustrate this point, even though only 2.5 percent of Massachusetts residents live in an area that lacks broadband infrastructure with “minimally acceptable speeds,” as defined by the American Jobs Plan, 11.1 percent of households lack a home internet subscription.²⁶ And, as the White House points out, broadband in the United States is more expensive than in many other OECD countries.²⁷ New America’s 2020 Cost of Connectivity report found that the average monthly price of an internet subscription equaled \$63.38 in the United States, compared to \$44.71 in Europe—even when controlling for city sizes.²⁸ However, such access does not significantly factor in the declining costs of mobile broadband services, especially for those with income limitations, according to data from the Pew Research Center.²⁹ Over 80% of the U.S. population have smartphones or other mobile devices to get online. As previously stated, people of color, low-income, rural, less-abled, and foreign-born populations without home broadband, access to PCs, or laptops, tend to be more “smartphone dependent,” which often equates to their mobile device being the only gateway to the internet when accessing services.³⁰ Such implications suggest that “futureproof” broadband infrastructure – as deemed in the White House plan - should be designed to be flexible and technology agnostic, allowing for multiple routes to internet connectivity, including TV white spaces, wireless 5G, and resources other than fiber connections to deliver gigabit speeds.

What makes broadband infrastructure different from some of the legacy infrastructure like water and electricity is also its ability to be more widely available in open, public spaces through Wi-Fi enabled, hot spots at public institutions (e.g., libraries, schools, hospitals, community centers), and in

²⁶ “White House releases state-by-state fact sheets to highlight nationwide need for the American Jobs Plan,” The White House, April 12, 2021, <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/12/white-house-releases-state-by-state-fact-sheets-to-highlight-nationwide-need-for-the-american-jobs-plan/>.

²⁷ “FACT SHEET: The American Jobs Plan,” The White House, March 31, 2021, <https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/31/fact-sheet-the-american-jobs-plan/>.

²⁸ Becky Chao and Claire Park, “The cost of connectivity 2020,” July 15, 2020, New America, Open Technology Institute, <https://www.newamerica.org/oti/reports/cost-connectivity-2020/>.

²⁹ ²⁹ “Demographics of Mobile Device Ownership and Adoption in the United States.” Washington, DC: Pew Research Center, April 7, 2021. <https://www.pewresearch.org/internet/fact-sheet/mobile/>.

³⁰ Ibid.

federally assisted or transitional housing where poverty restricts sustainable internet connections. In the early 2000s, I worked for a nonprofit organization called One Economy³¹, whose mission was to connect low-income families with internet access across the U.S. and abroad, especially in their homes. Our early efforts to bring online access to America’s public housing later would be demonstrated in the Connect Home initiative³² under the Obama administration’s Department of Housing and Urban Development (HUD) that accelerated high-speed broadband access in 28 of their communities. Unlike other critical physical assets, broadband infrastructure is more fluid, and can be enacted in a range of places and among a variety of stakeholders, from government to public- and private-sector leaders – partnerships that have once again surfaced during the pandemic through the expansion of low-cost broadband programs like Comcast’s Internet Essentials and the establishment of the Emergency Broadband Benefit, a partnership between the FCC, private, and nonprofit organizations.³³

Both broadband infrastructure and affordability are just two aspects of addressing the challenges experienced by populations that are rapidly becoming digitally invisible while experiencing a range of other persistent systemic inequalities. Here is where broadband adoption and use are of critical importance to narrow the existential threats to digital isolation. Throughout the U.S., the gaps in nationwide adoption of broadband service are nearly double of the access challenges in getting networks directly to consumers, which makes the digital divide more encompassing of other areas (e.g., urban, suburban, and tribal) in addition to rural. The gaps in broadband adoption further exacerbate longstanding societal inequalities in access to education, Health care, employment, banking, and more.

³¹ “One Economy Corporation.” In Wikipedia, March 30, 2021.

https://en.wikipedia.org/w/index.php?title=One_Economy_Corporation&oldid=1015150705.

³² Serlin, Christine. “HUD to Help Connect Low-Income Families With Internet Access.” Housing Finance, July 15, 2015. https://www.housingfinance.com/policy-legislation/hud-to-help-connect-low-income-families-with-internet-access_o.

³³ “Internet Essentials from Comcast.” Accessed April 27, 2021. <https://www.internetessentials.com/>.

Federal Communications Commission. “Emergency Broadband Benefit,” February 11, 2021. <https://www.fcc.gov/broadbandbenefit>.

As such, it is necessary to recognize which populations are most affected in these sectors and intentionally prioritize equitable broadband deployment to serve them and increase resources in support of the utilization of broadband infrastructure, including those targeted to digital literacy, workforce development, startup capital, telehealth, remote work, and learning, among other things.

The mishaps during the pandemic at our nation's schools and among our health care providers are extraordinary examples of how the most vulnerable populations of students and patients were impacted by lack of accessible broadband infrastructure and the continuing dismissal of resources targeted to digital equity programs.

A. *Schools*

First, Black, Latinx, and Native Americans students—which are currently underrepresented in the overall population of students graduating with U.S. bachelor's degrees, especially in STEM fields—are also the least likely to grow up in households with reliable internet access.³⁴ Prior to the COVID-19 outbreak, an estimated 35 percent of Native American student households, 30 percent of Black student households, and 26 percent of Latinx student households lacked reliable broadband access, compared to 18 percent of white student households.³⁵ Furthermore, a 2020 ACT survey found that 23 percent and 17 percent Black and Latinx K-12 students reported only having access to one device at home, shared among all household members, compared to 10 percent of white K-12 students.³⁶

³⁴ Emily Tate, "Graduation rates and race," Inside Higher Ed, April 26, 2017, <https://www.insidehighered.com/news/2017/04/26/college-completion-rates-vary-race-and-ethnicity-report-finds>; "U.S. Census Bureau releases new educational attainment data," U.S. Census Bureau, March 30, 2020, <https://www.census.gov/newsroom/press-releases/2020/educational-attainment.html>; Brian Yoder, "Engineering by the numbers," American Society for Engineering Education, <https://www.asee.org/papers-and-publications/publications/college-profiles/15EngineeringbytheNumbersPart1.pdf>.

³⁵ Sumit Chandra et al., "Closing the K-12 digital divide in the age of distance learning," Common Sense Media and Boston Consulting Group, June 2020, https://www.common sense media.org/sites/default/files/uploads/pdfs/common_sense_media_report_final_6_26_7.38am_web_updated.pdf;

³⁶ Raeal Moore and Michelle Croft, "Inequities in technological devices and internet persist during the coronavirus," ACT, April 20, 2020, <https://leadershipblog.act.org/2020/04/inequities-in-tech-coronavirus.html>.

For students who identify as Black, Latinx, Native American; who are low-income; who speak English as a second language; who require special needs accommodations; or who otherwise face disproportionate barriers to education, the disruption of in-person learning due to COVID-19 came with significant costs to educational attainment.³⁷ McKinsey & Company estimates that K-12 students who completed fully-remote education during the fall 2020 semester—and returned to in-person instruction in spring 2020—lost an average of 6.0 months of learning for white students, 9.2 months of learning for Hispanic students, and 10.3 months of learning for Black students.³⁸ It further predicts other long-term effects for K-12 students, such as increased feelings of social isolation and anxiety and decreased levels of motivation and productivity.

Around March or April 2020—soon after shutdowns began—the Los Angeles Unified School District estimated that one-third of high school students were not signing into their virtual classes.³⁹ In October 2020, principals in “highest-poverty” school districts reported that only 80 percent of their students had access to high-speed household internet.⁴⁰ At the same time, schools in high-poverty areas or that had higher percentages of non-white students are more likely to offer remote-only classes during the pandemic,⁴¹ and less likely to sizably fund student resources, professional development for teachers,

³⁷ Nicol Turner Lee, “For schools to reopen, Congress must include broadband funding in the stimulus bill,” The Brookings Institution, *TechTank*, July 28, 2020, <https://www.brookings.edu/blog/techtank/2020/07/28/for-schools-to-reopen-congress-must-include-broadband-funding-in-the-stimulus-bill/>.

³⁸ Emma Dorn, Bryan Hancock, Jimmy Sarakatsannis, and Ellen Viruleg, “COVID-19 and student learning in the United States: the hurt could last a lifetime,” McKinsey & Company, June 1, 2020, <https://www.mckinsey.com/industries/public-and-social-sector/our-insights/covid-19-and-student-learning-in-the-united-states-the-hurt-could-last-a-lifetime>.

³⁹ Tawnell D. Hobbs and Lee Hawkins, “The results are in for remote learning: it didn’t work,” The Wall Street Journal, June 5, 2020, <https://www.wsj.com/articles/schools-coronavirus-remote-learning-lockdown-tech-11591375078>.

⁴⁰ Melissa Kay Diliberti and Julia H. Kaufman, “Will this school year be another casualty of the pandemic?: Key findings from the American Educator Panels Fall 2020 COVID-19 surveys,” RAND Corporation, 2020, https://www.rand.org/pubs/research_reports/RRA168-4.html.

⁴¹ *Ibid.*

and parental support programs.⁴² As a result, the pandemic forced attention on the “homework gap,” or the difference in educational opportunity between students who have household internet access and those who do not, as well as the struggles in reaching equity in technology adoption.⁴³

Although overall student access to broadband and household devices improved from May 2020 to October 2020—the result of numerous deliberate efforts by school districts to expand device and internet availability for K-12 students—racial disparities are still present in student technology access. In October 2020, 91 percent of total households with K-12 students had access to both high-speed internet and a device, but Black and Hispanic student households were 3 to 4 percentage points less likely to have reliable access to devices than white student households, and 3 to 6 percentage points less likely to have reliable internet access.⁴⁴ Combined with other economic and societal disadvantages that Black, Latinx or Hispanic, and Native American students disproportionately face, this lack of device or broadband access contributes to the “student achievement gap” that is estimated to cost the United States hundreds of millions of dollars in GDP per year.⁴⁵ While having a connection can be life saving for marginalized students, it must be complemented by investments in adoption programs to motivate its use.

B. Health care

⁴² Nicol Turner Lee, “How courageous schools partnering with local communities can overcome digital inequalities during COVID-19,” The Brookings Institution, *TechTank*, September 17, 2020, <https://www.brookings.edu/blog/techtank/2020/09/17/how-courageous-schools-partnering-with-local-communities-can-overcome-digital-inequalities-during-covid-19/>.

⁴³ Nicol Turner Lee, “What the coronavirus reveals about the digital divide between schools and communities,” The Brookings Institution, *TechTank*, March 17, 2020, <https://www.brookings.edu/blog/techtank/2020/03/17/what-the-coronavirus-reveals-about-the-digital-divide-between-schools-and-communities/>.

⁴⁴ Emma Dorn, Bryan Hancock, Jimmy Sarakatsannis, and Ellen Viruleg, “COVID-19 and learning loss—disparities grow and students need help,” McKinsey & Company, December 8, 2020, <https://www.mckinsey.com/industries/public-and-social-sector/our-insights/covid-19-and-learning-loss-disparities-grow-and-students-need-help>.

⁴⁵ Emma Dorn, Bryan Hancock, Jimmy Sarakatsannis, and Ellen Viruleg, “COVID-19 and student learning in the United States: the hurt could last a lifetime,” McKinsey & Company, June 1, 2020, <https://www.mckinsey.com/industries/public-and-social-sector/our-insights/covid-19-and-student-learning-in-the-united-states-the-hurt-could-last-a-lifetime>.

Racial disparities have long existed in the U.S. Health care system, resulting in lower levels of access for Black, Latinx, and Native American communities. In 2016, Dayna Bowen Matthew, Edward Rodrigue, and Richard Reeves described in a Brookings report how “African Americans are disproportionately treated at health care facilities with the fewest technological resources ... [they] are referred to see specialists less often, receive less appropriate preventive care such as mammography and flu vaccines, receive fewer kidney and bone marrow transplants, receive fewer antiretroviral drugs for HIV, receive fewer antidepressants for diagnosed depression, and are admitted less often than whites for similar complaints of chest pain.”⁴⁶ Similarly, a 2005 study by researchers at the University of Southern California, University of Washington, and UCLA found that Latinx individuals are less likely to both be diagnosed with depression and receive treatment, compared to white individuals with similar symptoms or disorders.⁴⁷ The consequences of gaps in Health care treatment are especially severe for Black men and Native American individuals: the National Center for Health Statistics recently reported that the U.S. life expectancy is approximately 72.0 for Black men, compared to 76.4 for white men,⁴⁸ and the Indian Health Service has estimated that American Indians and Alaska Natives have a life expectancy of 73.0 years, compared to 78.5 years for the general U.S. population.⁴⁹

These disparities have persisted during the pandemic, as Black and Latinx individuals are disproportionately more likely to contract COVID-19. According to the National Urban League’s 2020 State of Black America, the COVID-19 infection rate for Black and Hispanic individuals in the United States respectively equals around 0.62 percent and 0.73 percent, compared to 0.23 percent for white

⁴⁶ Dayna Bowen Matthew, Edward Rodrigue, and Richard V. Reeves, “Time for justice: Tackling race inequalities in health and housing,” The Brookings Institution, October 19, 2016, <https://www.brookings.edu/research/time-for-justice-tackling-race-inequalities-in-health-and-housing/#footref-11>.

⁴⁷ Isabel T. Lagomasino et al., “Disparities in depression treatment for Latinos and site of care,” *Psychiatry Online* Vol. 56 No. 12, December 2005, <https://ps.psychiatryonline.org/doi/pdf/10.1176/appi.ps.56.12.1517>.

⁴⁸ Elizabeth Arias, “Changes in life expectancy by race and Hispanic origin in the United States, 2013-2014,” Centers for Disease Control and Prevention, National Center for Health Statistics, April 2016, <https://www.cdc.gov/nchs/products/databriefs/db244.htm>.

⁴⁹ “Fact sheets: disparities,” Indian Health Service, accessed April 21, 2021, <https://www.ihs.gov/newsroom/factsheets/disparities/>.

individuals. More alarmingly still, the death rate for Black Americans doubles that of white Americans: 70 out of 100,000 Black individuals in the United States had died from COVID-19 at the time of reporting, compared to 34 and 30 out of 100,000 Hispanic and white individuals, respectively.⁵⁰

Race intersects with factors such as income and occupation that also affect access to Health care—not only are Black individuals more likely to work for employers that do not offer health insurance, but they are more likely to experience higher-risk conditions and face systemic bias in the Health care system. African Americans are approximately 7.4 percentage points more likely to suffer from obesity, 12.5 percentage points more likely to suffer from hypertension, and 6.8 percentage points more likely to suffer from diabetes than Caucasians—all pre-existing conditions that could affect vulnerability to COVID-19.⁵¹ And although Black individuals equaled around 11.9 percent of the workforce prior to the pandemic, they accounted for 17.0 percent of essential positions that required in-person presence during the pandemic.⁵² In 2017 and 2018, only 58.7 percent of Black workers had paid sick days, compared to 66.6 percent of white workers,⁵³ and 11.5 percent of Black individuals lacked health insurance, compared to 7.5 percent of white individuals.⁵⁴ Despite these enhanced risks, in April 2020, when COVID-19 testing was scarcer early in the pandemic, preliminary research suggested that Black patients with coronavirus symptoms were less likely to receive treatment or tests during hospital visits than white patients.⁵⁵

⁵⁰ Timothy Murphy et al., “State of Black America,” National Urban League, 2020, <http://sobadev.iamempowered.com/sites/soba.iamempowered.com/files/NUL-SOBA-2020-ES-web.pdf>.

⁵¹ *Ibid.*

⁵² Elise Gould and Valerie Wilson, “Black workers face two of the most lethal preexisting conditions for coronavirus—racism and economic inequality,” Economic Policy Institute, June 1, 2020, <https://www.epi.org/publication/black-workers-covid/>.

⁵³ *Ibid.*

⁵⁴ Samantha Artiga and Kendal Orgera, “Changes in health coverage by race and ethnicity since the ACA, 2010-2018,” Kaiser Family Foundation, March 5, 2020, <https://www.kff.org/racial-equity-and-health-policy/issue-brief/changes-in-health-coverage-by-race-and-ethnicity-since-the-aca-2010-2018/>.

⁵⁵ John Eligon and Audra D. S. Burch, “Questions of bias in COVID-19 treatment add to the mourning for Black families,” The New York Times, May 20, 2020 (updated), <https://www.nytimes.com/2020/05/10/us/coronavirus-african-americans-bias.html>.

As the pandemic transitioned in-person medical visits to remote appointments, access to telehealth services becomes a necessary—though not exhaustive—component to improving equity in the Health care system.⁵⁶ Yet, the digital divide can reinforce the existing gaps in Health care access that marginalized populations face, and as such, addressing the systemic inequalities in broadband access and affordability as a prerequisite to supporting telehealth services. While telehealth services can reduce average wait times to receive an appointment, patients’ length of stay, and overcrowding in emergency rooms,⁵⁷ individuals in rural or low-income areas who are most likely to face geographic or financial challenges to accessing in-person Health care are also among the least likely to have reliable home internet.⁵⁸ In addition to addressing statutory limitations to telehealth adoption and delivery, Congress can help reduce historical disparities in Health care access and costs by expanding affordable broadband infrastructure to facilitate health care delivery, especially for more medically-marginalized communities whose adoption can address chronic concerns and higher rates of co-morbidities.

III. Recommendations

These two use cases alone have prompted legislative responses through the CARES Act, American Rescue Plan, and the proposed American Jobs Plan that are without recent precedent in size and scope. With high rates of unemployment, business, and school closures, as well as the constant threat of the resurgence of COVID-19 as the nation races toward increased vaccinations, the infrastructure plan is timely, and recognizes that the new normal is digital as more people work, learn, and get cared for remotely over robust broadband networks. In the backdrop of these realities are the

⁵⁶ Nicol Turner Lee and Niam Yaraghi, “How to make telehealth more permanent after COVID-19,” The Brookings Institution, *TechTank*, September 4, 2020, <https://www.brookings.edu/blog/techtank/2020/09/04/how-to-make-telehealth-more-permanent-after-covid-19/>.

⁵⁷ Shujing Sun, Susan F. Lu, and Huaxia Rui, “Does telemedicine reduce emergency room congestion? Evidence from New York State,” *Information Systems Research* Vol. 31, No. 3, August 27, 2020, <https://pubsonline.informs.org/doi/abs/10.1287/isre.2020.0926>.

⁵⁸ Brittney Crock Bauerly, Russell F. McCord, Rachel Hulkower, and Dawn Pepin, “Broadband access as a public health issue: The role of law in expanding broadband access and connecting underserved communities for better health outcomes,” *Journal of Law, Medicine, & Ethics*, June 2019, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6661896/>.

use of existing and emerging technologies to complement other solutions, whether in the form of networked bridges or roads for planned resilience or civilian smartphones capturing prosecutable offenses.

The arguments made in my testimony point support why America needs a Tech New Deal, which is designed to drive broadband infrastructure investments in rural, urban, and tribal areas; close the digital equity divide; increase workforce training in tech and related industries; and invest in local infrastructure to accelerate adoption among citizens, community-based organizations, and businesses.⁵⁹

I will wrap up my testimony with four salient next steps from my New Deal proposal as it relates to expanding broadband infrastructure for global, national, and local economic competitiveness.

1 – Start with the data and target physical and soft infrastructure among the least served communities first, before proceeding to other areas.

Accelerated broadband deployment in un- and under-connected rural, urban, and tribal areas should be among the first steps - once we identify exactly where these places are. Completing the national broadband map with the appropriated funding will not only surface the places in need of immediate broadband access, but also where there are entrenched systemic inequalities that are being masked due to the increasing social isolation of those communities like areas in the southern Black Belt or Delta Regions. A more accurate national broadband map will also surface the lack of competition (as well as potential over-builds) in urban and suburban communities. Technology agnostic and flexible approaches should be favored, which should create more localized solutions for deployment that make sense for the community being served. The White House recently referred to broadband as the new “electricity” for communities in comparing it to the rural electrification movement. I would expound on this notion and consider broadband to be more than a connector to services, but an enabler of individual and

⁵⁹ Nicol Turner-Lee, “Why America Needs a ‘Tech New Deal’ to Build Back Better,” *TechTank* (blog), January 12, 2021, <https://www.brookings.edu/blog/techtank/2021/01/12/why-america-needs-a-tech-new-deal-to-build-back-better/>.

community capacities that improves the conditions and life chances of residents and their communities. On this last point, investments in physical infrastructure should be on par with programs promoting adoption and equity, whether through modernized and digitally enabled K-12 public schools, wired federally assisted housing and community health care centers that can provide options for tapping into critical resources. In the case of schools, I argue in the Tech New Deal for a program designed to close digital divides between schools and communities called “No Child Offline,” which ensures equitable broadband access and improved social determinants for educational successes through home broadband access, device lending programs (e.g., laptops, or hot spots), training, and the institution of an Office of Innovation in every school district.⁶⁰

2 – Modernize and reform the universal service program.

The proposed \$100 billion dollar investment in high-speed broadband networks may not be enough to blanket the entire country, which is why Congress and the FCC need to overhaul the nation’s Universal Service Fund (USF) to add to the existing resources and diversify sources of revenue for broadband infrastructure, and the types of services that funds could be spent on, including adoption programs. The USF currently collects fees from telecommunications companies, some of which are passed on to customers.⁶¹ Its Lifeline program provides up to \$9.25 in a monthly subsidy to low-income households for internet service,⁶² while the E-Rate program funds internet access only at schools and libraries. Instead of a fee-based model, USF should transition to an appropriation of the federal budget so that it receives adequate funding to connect Americans to broadband internet. Furthermore, the E-Rate program should cover internet access at the homes of students and other community spaces where

⁶⁰ Turner Lee, Nicol. “Why America Needs a Tech New Deal.” Democracy Journal Spring 2021, no. 60 (March 11, 2021). <https://democracyjournal.org/magazine/60/why-america-needs-a-tech-new-deal/>.

⁶¹ “Universal Service Fund,” Federal Communications Commission, November 18, 2010, <https://www.fcc.gov/general/universal-service-fund>.

⁶² “Lifeline Support for Affordable Communications,” Federal Communications Commission, March 4, 2016, <https://www.fcc.gov/lifeline-consumers>.

learning happens apart from schools and libraries. Rural broadband and telehealth investments of the USF should also be reviewed to ensure that those investments are not only being maximized but covering the most vulnerable populations in rural and tribal areas. More generally, the current USF model needs reform to acknowledge the new realities of internet use instigated by COVID-19 and accommodate the increasing demand for online services.

3 – Strategically pair broadband infrastructure and adoption programs with workforce development goals to create a new pipeline for build out, use, and other enterprises.

Workers will be needed to build and expand broadband infrastructure and the Tech New Deal would be the vehicle to create workforce development programs to equip workers with skills for emerging industries, including installation and support jobs.⁶³ Currently, skilled jobs in fiber optic installation, data analytics, and customer service provide livable wages and employment security for workers. Employing credentialing systems or adopting models for apprenticeships in wireless or fiber jobs, or related security and network management fields can put people back to work in more stable careers. The U.S. Department of Labor can lead these efforts, as well as code these industry jobs under the NAICS for future funding opportunities. For workers who need to be re-skilled, a paid civilian corps of tech workers and volunteers, which could be modeled after existing national service programs, can assist in infrastructure deployment, and adoption programs, such as volunteers registering residents online for vaccines through mobile vans, or street canvassing.⁶⁴

4 – Lead infrastructure deployments and investments with “equity” at the center.

Technology affords the opportunities to dismiss the boundaries of place, people, and purposes. Given the disproportionate access to broadband, and the applications/platforms that it enables, a Tech New

⁶³ Nicol Turner Lee, “Why America Needs a Tech New Deal,” *Democracy Journal* Spring 2021, no. 60 (March 11, 2021), <https://democracyjournal.org/magazine/60/why-america-needs-a-tech-new-deal/>.

⁶⁴ Nicol Turner-Lee, “TechTank Podcast Episode 15: To Build Back Better, the U.S. Needs a Digital Service Corps,” TechTank Podcast, <https://www.brookings.edu/blog/techtank/2021/03/22/techtank-podcast-episode-15-to-build-back-better-the-u-s-needs-a-digital-service-corps/>.

Deal presupposes equity in the decisions that are being made in this area. Creating opportunities to study the demographics of existing broadband adoption and intersecting these findings with the systemic challenges that plague communities of color, and people from rural, older, disability, and other types of historically-disadvantaged communities will offer new strategies for engagement, and could be undertaken by the GAO. For my forthcoming book, I traveled across the U.S. to visit urban and rural communities, and interviewed white, Black, and immigrant residents. I met farmers, public servants, educators, business owners, caregivers, barbers, and even the unemployed who shared a resounding theme that without access to broadband that they were silent from the actions being taken to reclaim the economic livelihoods of their households and communities. This was before the pandemic. As the subcommittee explores how to evaluate the importance of vibrant infrastructure and systems, I implore the Members to realize that the stories of these people may very well be the ones of their own constituents, who are trapped on the other side of digital opportunities.

These recommendations augment the goal of bringing 100% of Americans online.⁶⁵ Achieving universal coverage will not only require adequate funding, but also the knowledge of how to install and maintain necessary broadband infrastructure and to make full use of it in our homes, schools, and communities. The Tech New Deal responds to the challenges presented by COVID-19 by connecting students and workers to the resources they need to fully participate in remote education, employment, and other vital services. Broadband is infrastructure that is just as vital in the 21st Century as electricity was in the 20th century and goes even further in terms of its beneficial use cases, which is why we need comprehensive infrastructure programs to make it universally accessible.

Thank you again to the Members of the Subcommittee on Trade for the opportunity to testify and I look forward to our questions.

⁶⁵ Nicol Turner-Lee, "With New Investments in Broadband Infrastructure, Can We Finally Close the Digital Divide?," TechTank Podcast, <https://www.brookings.edu/blog/techtank/2021/04/19/techtank-podcast-episode-17-with-new-investments-in-broadband-infrastructure-can-we-finally-close-the-digital-divide/>.