TESTIMONY OF NICOL TURNER LEE
Director, Center for Technology Innovation, The Brookings Institution
Senior Fellow, Governance Studies, The Brookings Institution

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Committee on Economic Disparity & Fairness in Growth

Hearing on "Connecting Americans to Prosperity: How Infrastructure can Bolster Inclusive Economic Growth"

Building for the Future: Advancing Digital Competitiveness through Broadband Access and Adoption

February 9, 2022

Chairman Himes, Ranking Member Steil, and distinguished members of the House Committee on Economic Disparity & Fairness in Growth, thank you for the invitation to testify as part of today's discussion on critical infrastructure, particularly the deployment, adoption, and use of high-speed broadband networks. I am Dr. 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 encompasses data collection and analysis around regulatory and legislative policies that govern telecommunications and high-tech industries, along with the impacts of broadband access, the digital divide, artificial intelligence, and machine-learning algorithms on vulnerable consumers. My forthcoming book, *Digitally invisible: How the internet is creating the new underclass* (Brookings, 2022)*,* addresses these topics and more. Today, I come before you with my own opinions.

Let me start my testimony by applauding the White House and Congress for prioritizing efforts to close the digital divide and positioning high-speed broadband alongside other critical

infrastructure assets like water, transport, and electricity. The global pandemic has surfaced the importance of online connectivity as millions obliged the calls for physical social distancing and transitioned online for remote work, school, health care, government services, and regular communications with friends and family members. As technology becomes more ubiquitously available and affordable for Americans of all socio-economic levels, it will become a game changer for how citizens transact and interact in their daily lives, and will be foundational to the development of inclusive economic growth in the U.S.

Our nation's other critical infrastructure, including water, transport, and electrical systems, also depends on the availability of robust broadband networks. Smart infrastructure that embeds technology into energy, water, waste, and transport systems has revitalized these grids, reduced environmental impacts, provided greater longevity to aging and eroding assets, and optimized investments and operating expenses through modernization. Concurrently, more and more citizens, businesses, governments, and other institutions are being transformed and, in some cases, disrupted by existing and emerging digital innovations as routine and essential activities migrate online, from online banking to telehealth.

In my testimony, I express that this is a historic time for our nation's degrading infrastructure with the additive component of broadband, which has been appropriated $65 billion of the $1.2 trillion 2021 Infrastructure Investment and Jobs Act (IIJA). The monies toward broadband will be the largest-ever digital infrastructure investment since the 2009 American Recovery and Reinvestment Act (ARRA) that allocated $4.7 billion toward online access.[1] The

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[1] "Fact Sheet: The Bipartisan Infrastructure Deal," The White House, November 6, 2021, https://www.whitehouse.gov/briefing-room/statements-releases/2021/11/06/fact-sheet-the-bipartisan-

National Telecommunications and Information Administration (NTIA) of the U.S. Department of Commerce, along with the Federal Communications Commission (FCC), are poised to distribute these resources to address the gaps in digital access, along with inequalities in adoption and use. I plan to share **two points** of interest with the committee: (a) why broadband infrastructure must be equitably deployed in both rural and urban areas; and (b) why closing the digital divide must be prioritized to promote an inclusive, digital ecosystem. My testimony will conclude with **three proposals** that the federal government should consider as actionable items going forward, such as remaining technology- neutral in solutions that address rural and urban broadband divides, ensuring broadband infrastructure complements and modernizes other national and local infrastructure assets, and positioning digital equity as a fundamental component of the decision-making around where and to whom broadband infrastructure is deployed.

I.   **Broadband is Critical Infrastructure**

In 2021, America's infrastructure was graded a "C-" by the American Society of Civil Engineers (ASCE).[2] Despite private industry investments in national and regional broadband networks, the ASCE pointed to the declining quality of speed, disparities in online access (e.g., among school-age children), and the increasing need for more infrastructure to accommodate emerging technologies like 5G as reasons for the less than ideal provision of broadband networks and services.[3] Since 2015, the FCC has defined "broadband" as 25 megabytes per

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infrastructure-deal/; *Infrastructure Investment and Jobs Act*. Public Law 117-58. *U.S. Statutes at Large* 135 (2021): 429 – 1467.
[2] ASCE's 2021 Infrastructure Report Card, "ASCE's 2021 American Infrastructure Report Card | GPA: C-," January 11, 2017, https://infrastructurereportcard.org/.
[3] Ibid.

second (Mbps) down/3 Mbps up as the minimum standard of service, an area that has been recently challenged by lawmakers and other broadband advocates who want to see the definition changed to symmetrical speeds of 100 Mbps down, especially after millions of school-age children moved to remote learning.[4]

During the pandemic, rural and urban areas alike needed high-speed broadband access to promote better outcomes in public safety, reliability, and economic growth. In its 2020 Economic Impact Report, Yelp found that approximately 163,175 businesses had closed by August 2020, six months after COVID-19's peak; 60% of which were permanent closures.[5] Minority- and women-owned businesses were the most disproportionately impacted. Between February and April 2020, the New York Federal Reserve Bank found that businesses owned and operated by African Americans were twice more likely to close compared to White-owned businesses due to weaker financial assets and their concentration in local markets hardest hit by the pandemic.[6]

Generally, small businesses were not prepared for the rapid shift to digital operations – whether on an operational or consumer-facing level. Before the pandemic, only 46% of small

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[4] Federal Communications Commission, "2015 Broadband Progress Report," February 4, 2015, https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2015-broadband-progress-report; Michael Bennet, U.S. Senator for Colorado, "Bennet, King, Portman, Manchin Urge Biden Administration to Create Modern, Unified Federal Broadband Standard," March 4, 2021, https://www.bennet.senate.gov/public/index.cfm/2021/3/bennet-king-portman-manchin-urge-biden-administration-to-create-modern-unified-federal-broadband-standard.
[5] Anjali Sundaram, "Yelp Data Shows 60% of Business Closures Due to the Coronavirus Pandemic Are Now Permanent," CNBC, September 16, 2020, https://www.cnbc.com/2020/09/16/yelp-data-shows-60percent-of-business-closures-due-to-the-coronavirus-pandemic-are-now-permanent.html.
[6] Claire Kramer Mills and Jessica Battisto, "Double Jeopardy: COVID-19's Concentrated Health and Wealth Effects in Black Communities," Federal Reserve Bank of New York, https://www.newyorkfed.org/medialibrary/media/smallbusiness/DoubleJeopardy_COVID19andBlackOwnedBusinesses.

businesses had an online presence.[7] These numbers have since increased as more small businesses are joining larger industries in the adoption and use of digital tools, including online payment systems and other internet-enabled applications and collaboration resources. But several industry sectors in the U.S. economy continue to be impacted by disruptive digital systems, including retail, transportation, and hospitality, due to declining in-person transactions.

On the networks side, more advanced broadband networks like 5G and satellite can improve user experiences, and enable more entrepreneurial and enterprising functions of the internet, including advanced manufacturing, autonomous vehicles, smart home devices, telehealth monitors, agricultural or environmental sensors, virtual reality systems, and more—when and where the capacity exists.[8] On 5G alone, the World Economic Forum estimates that access to the technology could produce $13.2 trillion and create an additional 22.3 million jobs globally.[9]

Digital resilience has also been evidenced in the public sector. From the onset of the pandemic, federal and state government agencies accelerated their deployment and use of virtual platforms, which have enabled a plethora of applications, transactions, and other services online. From the completion of unemployment applications to driver license renewals, more citizens are prompted to go online for routine and critical government functions,

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[7] PaymentsJournal, "Only 46% of SMBs Sell Their Products or Services Online," September 13, 2018, https://www.paymentsjournal.com/46-smbs-sell-products-services-online/.
[8] Verizon, "What Is the Latency of 5G?," February 2, 2020, https://www.verizon.com/about/our-company/5g/5g-latency; Larry Downes, "5G: What is it good for?" The Washington Post, February 3, 2022, https://www.washingtonpost.com/news/innovations/wp/2018/06/05/5g-what-is-it-good-for/.
[9] "The impact of 5G: Creating new value across industries and society," World Economic Forum, January 2020, https://www3.weforum.org/docs/WEF_The_Impact_of_5G_Report.pdf.

including scheduling vaccinations or ordering COVID-19 test kits. In December 2021, the White House issued an executive order calling for the modernization of government services via technologies "…that are simple to use, accessible, equitable, protective, transparent, and responsive for all people of the United States."[10]

But these aspirations for the private and public sectors are not attainable without available and accessible broadband infrastructure in both rural and urban areas. Digital innovations will not benefit citizens if they lack sufficient infrastructure in the places where they live.

Rural broadband access

Despite decades of assorted investments, broadband deployment in rural areas has been a pressing problem, resulting in populations – including those on tribal lands - being deprived of internet access on a large-scale basis. Universal service programs relying on outdated funding formulas have disincentivized private sector investments in areas where there often have "more cows than people."[11] Other difficulties, including proximity to telecom facilities and topographical challenges, also present themselves in rural broadband deployments, making these areas more expensive and technologically complicated to connect, particularly in the absence of fiber optic networks. According to former FCC strategist Paul De Sa, bringing broadband into rural areas would cost the U.S. nearly $80 billion to reach 80-100%

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[10] The White House, "Executive Order on Transforming Federal Customer Experience and Service Delivery to Rebuild Trust in Government," December 13, 2021, https://www.whitehouse.gov/briefing-room/presidential-actions/2021/12/13/executive-order-on-transforming-federal-customer-experience-and-service-delivery-to-rebuild-trust-in-government/.

[11] Nicol Turner Lee, "From Rural Digital Divides to Local Solutions," The Brookings Institution, April 2, 2020, https://www.brookings.edu/longform/from-rural-digital-divides-to-local-solutions/.

of the national rural footprint — a number which is much larger than the current IIJA

appropriation. [12]

According to the FCC's 2019 deployment report, 17.3% of rural residents (11.26 million

people) lack access to fixed terrestrial broadband.[13] A 10-percentage point difference of the

FCC numbers has been reported by a 2021 Broadband Now report, which suggests that access

to high-speed broadband is probably worse than federally reported and that at least 17.6

million rural residents lack access to fixed terrestrial broadband.[14] Broadband access for those

living in the Black rural South is even more alarming, at 62% compared to the 77% national

average of home broadband rates.[15] On top of this, over 30 million Americans live in geographic

locations that lack broadband infrastructure at "minimally acceptable speeds", with 35 percent

of them living in rural areas, according to the White House.[16]

In 2019, I traveled to several rural communities as part of the research for my

forthcoming book. One of the rural communities that I visited was Garrett County, Maryland,

with an estimated population of nearly 29,000 people who live among a land area of 647

square miles, less than 47 people per square mile.[17] There, I met a local tire shop owner whose

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[12] Federal Communications Commission, "Improving the Nation's Digital Infrastructure," January 19, 2017, https://www.fcc.gov/document/improving-nations-digital-infrastructure.
[13] Federal Communications Commission. "2019 Broadband Deployment Report," May 29, 2019, https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2019-broadband-deployment-report.
[14] John Busby, Julia Tanberk, and Tyler Cooper, "BroadbandNow Estimates Availability for All 50 States; Confirms That More than 42 Million Americans Do Not Have Access to Broadband," Broadband Now, May 5, 2021, https://broadbandnow.com/research/fcc-broadband-overreporting-by-state.
[15] Pew Research Center: Internet, Science & Tech, "Demographics of Internet and Home Broadband Usage in the United States," April 7, 2021, https://www.pewresearch.org/internet/fact-sheet/internet-broadband/; Dominique Harrison, "Expanding Broadband in the Black Rural South," Joint Center, July 9, 2021, https://jointcenter.org/expanding-broadband-in-the-black-rural-south/.
[16] "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/.
[17] U.S. Census Bureau. "QuickFacts: Garrett County, Maryland." Accessed November 7, 2021. https://www.census.gov/quickfacts/fact/table/garrettcountymaryland#.

reliance on textbook queries of manufacturers meant that product deliveries took weeks, sometimes even months. Before subscribing to a commercial provider participating in Microsoft's Airband initiative, he never imagined that getting the internet through television white spaces would lead to faster fulfillments and less tedious product searches.[18] Local case workers expressed the same urgency for broadband connectivity during my interviews with them. These professionals regularly traveled more than two hours to a client's home, then returned to the main office in the city of Oakland to update their files, resulting in significant delays and inefficiencies in monitoring and following up. Throughout the pandemic, these and other scenarios were made worse in places like Garrett County and other similar rural communities, justifying why the nation needs immediate solutions for addressing the rural broadband divide, especially the lack of available and contiguous infrastructure.[19]

Urban Broadband Access

But the connectivity challenges of rural communities do not override those upending the lives of residents in America's cities. In 2019, broadband expert John Horrigan argued that the number of disconnected households in urban areas is three times that of rural areas.[20] Low-income communities of color are particularly impacted in large cities, especially among clusters where the elderly and/or disabled live.[21] While large metropolitan areas may have a plethora of

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[18] Nicol Turner Lee, "From Rural Digital Divides to Local Solutions," The Brookings Institution, April 2, 2020, https://www.brookings.edu/longform/from-rural-digital-divides-to-local-solutions/.

[19] Alison Cutler, "Augusta County Citizens Want Faster, Stronger Internet. Some Don't Have Any at All," Staunton News Leader, August 16, 2021, https://www.newsleader.com/story/news/local/2021/08/16/augusta-county-citizens-want-faster-stronger-internet-some-dont-have-any-all/8149784002/.

[20] John B. Horrigan, "Analysis: Digital Divide Isn't Just a Rural Problem," Daily Yonder, August 14, 2019, https://dailyyonder.com/analysis-digital-divide-isnt-just-a-rural-rpblem/2019/08/14/1

[21] Alex Trollip, Blog. "Understanding the Urban Digital Divide," Bipartisan Policy Center, March 5, 2021. https://bipartisanpolicy.org/blog/urban-broadband-blog/

internet service providers (ISPs), they still struggle with the affordability of monthly broadband service and its personal relevance to their daily lives.[22] Digital disparities in some urban areas also mirror other existing systemic inequalities experienced by historically disadvantaged and other vulnerable populations, like poverty, housing insecurity, among other things. According to 2021 data from the Pew Foundation, only 57% of adults earning less than $30,000 a year have access to broadband internet, compared to 94% of upper-income families.[23] Only 18% of adults owned a device that they could use to access the internet.[24] While the urban-rural divide for internet subscriptions persists, it is still *smaller* than the broadband gap between wealthier and poorer households.[25]

Access to stable housing can also be a determinant of access to high-speed broadband networks in some urban communities. Today in the U.S., 1.2 million people live in "public housing", which includes federally assisted, scattered-site, FHA–back or insured, and low-income, senior residences, managed by 3,300 housing authorities.[26] Many of these households and units do not have access to high-speed broadband and are blocked from accessing the

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[22] Ibid.

[23] Emily A. Vogels, "Digital Divide Persists Even as Americans with Lower Incomes Make Gains in Tech Adoption," Pew Research Center (blog), June 22, 2021, https://www.pewresearch.org/fact-tank/2021/06/22/digital-divide-persists-even-as-americans-with-lower-incomes-make-gains-in-tech-adoption/; Emily A. Vogels,"Some Digital Divides Persist between Rural, Urban and Suburban America." Pew Research Center (blog), August 19, 2021. https://www.pewresearch.org/fact-tank/2021/08/19/some-digital-divides-persist-between-rural-urban-and-suburban-america/; Sara Atske and Andrew Perrin, "Home Broadband Adoption, Computer Ownership Vary by Race, Ethnicity in the U.S." Pew Research Center (blog), July 16, 2021, https://www.pewresearch.org/fact-tank/2021/07/16/home-broadband-adoption-computer-ownership-vary-by-race-ethnicity-in-the-u-s/.

[24] Office of Public & Indian Housing, "Use of Public Housing Funding to Support Internet Connectivity for Residents", U.S. Department of Housing and Urban Development, January 19, 2021, https://www.hud.gov/sites/dfiles/PIH/documents/PublicHousingFundingSupportInternetConnectivityResidents.pdf.

[25] John B. Horrigan, "Analysis: Digital Divide Isn't Just a Rural Problem," *The Daily Yonder*, August 14, 2019, https://dailyyonder.com/analysis-digital-divide-isnt-just-a-rural-problem/2019/08/14/.

[26] U.S. Department of Housing and Urban Development, "Public Housing," accessed January 18, 2022, https://www.hud.gov/program_offices/public_indian_housing/programs/ph.

critical resources and tools of our 21st century economy. Without internet, public housing

residents can't do what others do online, like apply for jobs, utilize distance learning, and access

health care, among other things. For decades, and largely due to systemic racism and

discrimination, places where public housing exist have also been intentionally redlined on the

other side of expressways or railroad tracks. The consequences of housing redlining have led to

community disinvestment and invisibility of entire populations by city governments, middle-

and sometimes working-class people who rarely interact with them.

Of late, pockets within some of our nation's largest cities have become less desirable for

emerging innovation, or the last in line to benefit.[27] In addition to enhancing the supply of

broadband infrastructure into these areas, state and local leaders must also strengthen *local

digital infrastructure*, like schools, libraries, housing, churches, and other anchor institutions

that drive the relevance of the internet among residents in their communities through

awareness and digital literacy training. During the pandemic, there was a multitude of front-

page news stories about the rise of "digital parking lots" at local establishments used by K-12

students impacted by the "homework gap."[28] But such occurrences were happening before the

pandemic in cities like Hartford, Connecticut where Black K-12 students were congregating on

the stoops of fast-food restaurants to tap into their free Wi-Fi.[29] In my own book research, I

[27] Tracy Jan, "Redlining Was Banned 50 Years Ago. It's Still Hurting Minorities Today," Washington Post, March 28, 2018, https://www.washingtonpost.com/news/wonk/wp/2018/03/28/redlining-was-banned-50-years-ago-its-still-hurting-minorities-today/.

[28] Alyson Klein, "Acting FCC Chair: The 'Homework Gap' Is an 'Especially Cruel' Reality During the Pandemic," Education Week, March 10, 2021, https://www.edweek.org/technology/acting-fcc-chair-the-homework-gap-is-an-especially-cruel-reality-during-the-pandemic/2021/03.

[29] Consumer Counsel, "Consumer Counsel Testifies Before Congressional Committee on Broadband Infrastructure and Closing the Digital Divide," February 20, 2018, https://portal.ct.gov/-/media/OCC/2018Feb19BlurbonCongressionalTestimonypdf.pdf.

learned about K-12, college students, and even educators tapping into the limited open access points in their communities to complete research assignments or get online for work.[30]

Whether trapped by the lack of broadband infrastructure within housing, schools, or other local institutions, rural and urban areas unequivocally need more access. Their only differences are in the solutions that get carried out, which should not lead to *competing* infrastructure interests and investments between rural and urban areas.

II.   **Closing the Digital Divide is the First Priority**

Historically, the concept of "digital divide" dates back to the early 2000s, when former NTIA Assistant Secretary, Larry Irving coined the term, offering a then-binary view into the disparate access to technology in the U.S.[31] During that time, the digital divide depicted those with or without access to the internet, a compatible device, or both. Digital literacy programs were critical because some policymakers and advocates believed that poor people needed computer basics, like how to use email and word processing programs.

Over time, the need for computer skills has grown exponentially with the advent of modern-day technology and its related disrupters like social media, which have changed the way individuals interact. Yet policymakers have still failed to bridge the digital divide, despite having previously expended resources to accelerate broadband deployment and adoption in unserved communities – mainly the 2009 ARRA monies. Policymakers, and some advocates for digital inclusion, have also esteemed program models that have not scaled digital progress

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[30] Nicol Turner Lee, "Bridging Digital Divides between Schools and Communities," The Brookings Institution, March 2, 2020, https://www.brookings.edu/research/bridging-digital-divides-between-schools-and-communities/.
[31] Ronald H. Brown, David J. Barram, and Larry Irving, "FALLING THROUGH THE NET: A Survey of the 'Have Nots' in Rural and Urban America," National Telecommunications and Information Administration, July 1995, https://www.ntia.doc.gov/ntiahome/fallingthru.html.

decades before the pandemic. But even with IIJA funding, the U.S. might still fail to address digital disparities without a clear definition of the problems being solved, and the absence of input from local stakeholders who understand the economic and social conditions of their communities. These are all points that I recently made in an op-ed in the *Hill*. [32]

Unfortunately, these old paradigms applied to contemporary digital challenges present a race to the bottom framework that works against more democratized access to broadband. For example, having more access to affordable broadband and an internet-enabled device could have enabled more efficient and widely available vaccination scheduling or sustained remote health care for digitally disenfranchised groups. But even better for disconnected populations is access to some type of digital navigator, a person who understands how these applications work and can accelerate technology adoption in their respective communities.

During the pandemic, the growing number of people without broadband access persisted despite the increasing use of online resources. In April 2020, 87% of American adults reported that the Internet had been important or essential during the COVID-19 outbreak.[33] 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 public health crisis.[34] From 2020 to 2021, the number of virtual telehealth appointments skyrocketed

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[32] Nicol Turner Lee, "Can we better define what we mean by closing the digital divide?," The Hill, December 18, 2021. https://thehill.com/opinion/technology/586396-can-we-better-define-what-we-mean-by-closing-the-digital-divide

[33] Emily A. Vogels, Andrew Perrin, Lee Rainie and Monica Anderson, "53% of Americans Say the Internet Has Been Essential During the COVID-19 Outbreak," *Pew Research Center*, April 30, 2020, https://www.pewresearch.org/internet/2020/04/30/53-of-americans-say-the-internet-has-been-essential-during-the-covid-19-outbreak/.

[34] 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/.

with an estimated 78-times increase.[35] 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.[36] In part, if not in whole, the

transition to online services will continue even after we move into endemic survival, and it is

slated to leave further behind low-income, rural, and older consumers already struggling to get

and remain online.[37]

However, in certain use cases like education and telehealth, the breadth and depth of

the digital divide further revealed itself. More than nine million K-12 students were reportedly

without home broadband service and an internet-enabled device at the onset of the pandemic

across rural and urban areas. In some low-income households, one device was shared among

multiple siblings. Getting students equipped with the tools necessary for remote learning,

including broadband service and an internet-enabled device, was wildly complicated among

large, metropolitan school districts, and now haunts Black, Latinx, and indigenous students

whose connectivity challenges during two academic calendar years are showing up in

quantifiable learning losses, mental health challenges, and deepened systemic and educational

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[35] Samantha Lai, "TechTank Podcast Episode 33: How to build back better with telehealth," The Brookings Institution, *TechTank*, November 29, 2021, https://www.brookings.edu/blog/techtank/2021/11/29/techtank-podcast-episode-33-how-to-build-back-better-with-telehealth/.

[36] "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/.

[37] Ina Fried, "2 in 5 U.S. seniors lack sufficient broadband," *Axios*, January 27, 2021, https://www.axios.com/seniors-broadband-36582583-1f83-4e53-bc9f-b0024ae39887.html.

disparities.[38] According to a study of 5.5 million public school students in third through eighth grade who were assessed in the 2020-2021 school year, those from majority Black or Latinx schools were six months behind their normal math goals, compared to four months for white students.[39]

On the flip side, telehealth adoption and use flourished over the course of the pandemic, positively improving care for medically underserved patients where providers were previously unavailable to them. With certain segments of the population lacking sufficient health coverage or proximity to quality hospitals or medical providers, telehealth became the norm during the pandemic and has been widely supported by the Biden-Harris administration. In August 2021, the White House granted over $19 million via the U.S. Department of Health and Human Services to eligible recipients for improved remote care in rural and underserved communities.[40] To date, the FCC's Connected Care Pilot Program has announced its third wave of grants, which now total more than $69.3 million invested in projects serving patients in 36 states, plus the District of Columbia. But like remote learning, telehealth requires broadband access, which many populations can't utilize at this point. The CDC reported that health centers in the South and rural areas continue to report the lowest average percentage of weekly

[38] Nicol Turner Lee, "No Child Deserves to Be Left Offline This School Year- Here's How Congress Can Help." The Brookings Institution, *TechTank,* August 2, 2021, https://www.brookings.edu/blog/techtank/2021/08/02/no-child-deserves-to-be-left-offline-this-school-year-heres-how-congress-can-help/.
[39] Sarah Mervosh, "The Pandemic Hurt These Students the Most," The New York Times, July 28, 2021, sec. U.S., https://www.nytimes.com/2021/07/28/us/covid-schools-at-home-learning-study.html.
[40] U.S. Department of Health and Human Services, "Biden-Harris Administration Invests over $19 Million to Expand Telehealth Nationwide and Improve Health in Rural, Other Underserved Communities," August 18, 2021, https://www.hhs.gov/about/news/2021/08/18/biden-harris-administration-invests-over-19-million-expand-telehealth-nationwide-improve-health-rural.html.

telehealth visits.[41] Unequal access to healthcare has further marginalized vulnerable

populations and exacerbated existing health disparities, which made them more susceptible to

the coronavirus in its early stages.

Finally, the digital divide complicates participation in the existing and emerging

communications labor force for populations without broadband access. As job postings have

moved online over the years, a lack of or limited internet access has made it difficult for job

seekers to participate in the labor market.[42] For employed individuals with limited internet

access, remote work has proven to be difficult, with many forced to work in the "digital parking

lots" or troubled by unstable connections during work hours.[43] Having quality broadband

infrastructure relies upon an established training pipeline and workforce. According to a new

report from the Progressive Policy Institute, over four million jobs will be 5G or related

technology opportunities, and they will have higher than average wages.[44] However, not

enough workers are currently trained to fill these positions, especially from under-served labor

markets. National skilling policies are needed to build a workforce that fills these positions.[45] To

promote more inclusive economic growth, the creation of good-paying broadband

infrastructure jobs is a start, followed by the establishment of formidable job training

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[41] Hanna B. Demeke, Sharifa Merali, Suzanne Marks, et al, "Trends in Use of Telehealth Among Health Centers During the COVID-19 Pandemic— United States, June 26-November 6, 2020", MMWR Morb Mortal Wkly Rep 2021;70:240–244, DOI: http://dx.doi.org/10.15585/mmwr.mm7007a3.
[42] Nicol Turner Lee, "Bridging Digital Divides between Schools and Communities," The Brookings Institution, March 2, 2020, https://www.brookings.edu/research/bridging-digital-divides-between-schools-and-communities/.
[43] Harmeet Kaur, "Why Rural Americans Are Having a Hard Time Working from Home," CNN, April 29, 2020, https://www.cnn.com/2020/04/29/us/rural-broadband-access-coronavirus-trnd/index.html.
[44] Michael Mandel and Elliott Long, "The Third Wave: How 5G Will Drive Job Growth Over the Next Fifteen Years," Progressive Policy Institute, September 17, 2020, https://www.progressivepolicy.org/publication/the-third-wave-how-5g-will-drive-job-growth-over-the-next-fifteen-years/.
[45] Sam Sabin, "5G Worker Shortages Could Provide Many Americans with Chance to Return to Work," Morning Consult, May 6, 2020, https://morningconsult.com/2020/05/06/5g-wireless-workforce-shortage-coronavirus/.

programs, including apprenticeships and industry credentialling in more lucrative careers of 5G

installers, data analysts, customer service representatives, and more.

When addressing workforce development, we should also confront the limitations in

under-served and under-represented labor markets, where creative strategies like a "digital

service corps" or "learn and earn" models might imbue the appropriate training incentives.

When former president Franklin Delano Roosevelt constructed the Civilian Conservation Corps

(CCC) in the 1930s, his goal was to employ millions of young people in the restoration of the

country's parks as part of the broad economic recovery plans. A new, national "digital service

corps" could be modeled after the CCC with oversight by the Corporation for National and

Community Service to improve upon the tech pipeline, furthering the adoption, utilization, and

expansion of broadband infrastructure.[46]

I argue in my research that "the severity of the digital divide goes beyond the usual

analogy of a three-legged stool – broadband availability, affordability, and digital literacy."[47]

Rather, closing the digital divide must be about addressing poverty, geographic isolation, and

social isolation – premises that I strongly assert in my forthcoming book. As the nation moves

toward more inclusive economic growth, federal and state governments must position digital

equity as a "hand up" instead of a paternalistic "hand out" to mitigate digital disparities.[48] That

is, government agencies must partner with anchor institutions, other community partners, and

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[46] Nicol Turner Lee, "TechTank Podcast Episode 15: To Build Back Better, the U.S. Needs a Digital Service Corps," The Brookings Institution, *TechTank*, March 22, 2021. 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/.
[47] Nicol Turner Lee, "Can We Better Define What We Mean by Closing the Digital Divide?" The Hill, December 18, 2021, https://thehill.com/opinion/technology/586396-can-we-better-define-what-we-mean-by-closing-the-digital-divide.
[48] Ibid.

industry to work toward the institutionalization and intuitive familiarity of digital use within

urban and rural communities. In this vein, efforts to close the digital divide should result in

people and their communities being moved from consumers to producers and innovators, who

are prepared to accelerate our nation's global digital competitiveness.

The arguments made in my testimony amplify why America needs a fair and equitable

approach to broadband infrastructure deployments in rural, urban, and tribal areas; one that

aggressively works to simultaneously close the digital divide through increased access to online

services and newly created jobs. I will wrap up my testimony with **three salient takeaways** that

Congress can do now to ensure that our forthcoming investments are not done in haste and

waste.

III.   Ensuring Broadband as Part of Inclusive Economic Growth

1- **Maintain technology neutrality and focus on regional broadband development to generate more tailored solutions for rural and urban areas.**

In 2016, the Obama administration announced a $160 million "Smart Cities" Initiative to

encourage research and collaborations in tackling regional problems.[49] These initiatives

permitted locals to define their own needs and formulate community-led solutions, instead of

imposing one-size-fits-all proposals across multiple cities. The "smart cities" movement often

refers to human-centered initiatives, where technology is leveraged to improve existing

services and generate new economic opportunities. Countries such as Korea, Japan, Canada and

more have launched smart city initiatives as governments seek the creation of a more inclusive

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[49] White House. "FACT SHEET: Administration Announces New 'Smart Cities' Initiative to Help Communities Tackle Local Challenges and Improve City Services," September 14, 2015, https://obamawhitehouse.archives.gov/the-press-office/2015/09/14/fact-sheet-administration-announces-new-smart-cities-initiative-help.

future for all.[50] The expansion of broadband infrastructure may require a similar approach to avoid competitive interests and needs of rural, urban, and tribal communities. All communities will have different service needs, which will require access to fiber optics but not always as the first-choice option. With the availability of existing and emerging technologies like 5G, satellite, cable, TV White Spaces, and the assortment of wireline and wireless capabilities, states need to be the ones to determine what sets of technical connections, even if hybrid, work best for the communities being served. A report by the Richmond Federal Reserve explored technical approaches that sidestep the need for wired connections, mainly through fixed wireless or satellite service where laying fiber to every home may not be necessary.[51] In the report, they highlighted the Shenandoah Telecommunications Company (Shentel), whose BEAM Internet product targets low-density, rural areas within the company's service area and doesn't rely upon fiber for unlimited, high-speed internet connections.[52]

In addition to technical agnosticism, public-private partnerships that facilitate regional broadband development can be critical drivers in expanding broadband resources in both urban and rural areas. In January 2021, Arizona State University hosted its Smart Region Summit, which focused on ways to improve data collection and transparency, increase efficiency, and optimize infrastructure across cities and regions to meet local needs.[53] The project aims to

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[50] "Smart Cities and Inclusive Growth," Organization for Economic Cooperation and Development, 2020, https://www.oecd.org/cfe/cities/OECD_Policy_Paper_Smart_Cities_and_Inclusive_Growth.pdf.
[51] Alexander Marré, "Bringing Broadband to Rural America," Federal Reserve Bank of Richmond, December 2020, https://www.richmondfed.org/publications/community_development/community_scope/2020/comm_scope_vol 8_no1.
[52] Bevin Fletcher, "Shentel Expands Fixed Wireless Service for Rural Communities," Fierce Wireless, May 14, 2021, https://www.fiercewireless.com/operators/shentel-expands-fixed-wireless-service-for-rural-communities.
[53] Arizona State University, "Smart Region Summit," Accessed February 7, 2022, https://uto.asu.edu/events/smart-region-summit.

intersect infrastructure and digital inclusion to create futureproofed systems that build virtual bridges between areas, and roll out smart-enabled technologies serving local citizens, businesses, government, and other institutions. More work should be replicated around a smart regional approach to broadband infrastructure, which can catapult aligned regional interests within and across state lines.

2 - **Broadband must be complementary to other national and local infrastructure.** Broadband can also help to mitigate the risks associated with climate change and other environmental concerns through better managed public transportation systems, or drone surveillance of land masses. With access to high-capacity connectivity, states and cities can deploy sensors, satellites, and other smart devices necessary to achieve large-scale community objectives. In North Carolina, the Roanoke Electric Cooperative has used smart thermostats and water heaters to optimize their peak water and electricity periods and reduce overall utility usage.[54] Energy companies like BP estimate that smart meters and sensors, enabled by high-speed broadband networks, could potentially reduce electricity usage in the U.S. by more than 25 percent by 2050.[55] However, communities that lack high-speed broadband infrastructure risk being looped out of accurate climate data collection, and are likely to be victimized by tragic natural disasters or skyrocketing energy costs. With higher-capacity broadband infrastructure, more cities and even smaller rural towns can support smart devices and the

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[54] Curtis Wynn, "The State of Infrastructure in Rural America: Testimony at House Committee on Agriculture," NRECA - America's Electric Cooperatives, July 19, 2017, https://www.electric.coop/curtis-wynn-house-committee-agriculture-infrastructure.
[55] "BP Technology Outlook," BP, 2018, http://www.ourenergypolicy.org/wp-content/uploads/2018/03/bp-technology-outlook-2018.pdf.

communications necessary to upgrade their public transportation systems or roads, improving

safety and reducing traffic congestion in the long term.

On a more granular local level, public housing infrastructure should also be equipped

with high-speed broadband access. In this case, federal agencies can effectively target

broadband services to its units through retrofitting or setting requirements for broadband

installations within every housing unit receiving or subsidized by federal monies. The IIJA

allocates funding for "community anchor institutions," which does mention public housing

authorities and support organizations. It also calls for better data collection on broadband

service in public or federally assisted housing units. These measures alone are important and

should be highlighted, as existing and future housing must be digitally resilient, and able to

connect residents with the resources that can improve their economic livelihoods.

3 – States' broadband infrastructure plans must position equity as its main priority.

Finally, technology affords us the opportunities to dismiss boundaries of place, people, and

purposes in an ideal world. Given the disproportionate access to broadband and the platforms

and applications that it enables, it is important to presuppose equity in the decisions that are

made around where to build and who to serve – at least, in the first iteration of broadband

build-out and digital equity programs. *First*, we must create opportunities to study the

demographics of existing broadband adoption trends and intersect these findings with the

systemic challenges that plague communities of color, as well as people from rural, older,

disabled, tribal, and other marginalized circumstances. *Second*, the U.S. needs a reformation

and modernization of how universal service is defined and apportioned to communities in

need, which can fully unleash the capacities of the digital economy for all segments of society.

Third, individuals – regardless of their educational status – should be able to fruitfully work and earn in the existing and emerging communications ecosystems or be offered opportunities to learn the necessary skills.

These and other insights should push legislators to ensure that national broadband maps are being concurrently updated as broadband infrastructure is being rolled out, and agencies like the NTIA and FCC have established metrics and goals to track for equitable outcomes. My own research has offered various equity frameworks to confront America's digital divide, from asserting a "Tech New Deal"[56] that is a more comprehensive approach to aspects of the Bipartisan Infrastructure Bill, to suggesting that "No Child Be Left Offline,"[57] which would ensure that every K-12 student is prepared for basic digital adoption and use with options for affordable broadband service, an internet-enabled device, hot spot, and relevant training resources for parents and other caregivers.

Under a portion of the IIJA, states are obliged to establish digital equity plans as part of the digital inclusion portion of the bill, or the Digital Equity Act of 2021, which appropriates $2.75 billion through the State Digital Equity Capacity Grant Program and the Digital Equity Competitive Grant Program.[58] But I implore state leaders to exercise this same cadence as part of the larger $65 billion allocation and establish digital equity goals around infrastructure

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[56] Nicol Turner Lee, "Why America Needs a 'Tech New Deal' to Build Back Better," The Brookings Institution, *TechTank*, January 12, 2021, https://www.brookings.edu/blog/techtank/2021/01/12/why-america-needs-a-tech-new-deal-to-build-back-better/.

[57] Nicol Turner Lee, "No Child Deserves to Be Left Offline This School Year—Here's How Congress Can Help," The Brookings Institution, *TechTank*, August 2, 2021, https://www.brookings.edu/blog/techtank/2021/08/02/no-child-deserves-to-be-left-offline-this-school-year-heres-how-congress-can-help/.

[58] Amy Huffman, "The Infrastructure Act and Digital Equity Act Passed … Now What?" National Digital Inclusion Alliance, November 16, 2021, https://www.digitalinclusion.org/blog/2021/11/16/the-infrastructure-act-and-digital-equity-act-passed-now-what/.

deployments. Having equity at the core of states' planning will motivate leaders to better identify the problems and the stakeholders who need to be at the table representing digitally disconnected constituents, like school and community leaders, as well as other practitioners and community activists.

Chairman Himes, Ranking Member Steil, and distinguished members of the House Committee on Economic Disparity & Fairness in Growth, my testimony should amplify that investing in broadband goes beyond cell towers, satellite dishes, or fiber optic conduits. It is about investments in *people and their communities* where quality access to existing and futureproofed technologies contribute to their economic growth and personal livelihoods.

Thank you again to the Members of the Committee on Economic Disparity & Fairness in Growth for the opportunity to testify, and I look forward to your questions. I also want to thank Brookings researchers Samantha Lai, James Seddon, Caitlin Chin, and Mauricio Baker, for their assistance in preparing my statement.