

Issue: VA Broadband

Making Virginia's Broadband Better

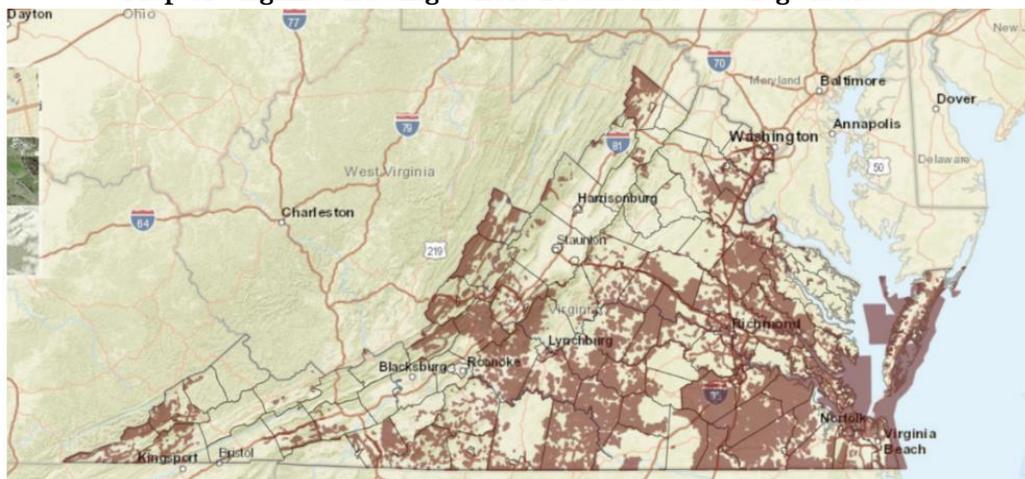
What electricity and then telephone connections did to improve rural life 100 years ago, broadband in rural areas can do today. But while “rural broadband” is now a catchphrase, lack of access to broadband is an issue in poor urban communities, too. Virginia’s superintendent for public instruction, Dr. James Lane, has called internet access “the civil rights issue of our time.”¹ The COVID-19 pandemic showed clearly how living without robust broadband means being cut off from remote work, online school, medical care, business opportunities and access to culture. A recent U.S. Chamber of Commerce report said improved broadband could increase annual sales in Virginia by \$2.24 billion annually, add more than 9,400 jobs, and boost wages more than \$450 million.²

A recent Brookings Institute report noted remoteness and poverty both play a role in the problem: “Although a larger share of rural households lack broadband (about 19 percent of rural households, as opposed to 14 percent of urban households, according to the U.S. Census Bureau), in absolute numbers about three times as many households without broadband are in urban areas. Many urban families have broadband network infrastructure physically available but are unable to afford internet services.”³

Understanding what’s needed to improve the situation in Virginia means knowing what information is important and what crucial data is missing. Unfortunately, both nationwide and statewide, there are not reliable estimates of people lacking usable or affordable broadband. Existing figures probably lowball the actual situation.⁴ Using federal numbers, the state estimated three years ago that 660,000 rural Virginians lack broadband.⁵ The numbers had a built-in undercount: if a census block had one connection, the Federal Communications Commission assumed everyone in the block was connected. That fallacy was exposed in 2019; accurate maps are a work in progress.

In Virginia in 2019, the Republican-led legislature enacted a measure saying that an area was “unserved” only if no more than 10 percent of residents and businesses had access to broadband. Across the country, broadband adoption lags the adoption of earlier technologies. Below is a map of areas of the state that have broadband download speeds less than 10 megabits per second and upload speeds less than 1 megabit per second. These speeds once were considered acceptable, but are now too slow for the multiple, simultaneous household uses that are common.

Map of Virginia Showing Where Broadband Coverage Is Slow⁶



Although the scope of the problem is still fuzzy, the remedies are clear. This paper will try to provide a roadmap showing the most essential elements, the money now available for broadband, and a few sketches of communities that have created solutions.

Homes with three or four residents using the internet simultaneously for work, online education, high-end creative work, streaming movies, gaming, sending e-mails, and checking social media should have access to internet speeds of 50 to 100 megabits per second. The chart below, from reviews.org,⁷ gives an idea of how different simultaneous activities demand different speeds. The brown areas in the map above show how much of Virginia has inadequate broadband.

What can you do with different internet speeds?

Internet speed	Number of People	Activities
5-25 Mbps	1-2	Casual web browsing, emails, social media, streaming SD video, streaming music
25-50 Mbps	1-3	Streaming HD and 4K video, streaming music, gaming, light work from home
50-100 Mbps	2-4	Streaming 4K video, gaming, working from home, using home security devices
100-500 Mbps	2-5	Streaming 4K video, gaming, using home security and smart home devices
500-1000 Mbps	3-5+	Running a home office or creative profession, streaming in 4K using home security and smart home devices

There are few 'one size fits all' solutions, but there are two aspects that matter most. First is the distribution of the millions of dollars needed to build the necessary infrastructure. A section of this report will detail the pots of money available. Second, there are broadband bottlenecks, enshrined in Virginia laws, which must be resolved. These laws protect wealthy and powerful broadband providers—Verizon, Century Link, and Comcast—from publicly supported competition. Big providers often shun rural areas as it's seldom profitable to pay for expensive infrastructure that serves few customers.

This makes haphazard broadband deployment a classic market failure.⁸ It has put the burden on states and localities to find creative solutions, whether through creating go-it-alone municipal efforts, expanding the work of existing rural electric or telephone cooperatives, or developing public-private partnerships. In every case, the community or urban housing block will need an experienced broadband expert to assess local obstacles to broadband—technical or regulatory—and to navigate the way to solutions. And the community will need access to large sums of federal and state money.

What has haphazard broadband deployment cost the commonwealth? Two years ago, a Virginia Chamber of Commerce statement quoted a report by its U.S. parent saying, "Small businesses with broadband have already taken advantage of online tools to boost sales, with nearly 20 percent of rural small businesses relying on online sales alone. Even for businesses with brick-and-mortar locations, 29 percent reduced product/material costs by buying online and 55 percent reported boosted sales after using online tools...." It added, "From 2015-2018, Virginia's unrealized gains due to the lack of

access to digital tools by rural small businesses were immense: \$2.1 billion in annual sales lost, 9,000 jobs never created, and \$436 million in annual wages never collected.”⁹

Broadband Technology

The two most basic ways broadband reaches a home or business are wires and microwave signals. Wires can be old copper wires originally used for electricity, coaxial for cable, or the newer fiber optic lines developed for cable television and advanced communications. Signals coming over airwaves can come from local fixed sites, perhaps using unused television spectrum (called “TV white space”) or from satellites. There are two varieties of satellite—the old ones in higher orbits, which are hundreds of miles away, and a new generation of low-earth-orbit satellites.

Wires provide the most reliable service but are the most expensive connections to install. Planners refer to two elements of wired installation: the “middle mile,” which takes connectivity through a general area, and the “last-mile,” which takes it to the customer. The “last-mile” extension of wires is usually the most expensive part of the infrastructure needed. Installed in some areas are a hybrid of wires and airwaves, such as setting up an antenna in a high spot with clear line of sight to the area, such as a silo, a steeple, or a cell phone tower. The antenna is wired to the internet and can broadcast broadband signals to a nearby community. This is often used in rural areas; it’s called “fixed wireless.”

In the most remote areas, satellites may be the only viable technology. In a recent Q & A with Pew Trusts, the governor’s broadband adviser said satellite services “are either too slow or entirely untested.”¹⁰ Some disagree with this assessment, particularly since the ballyhooed expansion of SpaceX’s Starlink low-earth-orbit satellite network. Public schools in Wise County are participating in the first pilot program in Virginia schools using Starlink satellites to access broadband. The pilot program will start with 45 families and expand to 90 families.¹¹

But all systems have drawbacks. Cost is the biggest, in terms of wired systems, but older wired systems face the potential of obsolescence as internet speeds multiply. For wireless systems, potential problems run from interference caused by terrestrial obstacles, like mountains, trees, or electric storms. They also suffer from lag-time—known in the industry as latency—for satellite signals. Local stakeholders teaming with private or public experts will make the best technology decisions for their regions. They will also certainly need money.

Federal and State Broadband Program Funding Now Available

In July 2021, Governor Northam announced that universal broadband in Virginia could be expedited from an anticipated completion in 2028 to 2024 at a cost \$700 million.¹² The totals of Virginia’s broadband contributions and pass-alongs of federal monies were made clear in the special session of the legislature that started in August of 2021.

The General Assembly approved the Fiscal Year 2022 budget for COVID-19 relief spending, allocating the \$4.3 billion Virginia received in the State Fiscal Recovery Fund—a part of the American Rescue Plan Act (ARP) passed by the U.S. Congress. Broadband deployment is a permitted use of the State Fiscal Recovery Fund.

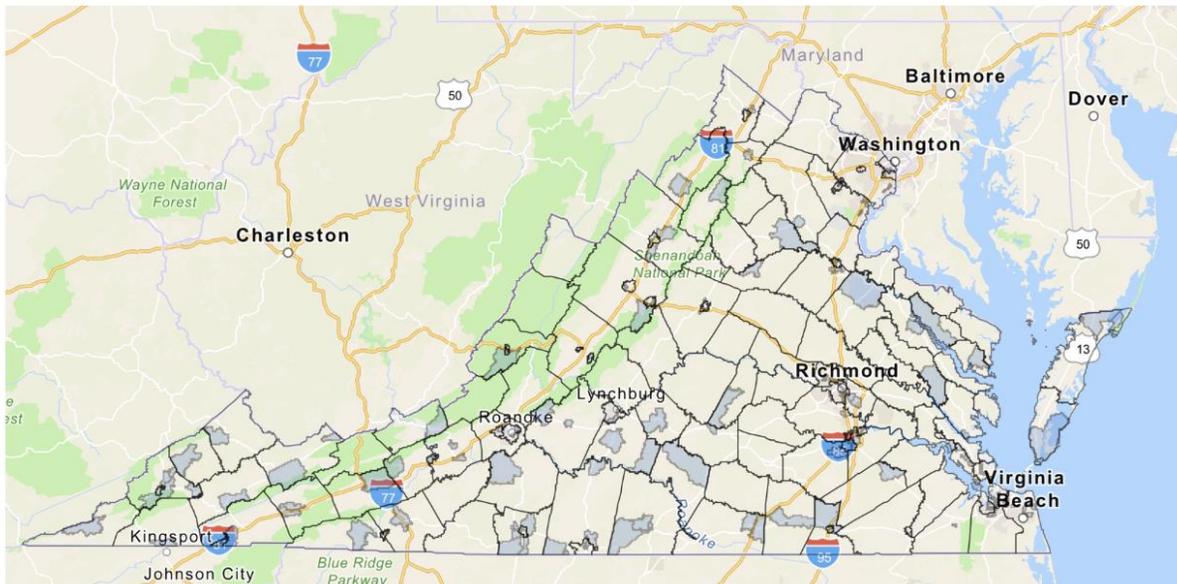
FY22 COVID Relief Budget Broadband Appropriations

- **Dept. of Housing and Community Development (DHCD)** - Part 1 of a \$700 million appropriation for the development of broadband infrastructure in the state amounts to \$479,000,000. The remaining funds—\$222 million—will come from **Capital Project Fund** dollars in the American Rescue Plan and will help pay for last-mile broadband buildout.
- **DHCD - New Line Extension Customer Assistance Program (LECAP)** to help extend broadband service to customers that cannot afford to pay for the cost of running lines from the transmission box to their homes. (Internet service providers only cover 150 feet); \$8,000,000
- **Dept. of General Services** - Additional support to coordinate land-use transactions involving broadband expansion projects on public land; \$500,000

Governor Northam’s Fiscal Year 2022 budget includes \$479 million in federal funds for broadband infrastructure.¹³ Additional monies from the Capital Project Fund, also a part of the ARP, will be used to make up the \$700 million required for universal broadband.¹⁴

The broadband projects are to complete last-mile buildouts. The governor estimates 233,500 locations remain to be connected to broadband.¹⁵ The box to the left gives a breakdown of other broadband-related expenditures in federal COVID-19 relief spending in Virginia.

Map of Virginia’s Opportunity Zones¹⁶
(Gray areas are the Opportunity Zones)



Beyond the State Fiscal Recovery Fund and the Local Fiscal Recovery Fund, which gives funds directly to counties, metro areas, cities and towns, the American Rescue Plan can pay for broadband and digital equity projects. Recipients include rural and urban Opportunity Zones, rural health-care facilities, schools and libraries, tribal governments, and homeowners.¹⁷ (See map above; the gray areas are the Opportunity Zones.) Opportunity Zone funds are disbursed by the federal Department of Commerce through its Economic Adjustment Program. Broadband projects applying within this program must include job-creation goals.¹⁸

Some federal monies allocated under the earlier CARES Act have already been awarded. About \$30 million was awarded to 71 projects in Virginia, serving 50 localities. It was used both to connect to 24,026 new locations and to provide more affordable broadband to 6,796 locations. The money was disbursed under a variety of project types, including those emphasizing affordability, last-mile fiber optics, last-mile fixed wireless, middle mile, public wi-fi, and mobile hotspots.¹⁹

One persistent problem with broadband access is affordability. Different parts of the new federal and state broadband funding legislation tackle this. One federal program targeting broadband affordability is the Emergency Broadcast Benefit Program, which provides a broadband subscription subsidy of \$50 a month and \$75 a month on tribal lands for eligible low-income households. It also provides a one-time \$100 voucher towards purchase of a laptop, tablet, or desktop computer.²⁰

Since 2018, the Virginia Telecommunication Initiative (VATI) has invested \$73.1 million in funds to connect 76,351 Virginians.²¹ In Fiscal Year 2021, it underwrote more than 24,500 individual connections through 16 projects in 27 localities.²² In the coming fiscal year, more than 85 county governments, in addition to local internet providers and smaller jurisdictions, have notified the state they intend to apply for some of the available \$49.7 million.²³

How Some Communities Are Using the New Funds

Here are examples of the kinds of plans local communities are developing as described by the Associated Press in December 2020.²⁴ Of the 50 cities or counties that have already received grants, some are installing last-mile or wireless connections. Others plan to use the money to subsidize the internet bills of low-income families. Washington County, in the most southwestern part of Virginia, received nearly \$432,000 to spend on two projects to connect about 140 homes, a handful of businesses, and a church. The City of Portsmouth plans to use its \$750,000 to install a wireless network for more than 1,000 public housing units and give residents free access to high-speed internet.

What Some Communities Have Already Done

Over the past decade, Virginia's laws throttling the ability of municipalities and other public entities to provide broadband service—laws passed under the banner of defending free enterprise—did not prevent all efforts to create rural broadband services. Successful efforts preceded the legal restrictions and were later grandfathered in, and they have had significant success. These include the Roanoke Valley Broadband Authority, born of a collaboration between the cities of Roanoke and Salem, which joined with Roanoke County and Botetourt County. The four jurisdictions founded the authority in 2013; a 47-mile network opened in 2016. Significant support came from a \$6.2 million bond from the Virginia Resources Authority.²⁵ Earlier, in 2007, the city of Danville embarked on construction of a network based on a local utility's lines. As a result, in Danville, 135 miles of fiber optic lines connect local businesses.²⁶

Electric and telephone cooperatives created decades ago to keep rural America abreast of what was then the latest technology, have also played a role in expanding broadband in Virginia. The Central Virginia Electric Cooperative has run fiber optic lines to the homes and businesses of its 37,000 members.²⁷ About 17 years ago, the Old Dominion Electric Cooperative formed the Mid-Atlantic Broadband Cooperative, using money allotted to the state in the settlement of its claims on the tobacco industry. It claims to have helped create more than 2,000 jobs and may have been a factor in attracting Microsoft's Virginia Data Center.²⁸ To the west, in the Shenandoah Valley, BARC Connects began offering its 12,500 customers high-speed internet through fiber optic lines that reached customers' homes.²⁹

What Some Communities Are Trying to Do

Clarke County in far northwestern Virginia lacks broadband service in most areas outside the towns of Berryville and Boyce. During the past two years, Clarke County used a \$209,513 VATI grant to extend broadband to roughly 100 households in the White Post area in a joint project with Comcast. The company provided a \$119,463 matching grant for a total project cost of \$328,976. In July 2021 its Board of Supervisors took the first steps to participate in a regional project developed by All Points Broadband Partners LLC. The move would be in tandem with Frederick County and Warren County. Shenandoah Valley Electric Cooperative and Dominion Energy Virginia are members; Rappahannock Electric Cooperative—Clarke County’s electricity provider—is expected to join.³⁰

The Eastern Shore of Virginia Broadband Authority was created by Accomack County and Northampton County; it now has 480 miles of fiber optic cable running through the two counties and aims to connect 70 percent of addresses on the Eastern Shore. It has also started a program to allow groups of citizens to apply for services in “micro communities.” An alternative option for unserved residents: 15 different wi-fi hotspots.³¹

The Institute for Local Self Reliance reported recently that Accomack County supervisors are considering allocating \$1 to \$5 million of ARP funds for local broadband expansion.³² “County Supervisors plan to request that A&N Electric Cooperative and the Eastern Shore Broadband Authority put together plans detailing how the potential funding could be utilized.”³³

In the Appalachians, Grayson County has about 9,100 housing units where 15,000 people live, half of them above age 50. A group of seniors lobbied county supervisors; the county is now partnering with Appalachian Power. In 2019, after a state law was passed,³⁴ the state Corporation Commission approved a pilot program which led to Appalachian Power running 240 miles of fiber optic cable in Grayson County; in March 2021, about 20 percent of that work was complete.³⁵ A 2021 law makes permanent³⁶ electric utilities’ right to get approval for providing broadband to underserved areas.³⁷

Legal Obstacles Will Take Time to Eliminate

The Institute for Local Self-Reliance in Minnesota has followed closely various state restrictions on municipal broadband expansion. Their website noted last year the difficulties faced by legislative efforts by members of both parties to overturn the restrictions. Democratic Delegate Mark Levine, who represents a suburban Washington D.C. area in the General Assembly, introduced a bill (HB 1052, 2020) to allow local communities to invest in broadband networks.³⁸ Unfortunately, Levine pulled back his 2020 legislation, which was strongly opposed by lobbyists from telephone companies and big cable companies.

As Lisa Gonzalez wrote on the MuniNetworks blog,³⁹ “Virginia had long been a state where communities have had to fight ever-increasing efforts from special interest lobbyists seeking to strip them of the local authority they still possess... The state has laws in place now that impose onerous reporting requirements on municipal networks to discourage new projects and operate as almost a de facto ban. Past fights on any broadband bill designed to restore local authority or ease requirements make any lawmaker careful.”

Going Forward

Since county and municipal officials are the key for determining what kind of broadband technology best fits their area and how to best to support low-income populations, state legislators’ most important role may be identifying the best pots of money they could draw on and making the application process manageable. In the longer term, bills unravelling the legal restrictions on municipal broadband, like Delegate Levine’s failed effort in 2020, should be a priority. But for the

moment, the priority is getting enough money to the right places and organizations to bring all Virginia citizens within broadband's embrace.

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- ¹ <https://housingforwardva.org/news/fwd-147-affordable-housing-broadband-internet/>
 - ² https://americaninnovators.com/wp-content/uploads/2019/03/rural_report_factsheet_VA.pdf
 - ³ <https://www.brookings.edu/blog/up-front/2021/08/18/the-benefits-and-costs-of-broadband-expansion/>
 - ⁴ <https://blogs.microsoft.com/on-the-issues/2019/04/08/its-time-for-a-new-approach-for-mapping-broadband-data-to-better-serve-americans/>
 - ⁵ <https://commonwealthconnect.virginiainteractive.org/sites/default/files/CIT%20Documents/Commonwealth%20Connect%20Report.pdf>
 - ⁶ Map developed using <https://broadband.cgit.vt.edu/IntegratedToolbox/>
 - ⁷ <https://www.reviews.org/internet-service/how-many-mbps-do-i-need/>
 - ⁸ <https://www.brookings.edu/book/the-broadband-problem/>
 - ⁹ <https://vachamber.com/2019/11/22/increasing-support-for-virginias-broadband-needs-an-update-from-the-commonwealths-chief-broadband-advisor-evan-feinman/>
 - ¹⁰ <https://www.pewtrusts.org/en/research-and-analysis/articles/2021/03/24/virginia-aims-for-universal-broadband-access-by-2028>
 - ¹¹ <https://www.virginiabusiness.com/article/wise-county-first-to-receive-starlink-internet-in-va/>
 - ¹² <https://www.governor.virginia.gov/newsroom/all-releases/2021/july/headline-898837-en.html>
 - ¹³ <https://lis.virginia.gov/cgi-bin/legp604.exe?213+ful+CHAP0001>
 - ¹⁴ <https://www.vpap.org/visuals/visual/american-rescue-plan-budget-proposal/>
 - ¹⁵ <https://www.governor.virginia.gov/newsroom/all-releases/2021/july/headline-898837-en.html>
 - ¹⁶ <https://www.dhcd.virginia.gov/opportunity-zones-oz>
 - ¹⁷ https://www.localmajority.org/wp-content/uploads/2021/07/VA.ARP_.07052021.HY_jxr_.rf_jr_.pdf
 - ¹⁸ <https://etisoftware.com/broadband-funding-resource-guide/us-dept-of-commerce-economic-development-administration/>
 - ¹⁹ <https://www.commonwealthconnect.virginia.gov/cares-act-awards>
 - ²⁰ <https://getemergencybroadband.org/>
 - ²¹ <https://plowsandpolitics.com/2021/03/18/governor-northam-announces-20-1-million-to-strengthen-broadband-infrastructure-in-17-localities/>
 - ²² <https://dhcd.virginia.gov/sites/default/files/Docx/vati/2022-vati-how-to-apply-webinar-slides.pdf>
 - ²³ <https://www.dhcd.virginia.gov/vati>
 - ²⁴ <https://apnews.com/article/ralph-northam-virginia-fe2d22feabf415ca29465e0ca850d0c0>
 - ²⁵ <https://muninetworks.org/content/roanoke-valley-broadband-authority-moving-forward>
 - ²⁶ <http://www.bbpomag.com/MuniPortal/EditorsChoice/1111editorschoice.php>
 - ²⁷ <https://www.mycvec.com/broadband/project-overview>
 - ²⁸ <https://mbc-va.com/history/>
 - ²⁹ <https://barcelectric.com/about-us/>
 - ³⁰ https://www.winchesterstar.com/winchester_star/clarke-county-considering-another-broadband-option/article_5565752f-90f1-5d6a-9ac0-8f09b910d4d5.html
 - ³¹ <https://www.easternshorepost.com/2020/09/24/broadband-authority-plans-to-expand-shore-internet-access/>
 - ³² <https://shoredailynews.com/headlines/accomack-county-supervisors-discuss-the-use-of-arpa-funding/>
 - ³³ <https://muninetworks.org/content/our-big-list-american-rescue-plan-community-broadband-projects>
 - ³⁴ <https://lis.virginia.gov/cgi-bin/legp604.exe?191+sum+HB2691>
 - ³⁵ <https://www.aarp.org/livable-communities/network-age-friendly-communities/info-2021/broadband-grayson-county-virginia.html>
 - ³⁶ <https://lis.virginia.gov/cgi-bin/legp604.exe?212+sum+HB2304>
 - ³⁷ <https://www.vpap.org/bills/72963/HB2304/>
 - ³⁸ <https://lis.virginia.gov/cgi-bin/legp604.exe?201+sum+HB1052>
 - ³⁹ <https://muninetworks.org/content/state-legislatures-2020-broadband-preemption-still-risk>

Appendix A

ARP Funds that Include Broadband and Digital Equity Uses

ARP Provision	Funding and Expiration	Recipients	Physical Network Build-out	Device Support	Broadband Connectivity Subscription Support	Digital Literacy Training
Elementary and Secondary Emergency Relief Fund	\$122,775 billion through Sept 30, 2023	Local educational agencies		x	x	
Institute of Museum and Library Services	\$200 million until expended	State Library administrative agencies	x	x	x	x
Economic Adjustment Services	\$3 billion through Sept 30, 2022	Dept. of Commerce, states and communities	x			
Homeowner Assistance Fund	\$9.961 billion through Sept 30, 2025	States, territories, and Tribal governments			x	
Emergency Connectivity Fund	\$7.171 billion through Sept 30, 2030	Schools and libraries	x	x	x	
Coronavirus State Fiscal Recovery Fund	\$219.8 billion through 2024	States, territories, and Tribal governments	x	x	x	x
Coronavirus Local Fiscal Recovery Fund	\$13.2 billion through 2024	Metro areas, counties, cities, towns and villages	x	x	x	x
Coronavirus Capital Projects Fund	\$10 billion until expended	States, territories, and Tribal governments	x	x		
Local Assistance and Tribal Consistency Fund	\$2 billion through Sept 30, 2023	Revenue sharing counties and Tribal governments	x	x	x	x

Source: <https://www.brookings.edu/research/the-american-rescue-plan-is-the-broadband-down-payment-the-country-needs/>