BROADBAND BUILDS THE FUTURE

ReImagine Appalachia

This white paper was prepared in conjunction with the Reimagine Appalachia coalition by Mark Shanahan, New Morning Energy LLC and Dr. Stephen Herzenberg and Maisum Murtaza, Keystone Research Center. Thanks to Bill Callahan, Mimi Pickering, Professor Sascha Meinrath, Professor Christopher Ali and dozens of others across the ReImagine Appalachia coalition that contributed.

Reimagine Appalachia was created out of a broad recognition that the economy has not been working for most people and places in the Ohio River Valley. In response, a diverse set of economic, environmental and community leaders, and grassroots organizations, came together to find common ground and build the future we want to see—a 21st century economy that's good for workers, communities, and the environment as demonstrated in our campaign video.

Our policy blueprint, endorsed by nearly 100 organizations, was created with the intent that we can rebuild our economy by expanding opportunity through public investments, building a 21st Century economy with investments that create green jobs; and rebuilding the middle class including by strengthening workers' right to form unions in all sectors and boosting local ownership.

These whitepapers are the next stage in ReImagine Appalachia's work to show that federal investments in the people, communities and infrastructure of Appalachia can work to revitalize the region, if politicians are willing to step up to the challenge.

"High quality, affordable broadband is foundational for a prosperous 21st century Appalachia. Children and families—and the local businesses, schools and health care institutions that serve them—require broadband to ensure their well-being. All Appalachians, regardless of their income or race, must be able to access the internet. Universal broadband is also necessary for a smart grid."

--ReImagine Appalachia Blueprint

IN BRIEF

WHY BROADBAND MATTERS

- High-quality internet is now basic infrastructure; like access to water or electricity, it is a necessity for families, students, businesses, farmers, healthcare providers and those who wish to access government services. It is also necessary for grid modernization and the smart grid which are vital to reducing carbon emissions.
- The pandemic has made more visible the critical infrastructure need for universal high-quality broadband in rural Appalachia to avoid business and personal financial crises that start vicious cycles of economic decline as well as to close the "homework gap" that is becoming a widening "schooling gap."

THE PROBLEMS

Lack of Affordable Access

- Access to the internet is essential for growing Appalachia's economy and expanding educational opportunities. However, many rural regions and city neighborhoods have no affordable access to high-quality broadband or no access at all. The Federal Communications Commission (FCC) undercounts the number of people without access by as much as a factor of six.
- A best-practice 2019 Pennsylvania study found, based on 11 million speed tests, that in not a single county in Pennsylvania did at least 50% of people have access to the FCC's inadequate definition of broadband connectivity (a 25/3 megabits per second download/upload standard).
- Using powerful maps made from brand new "open source" data like that used in the Pennsylvania study, this ReImagine Appalachia white paper shows that broadband speeds are (a) even lower in KY, OH, and WV than PA, (b) lowest in the Appalachian parts of our region, and (c) rank in the bottom half of states—and sometimes in the bottom five or 10—in KY, OH, and WV.

Market and Regulatory Failure

- There is no access to quality, affordable broadband in many rural, urban, and suburban lower-income communities and neighborhoods for a simple reason: market failure. The major incumbent providers cannot make large profits by delivering affordable quality service where population density and/or incomes are low.
- Universal, quality service is deemed unworkable by regulators too subservient to incumbent providers and some providers ignore the universal service requirements that do exist.

Solutions

- Best-practice municipalities (Chattanooga), rural electrical cooperatives (McKee, KY), and states (Minnesota) underscore that we can fix these problems and achieve affordable, universal quality service.
- Two federal bills with around $100 billion for improving broadband—roughly the needed level—and many of the right provisions (e.g., promoting competition and allowing a role for municipalities and cooperatives where they can deliver best value) have passed the U.S. House this year, but not been taken up by the U.S. Senate.

Recommendations for Action

- Empower lead entities to drive federal policy including, in rural areas, the Rural Utilities Service (RUS). RUS is the successor agency to the New Deal's Rural Electrification Administration (REA), which brought electricity and telephone service to farms and rural areas from the 1930s to the 1950s. RUS can do the same for broadband today. Empowering lead agencies, including RUS, to drive effective national broadband policy will require Congressional action and executive action.
- Fund statewide assessments of connectivity to replace faulty FCC data by leveraging the work of M-Lab that produced this paper's data.
- Invest in universal broadband using a mix of public, cooperative, and private service and competition.
- Require states to develop and implement plans to provide high-quality connectivity as a condition for receiving federal funds; the plans should adopt the gold standard of 100/100 mbps and identify clear program targets and dates.
- Governors should establish interagency broadband working groups and task forces that include stakeholders from underserved communities to oversee development and implementation of state plans.
- Link federal funds to the creation of high-quality jobs that are locally filled, union wage and available to all including those historically excluded.

WHY BROADBAND MATTERS

Broadband is a term used to describe high-speed internet connectivity and encompasses an array of delivery technologies, ranging from DSL to fiber optic to satellite.[1] The key questions are connectivity (do you have access?), speed (how fast you can download and upload data?), quality (how reliable and consistent is your connection?) and affordability (can you pay for it?).

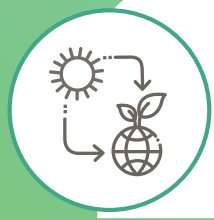
As with other hidden, or at least ignored, inequalities, COVID 19 has made dramatically more visible the impact of unequal access to high quality broadband. In affluent suburbs and city neighborhoods, many businesses, schools, and communities have adapted to life online instead of in person. Meetings and

classes take place online. Retailers shift staff to online sales. Health professionals deliver telemedicine. Friends and families hold video happy hours. Digital is not a substitute for in person but learning, business, and socialization—life—goes on. This continuity hinges on technological literacy and access to computers, tablets, and smartphones. It also requires the availability of high-quality broadband—in many cases fiber that delivers close to 1,000 Megabytes per second (Mbps).

Many rural communities and low-income neighborhoods, by contrast, cannot easily adapt to a world online. Soliciting or serving customers digitally is more miss than hit. Businesses and homeowners must park outside the local library or restaurant to even send an email. At best, participation in Zoom meetings requires turning off the video, connecting to audio by phone, and being disconnected intermittently. These realities reflect digital divides based on income, education, and place. On the level of our entire electrical infrastructure, lack of universal broadband compromises implementation of the smart grid needed for energy efficiency and more rapid growth of distributed renewable energy (Box 1).

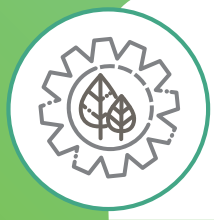
Box 1

BROADBAND AND CLIMATE CHANGE



Properly deployed, high-speed reliable broadband can lead to significant reductions in carbon emissions. Without it, the Bipartisan Policy Center points out, we cannot implement precision agriculture, precision forestry, next generation energy efficiency and resilient rural electrical systems.[2]

Precision farming allows modern information technologies to improve resource use, increase efficiency and yield as well as quality and sustainability. (See the ReImagine Appalachia white paper titled “Heal Our Land and People”) These increase soil carbon sequestration in addition to decreasing emissions.



Information technologies backed by high-quality broadband can also support precision forestry. Use of remote sensing, digital monitoring and advanced analytics can identify threats from pests, diseases and wildfires as well as defining sustainable growth and harvest strategies.

A modernized electric grid—often referred to as Smart Grid—requires better data collection, customer communication and centralized controls whether on the farm, in a business or in a residence: in other words, Smart Grid depends on high-quality broadband. Not only will the efficiency that results from Smart Grid reduce carbon emissions, it will reduce customer costs, including by giving customers of rural cooperatives, municipal electric providers, and investor-owned utilities more control over their use of electricity. The technology can also pinpoint system weaknesses, predict potential failures and restore power more quickly.[3]

Ten years ago, Congress recognized the importance of broadband when it instructed the Federal Communications Commission (FCC) to develop a National Broadband Plan that would "include a detailed strategy for achieving affordability and maximizing use of broadband to advance consumer welfare, civic participation, public safety and homeland security, community development, health care delivery, energy independence and efficiency, education, employee training, private sector investment, entrepreneurial activity, job creation and economic growth, and other national purposes."[4] The plan was developed through a robust public review process and laid out ambitious goals for the broadband of the future. Unfortunately, as the next section shows, even using its own inadequate metrics, the FCC has failed to deliver. Christopher Terry points out: "(I)t is clear the agency will not meet the plan's stated benchmarks for speed, for universal access, for public safety communications, nor for access to high-speed broadband for anchor institutions like schools and libraries or to provide functional energy management controls. Each failure represents an unfilled public-interest objective." [5]

THE PROBLEMS

LACK OF AFFORDABLE ACCESS FOR MANY PEOPLE AND PLACES

Throughout our discussion, we will frequently refer to challenges facing rural areas and, indeed, Appalachia is usually thought of as a rural area. It is critical to note that the challenges we describe exist in rural, urban, and suburban areas. They are driven by geography, income, race, and lower education levels. They are also driven by what we describe as a market failure.

The Federal Communications Commission defines broadband as an "always-on" 25/3 internet connection—one with a minimum download speed of 25 mbps and upload speed of 3 mbps. Most experts today argue that this standard is highly inadequate and does not even capture what is technically possible.[6] Jonathan Sallet argues for a broader, more comprehensive definition: the true metric should be "high-performance broadband" encompassing "fixed broadband networks (that) are fit for the future; they provide fast, symmetrical upload and download speeds, low latency (moving data without noticeable delay), ample monthly usage capacity, and security from cyberattacks."[7]

As the lead federal agency on broadband, the FCC gathers data on availability of broadband across the country using the 25/3 standard. Its data, however, do not accurately capture actual accessibility, usage, or affordability. For example, they count the entire census block as having access if any single location within it has access. (The Commission itself recognizes the problem with this methodology in rural areas: "this analysis likely overstates the coverage experienced by some consumers, especially in large or irregularly-shaped census blocks. We therefore acknowledge that this analysis may overstate the deployment of fixed and mobile services."[8])

FCC methods result in an eye-popping overcount of broadband access. In its 2016 report, the FCC finds that broadband is not available to 24.7 million Americans; Microsoft, meanwhile, estimates that 162.8 million Americans do not use the internet at broadband speeds.[9] In its 2020 report, the FCC claims significant decreases in the digital divide, but two Commissioners bluntly dissent. Commissioner Geoffrey Starks points out: "The fact that this report must rely on the unreliable should be reflected in its conclusions. I cannot approve the report's confident declaration that this data constitutes 'compelling evidence' that Advanced Telecommunications Capability is being deployed on a reasonable and timely basis. We do not have a strong

basis for that conclusion, and we should say so."[10] Fellow dissenter Commissioner Jessica Rosenworcel finds the report baffling: "For starters, the FCC concludes that there are only 18 million people in the United States without access to broadband. This number wildly understates the extent of the digital divide in this country. ... Other studies have shown that the true number of people without broadband access is 42 million or even as high as 162 million."[11]

A best-practice 2019 state study commissioned by the Center for Rural Pennsylvania used more than 11 million broadband speed tests to determine how many people and places really have access to the FCC's inadequate 25/3 metric. The FCC maps from December 2017 (updated May 2019) show 100% availability across all of Pennsylvania. The Penn State research team, headed by Sascha Meinrath, the Palmer Chair in Telecommunications, found that, in fact, "there were 0 (zero) counties in Pennsylvania where at least 50% of the populace received 'broadband' connectivity, as defined by the FCC."[12] The study found that, since 2014, the discrepancy between FCC data and the study's has grown in rural areas. Even in urban areas, except affluent suburbs outside Pittsburgh and Philadelphia, the median speed (among households tested) rarely reached the FCC standard.[13]

Dr. Meinrath's 2019 study leveraged data available from the Measurement Lab (M-Lab) (https://www.measurementlab.net/) platform, an open source project of researchers, industry and public interest partners, and an international team of network researchers. Over the course of the 2019 Pennsylvania study, the research team developed a transparent and replicable methodology that uses open source tools for collecting reliable broadband data in every state—and much of the world. For this white paper, we downloaded M-Lab data for every county and every congressional district in Ohio, Pennsylvania, West Virginia, and Kentucky to demonstrate definitively the woeful quality of broadband available in our four states. Table 1 shows that the median download and upload speeds for Pennsylvania as a whole rank in the top 20 states, despite the inadequate quality documented in the Center for Rural Pennsylvania study.

Table 1

Median Broadband Upload and Download Speeds in Pennsylvania, Ohio, West Virginia, and Kentucky

	DOWNLOAD SPEED		UPLOAD SPEED	
STATE	MBITS/S*	STATE RANKING	MBITS/S*	STATE RANKING
Pennsylvania	41	11	8.7	19
Ohio	26	35	7.3	30
Kentucky	22	41	7.0	35
West Virginia	18	46	5.2	43

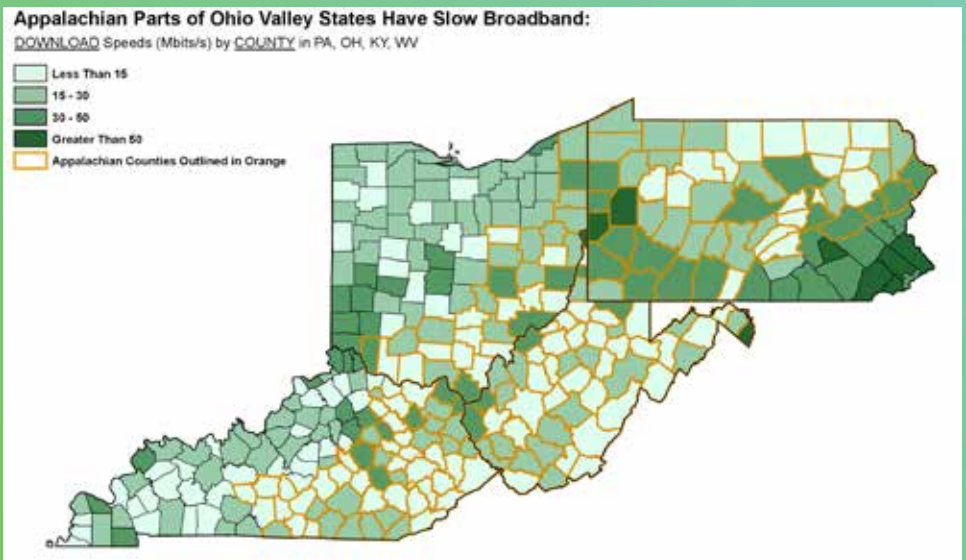
*An Mbit/s is a megabit per second; a megabit is a thousand kilobits and a million bits.

Source: Keystone Research Center based on data online at https://datastudio.google.com/reporting/1djtGEuqV4Qwrj26GQTN_xzp3rsMYYcmv/page/YW8NB?s=rzD5rHYkLT4

Among the 50 states, Ohio, West Virginia, and Kentucky all rank 30th or lower for both download and upload speed, with West Virginia in the bottom eight.

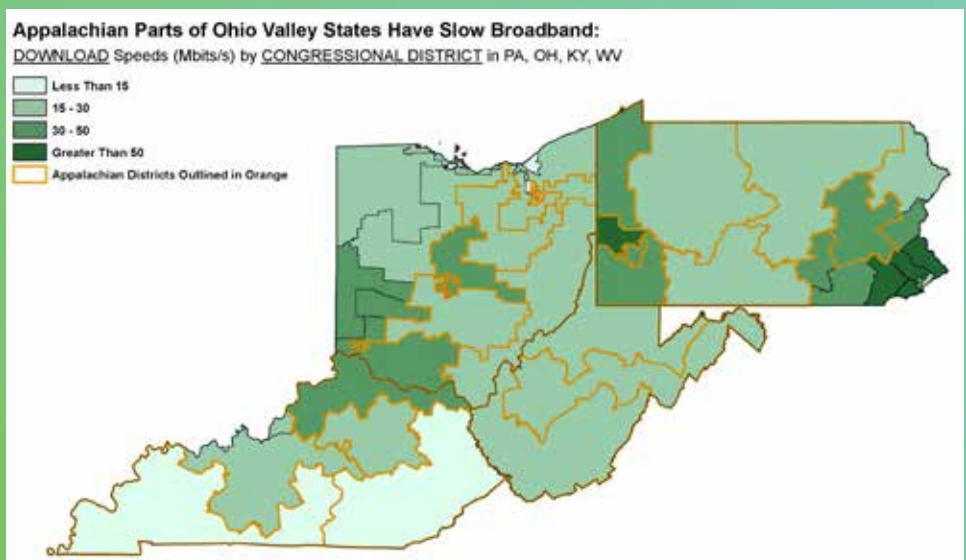
Maps 1 (download speed by county) and 2 (download speed by congressional district) show that broadband quality is worse in the Appalachian portions of Pennsylvania, Ohio, and Kentucky than in those states overall; all of West Virginia is in Appalachia and the maps reflect its 46th place rank for download speed.

Map 1



Source: Keystone Research Center based on Measurement Labor NDT Data 12/30/2019 - 9/7/2020 donwloaded from https://www.measurementlab.net/visualizations/

Map 2



Source: Keystone Research Center based on Measurement Labor NDT Data 12/30/2019 - 9/7/2020 donwloaded from https://www.measurementlab.net/visualizations/

FAILED MARKETS

Some suggest that the low quality of existing broadband is a reflection of dysfunctional policies captured by incumbent providers. There are pots of federal money that cannot be tapped in areas where an existing provider delivers low quality service. There are state regulations that impede universal broadband. UVA professor Christopher Ali argues that rural broadband, by definition, is a market failure and in turn, the lack of broadband in rural America has reproduced democratic, social and economic inequality. "There are simply not enough people living in rural America to merit private market investment in broadband."[14] The National Digital Inclusion Alliance points out that this failure is not limited to low density population areas; it is also concentrated in areas with lower household incomes. "'Not having a home broadband connection' is different from 'not having broadband service available.' Most Americans who do not have broadband access in their homes live in places where commercial high-speed internet is available—if they can afford it."[15] We argue that this combined denial of service based on place and income is the full market failure.

REGULATORY CAPTURE AND COMPLEX, INEFFECTIVE PROGRAMS

Some suggest that the low quality of existing broadband also reflects dysfunctional policies and regulations shaped by industry influence and "regulatory capture"— the situation when a regulatory agency becomes dominated by the interests it regulates and not by the public interest. (One reason regulatory capture happens: regulators come from or may gain future employment in the regulated industry.) The Federal Communications Commission has long been charged with this status, including in its regulation of broadband and the internet. "A detailed look at actions—and non-actions—shows that over the years the FCC has granted the wireless industry pretty much what it has wanted. Until very recently it has also granted cable what it wants. More broadly, the FCC has again and again echoed the lobbying points of major technology interests."[16]

One example of regulatory capture: the FCC's repeal of net neutrality, which had required internet service providers (ISP) to provide access to all sites, content and applications at the same speed, under the same conditions, without blocking or preferencing any content. Former FCC chairman Tom Wheeler wrote that with the net neutrality vote "the lobbyists for the internet service providers realized their long-envisioned strategy to gut the authority of the agency that since 1934 has been charged with overseeing the activities of the nation's essential networks."[17] Incumbent providers also influence Congress and executive agencies as well as regulators: for example, there are pots of federal money that cannot be tapped to upgrade broadband in any area where an existing provider delivers even low-quality service.

The same processes of regulatory capture and industry influence on lawmakers occur at the state level, with different players exercising different levels of influence in each state. Pennsylvania, for example, bans municipalities providing broadband, thus choking off one source of competition and one potential force for more universal accessible, affordable, high-quality broadband (see Box 2).

Box 2

OTHER ASSESSMENTS OF BROADBAND IN OHIO VALLEY STATES

How do other assessments of broadband in Kentucky, Ohio, Pennsylvania, and West Virginia compare with the rankings for download and upload speed summarized in Table 1 and the maps of this report?

BroadbandNow ranks states for "overall strength of its broadband ecosystem" based on three criteria: terrestrial broadband access, wired low-priced plan access, and average speed test.[30] Pennsylvania ranks 11th, Ohio 24th, Kentucky 40th, and West Virginia 44th.

The "50 States of Broadband Report" rates states based on "availability" (27.5% of the overall ranking), adoption (12.5%), driving meaningful use (15%), growth investment (30%), and regulation (15%) (i.e., the "presence of laws that place restrictions or conditions on the municipal (or other) ownership or operation of networks."[31] A major limitation of this ranking (as of the 2017 ranking; a 2020 update is promised online) is that "availability" is based on the FCC 25/3 standard and on FCC data. For this reason, and also because Pennsylvania is the only one of our four states that has restrictive regulations in place, the 50 States report shuffles our four-card deck: Ohio ranks second overall, in part because it ties for first for "driving meaningful use;" Kentucky ranks 12th, West Virginia 32nd, Pennsylvania 43rd.

Highlighting that Pennsylvania has restrictive regulations in place that should be eliminated is important. Specifically: "Pennsylvania prohibits municipalities from providing broadband services to the public for a fee unless such services are not provided by the local telephone company and the local telephone company refuses to provide such services within 14 months of a request by the political subdivision. In determining whether the local telephone company is providing, or will provide, broadband service in the community, the only relevant consideration is data speed. That is, if the company is willing to provide the data speed that the community seeks, no other factor can be considered, including price, quality of service, coverage, mobility, etc. (66 Pa. Cons. Stat. Ann. § 3014(h))."[32]

Another complicating factor federally is the profusion of agencies charged with some level of oversight, regulation and/or support for broadband programs. The two lead agencies are the Federal Communications Commission and the US Department of Agriculture. We have already seen that the FCC, despite improvements over the years, has not met its own goals and has used poor data to identify the problem. The USDA operates several programs targeting rural areas; one of its problems is that programs in the agency use several definitions of rural. In fact, in its 2013 report on the issue, USDA found over 30 different definitions in use in its own programs.[18] Add into the mix different programs in the Department of Commerce, the Department of Health and Human Services, the Department of Education, and the Department of Defense. In sum, the federal approach to broadband is both inadequate and bewilderingly complex.

SOLUTIONS

STATES, LOCALITIES, AND COOPERATIVES POINT THE WAY

Given the lack of concerted progress at the national level, state and local governments have initiated their own efforts to provide some level of broadband service. Summary reports looking at state activity demonstrate that a variety of structures and approaches are being put in place.[19] Amid a grim overall picture of inadequate service, bright spots have emerged (see Box 3 and Box 4 for examples). Local governments are defining quality broadband as an essential service. Rural electrical cooperatives are stepping up to do for broadband what they did for electricity after the creation of the New Deal's Rural Electrification Administration. Some states also have implemented plans to achieve high standards. For example, Prof. Christopher Ali highlights the Minnesota program as "a national leader in state broadband policies, not necessarily because of the level of public funding, but because of its scope and scale. Minnesota's Broadband Office operates not only as a grantor of funds, but as a clearinghouse of information and as a trusted advisor to communities working on cataloguing their broadband needs."[20]

Box 3

CHATTANOOGA EXAMPLE

Leveraging a Single Opportunity

The City of Chattanooga built its own Smart Grid. When it was considering locating a high-tech auto plant in the area, the automaker Volkswagen asked the City of Chattanooga to address the problematic power outages on the electric grid experienced regularly during storms. So, the municipally owned electric utility of Chattanooga, Tennessee—the Electric Power Board of Chattanooga—built its smart grid. First, the utility beefed up the electric grid, so that if a tree falls in one area, it does not cause outages in other areas. Second, it strung fiber-optic cable across the community. The cable provided Volkswagen with the internet speeds it needed, but it also enabled the Electric Power Board to offer high-speed internet to residents at a lower cost and far faster speeds than the competing cable company could offer (Comcast). As a result, the City of Chattanooga is now home to a vibrant tech community, and a vibrant music and film scene, after experiencing decades-long decline that left behind empty factories and warehouses. Neighboring communities want access to their network, too. Companies like AT&T and Comcast, however, sued to stop them and drove passage of state laws prohibiting the city from expanding its network.[28]

Box 4

THE MCKEE, KY EXAMPLE

Old Bub Lights Up Silicon Holler

In 2014, McKee, KY, went from having barely any internet connection to one of the fastest networks in the country. Its home county of Jackson and neighboring Owsley have two things in common: they are among the poorest counties in Kentucky and they are both served by the Peoples Rural Telephone Cooperative (PRTC). The Cooperative itself grew out of an amendment to the New Deal's Rural Electrification Act in 1949 that allowed cooperatives to get low interest loans to build and operate telephone service. PRTC began providing service to 575 subscribers and today serves around 7,000.

The cooperative has always had an entrepreneurial drive. Its CEO, Keith Gabbard, moved the company into cable TV, added dial up internet and partnered with four regional telecommunication companies to create Appalachian Wireless that now covers 27 counties. When it came time to upgrade part of its infrastructure, despite a depressed local economy, PRTC decided to modernize. Instead of replacing copper wire, Gabbard decided to put in fiber. As he told Sue Halpern from The New Yorker: "It's no more difficult to build fiber than it is copper. It was just a matter of money and time. ...Someone has to build the last mile. The big telecom companies aren't going to do it...We're a co-op. We're owned by the members. We answer to each other."

Using grants and loans from the USDA and the American Recovery and Reinvestment Act (ARRA), PRTC took six years to pull a thousand miles of cable to all seven thousand structures in PRTC's territory that could provide 1,000 megabytes per second. Much of this territory is in rugged mountain terrain. In fact, in those areas, PRTC used Old Bub the mule to pull the cable from pole to pole.

Five years later, in 2020, Gabbard reported the area's unemployment rate went down from 16% to 5%. More than 1,000 jobs have been created, many in high tech support. PRTC also established free internet access at the local library so local veterans do not have to make the long drive to the Lexington, VA clinic and can use telehealth instead. The Eastern Kentucky Concentrated Employment Program told the Lane Report that a project like PRTC "takes the lid off of the potential for both economic development and for what people can do from their homes." The Owsley County school district uses the internet to provide remote learning, access to pediatric and mental health practitioners, and to allow high school students to simultaneously earn an associate's degree.

Everyone acknowledges that high-performance broadband will not solve all the counties' problems or eliminate decades of poverty quickly. But it does change the opportunity curve. As Keith Gabbard told the Lane Report: "...we have it to every single home and business, not just in this town (McKee), but to every place to the farthest holler out. Everyone has the same capability."[29]

PRINCIPLES TO GUIDE FEDERAL AND STATE POLICY

Conceptually, the solution to the lack of universal, high quality, affordable, and accessible broadband is simple: recognize broadband for the public good it is; invest sufficient resources to get a functional mix of public, cooperative, and private providers to deliver high-quality broadband everywhere; and, regulate to promote competitive and efficient markets rather than fill the pockets of well-connected large incumbents.

Although each state and local entity needs to design the approach that is right for them, clear national goals and guidelines are essential to achieve equitable, high-quality broadband for all Americans. The federal government must step up and help spread the positive practices in leading states and localities. Better data, higher standards, and more money are all necessary components of a more effective federal government role.

Based on the discussion above, the following principles should guide federal and state policy to advance the goal of universal, quality, reliable, affordable broadband.

1. Broadband deployment should be focused on achieving tangible and affordable universal service to all Americans, eliminating geographical imbalance. The goal should be the current gold standard of 100/100 mbps (megabits per second) service.

2. To be effective and equitable, the plan must include parallel investment in community digital inclusion programs to help the least connected residents and small businesses acquire affordable high-speed broadband, affordable devices and basic digital skills and support.

3. The program must consider a combination of approaches that reflects the complexity of the challenge and allows community (state and local) control of the design and build-out phases.

4. Public funds must leverage private investment and prioritize the creation of local, unionized and union-wage jobs.

5. Funding should encourage innovative infrastructure models that are inclusive and competitive while not unfairly favoring incumbent providers. Public funding should, as a rule, go to the provider offering the best quality-cost combination subject to meeting clearly defined and aggressive minimum standards.

6. New infrastructure design should be flexible to accommodate technology advances with minimum future disruption.

7. Net neutrality must be fully restored (i.e., internet service providers should enable access to all content and applications regardless of the source, and without favoring or blocking particular products or websites).

EXISTING CONGRESSIONAL LEGISLATION

By the end of September 2020, there had been 299 pieces of legislation introduced in the current session of Congress related to broadband in America. They address many issues:

- closing the digital gap in a multitude of ways
- expanding rural access
- setting rules for construction projects
- developing better FCC data and maps
- implementing broadband seismometers to measure volcanic activity

But only seven have cleared both the House and the Senate and been signed into law.[21]

Almost none of them propose the comprehensive and coordinated broadband strategy necessary to give all Americans access to a vital piece of the nation's 21st century infrastructure. The two that come closest are the HEROES (Health and Economic Recovery Omnibus Emergency Solutions) Act (HR 6800) and the Moving Forward Act (HR 2). Both have passed the US House of Representatives, but not the US Senate.

The Moving Forward Act (HR2) is an infrastructure package that contains significant funding for broadband. It passed the US House July 1 by a 233-188 vote but has not been taken up by the US Senate. HR2 includes $80 billion for deployment to unserved areas. HR2 would also create a benefit program for low-income households to receive $50/month toward the price of internet service. It addresses the "homework gap" with a $5 billion grant program to fund connectivity for students and teachers, including mobile hotspot lending by schools and libraries. It creates two new grant programs to help achieve digital equity, appropriating more than $1 billion: the State Digital Equity Capacity program for states to create and implement comprehensive plans to increase adoption and skills; and a competitive grant program for local entities, indigenous community entities, anchor institutions and others to carry out similar activities at the community level. Finally, the programs funded by the bill must include strong protections for workers' rights and union organizing, including a requirement to remain neutral in organizing efforts and a prohibition on subcontracting to circumvent collective bargaining agreements.[22]

The HEROES (Health and Economic Recovery Omnibus Emergency Solutions) Act (HR 6800) is specifically designed to address challenges caused by the COVID-19 pandemic. It passed the House on a largely partisan vote 208 to 199 on May 15 but has not been taken up by the US Senate. It includes $4 billion in emergency connectivity funding; $1.5 billion for connectivity and devices for student; $2 billion for the Rural Health Care program; prohibits service termination or late fees due to inability to pay because of COVID; provides $24 million for better FCC maps; mandates reasonable rates for prison phones; and, enhances the Lifeline program.[23]

A third bill introduced June 24 by Rep. James Clyburn (HR 7302 the Accessible Affordable Internet for All Act) and its Senate companion bill introduced by Sen. Klobuchar July 1 incorporate much of the HEROES Act broadband content and includes $80 billion for nationwide deployment of infrastructure, a new secured loan program, requires affordable options in ISP plans and provides a monthly discount for low income users. It too includes grants to states to close the digital gap, $5 billion to help students without internet at home and authorizes funding for Wi-Fi on school buses.

RECOMMENDATIONS FOR ACTION:

BROADBAND BUILDS THE FUTURE

We know what the broadband problem is. This discussion demonstrates that we also know the first key steps to solving that problem. Broadband advocates, the US House of Representatives and Presidential candidate Joe Biden have put forward proposals to invest in infrastructure and carbon emissions reduction to lift the nation out of the COVID recession. The Trump administration infrastructure proposal also includes broadband but with little detail.

To ReImagine Appalachia, we call upon our federal political leadership to take the following concrete actions:

1. **Empower lead entities to drive federal policy including, in rural areas, the Rural Utilities Service**, replicating the success of the New Deal Rural Electrification Administration. We have identified the plethora of federal agencies operating in the broadband space. There must be a serious effort to establish common definitions, common goals and coordinated bureaucratic programs and action. This will be no small task; it will require strong executive control and Congressional action. Congress and the next four-year presidential administration should identify lead entities to drive the push to universal, quality broadband. The President should clearly identify and empower a central control entity to coordinate all federal programs. For rural areas, the Rural Utilities Service (RUS), the successor agency to the Rural Electrification Administration (REA) created in the mid-1930s, could be the lead. [24] Over just two decades, the REA oversaw the electrification and diffusion of telephone service to rural areas and farms, often relying on electric cooperatives. The creation of the REA reflected, in part, the recognition of "market failure." Its success resulted in legitimation of a government role in the drive to universal service, based upon the agency's close relationships to farmers and to other businesses in rural areas, and the agency's own effective promotion of the value of its work to business and economic development. An updated and reinvigorated RUS could use the same ingredients to achieve quality universal broadband in all rural areas and that would especially benefit our four-state region.
2. **Fund statewide assessments of connectivity.** FCC data on broadband availability is essentially meaningless. It consists of self-reported (Form 477) data of upload and download speeds at the fastest ISP connection in each Census block (the nation's largest Census block, in Alaska, covers over 8,500 square miles according to University of Virginia Professor Chris Ali). The FCC claims Pennsylvania has 25/3 broadband everywhere—when, as we have seen, less than 50% of connections meet this standard in most of the state. The federal government should support statewide assessments of connectivity, leveraging the work of M-Lab that produced the data used above.
3. **Invest in universal broadband** using a mix of public and cooperative service and competition including through reverse auctions. The Moving Forward ACT infrastructure bill passed by the House proposes $100 billion. The funds should be frontloaded as soon as quality proposals are provided by states for a federal-state partnership to achieve high-performance broadband throughout the US. (Minnesota's model broadband program estimated in 2016 that it would take the state $900 million to $3.2 billion (the average of which is $2.05 billion) to achieve a 100/20 standard by 2026. Expanding those costs proportionally to the nation would run on the order of $116 billion. A 2017 Deloitte study estimated a national cost of $130-150 billion over 5-7 years.[25]) This build out should capitalize on the capacity of all existing

or potential providers, including rural electrical cooperatives, with the Rural Utilities Services given responsibility for allocating these funds and overseeing the program. This federal-state plan will require waiving of federal restrictions and prohibiting state restrictions (including ones already on the books) that protect incumbent providers that deliver inadequate service.

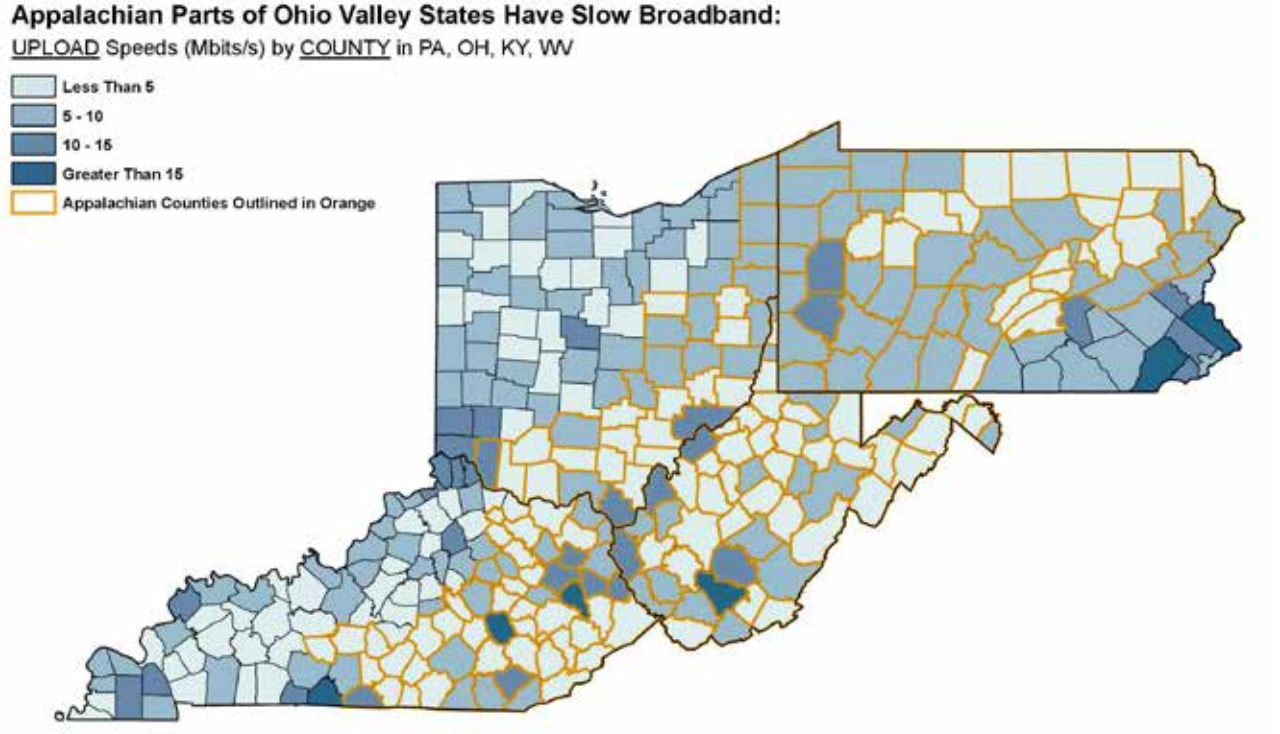
4. **Require states to develop and implement plans to provide high-quality connectivity to receive federal funds** (the 100/100 Mbps standard recommended by Jonathan Sallet[26]). Embrace best practices like Minnesota's by setting clear targets and timelines: achieve high quality connectivity in as many places as possible in time for the 2021/2022 school year and universally by 2025.

5. **Governors should establish interagency broadband working groups and broadband task forces** that include stakeholders from underserved communities to oversee development and implementation of state plans. The charters of the task force and working group should state unambiguously that the connection goals and meeting these goals is the purpose of each group's efforts not the self-interest of incumbent providers. This build out should capitalize on the capacity of all existing or potential providers, including rural electrical cooperatives and municipal utility agencies. These broadband infrastructure projects should scale as fast as can be done safely once shovel ready projects are identified.

6. **Tie federal funds and regulations to the creation of high-quality jobs and union rights for all.** All entities receiving public climate/COVID stimulus funds should ensure that the jobs created and supported by these funds are prevailing wage, locally filled and available to all including those historically excluded. Training programs should be established to provide access to those populations historically excluded from these skilled jobs. Recipients should also be required to honor the right to organize and be prohibited from circumventing collective bargaining agreements by subcontracting. For example, companies and their subcontractors should be prohibited from attempting to persuade workers not to join a union (it's workers' collective choice not the employers) and companies should be required to recognize and bargain with a union if a majority of workers demonstrate their support for a union (e.g., by signing union cards).[27] When it comes to union rights and to wage standards, in addition, the real objective of public policy should be to establish rights and standards across entire clean energy or other sustainable industries—e.g., by facilitating union elections across multiple worksites in a state (such as all non-union broadband providers receiving government funds) or by enabling regional and statewide standards setting, also at the sectoral level. These types of bold policy innovations could help unions and working people see more clearly the potential for climate infrastructure investment to increase economic opportunity.

APPENDIX

A1



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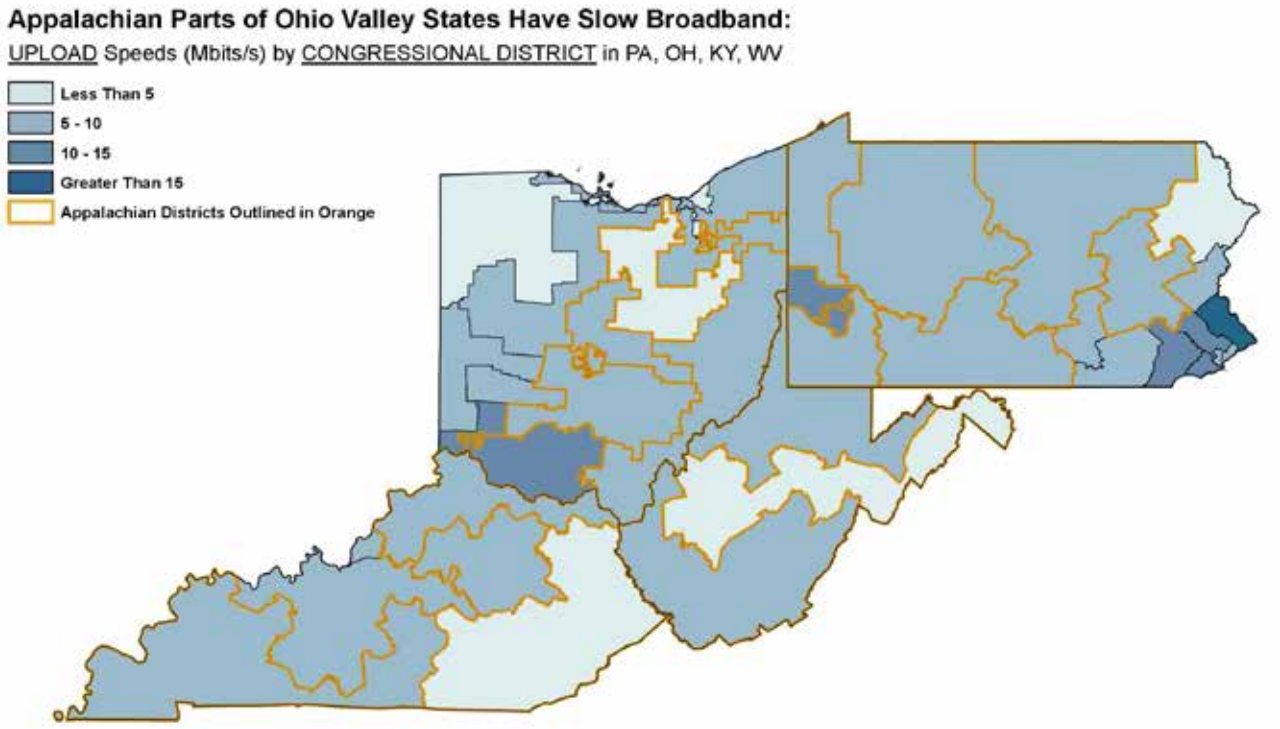
A2



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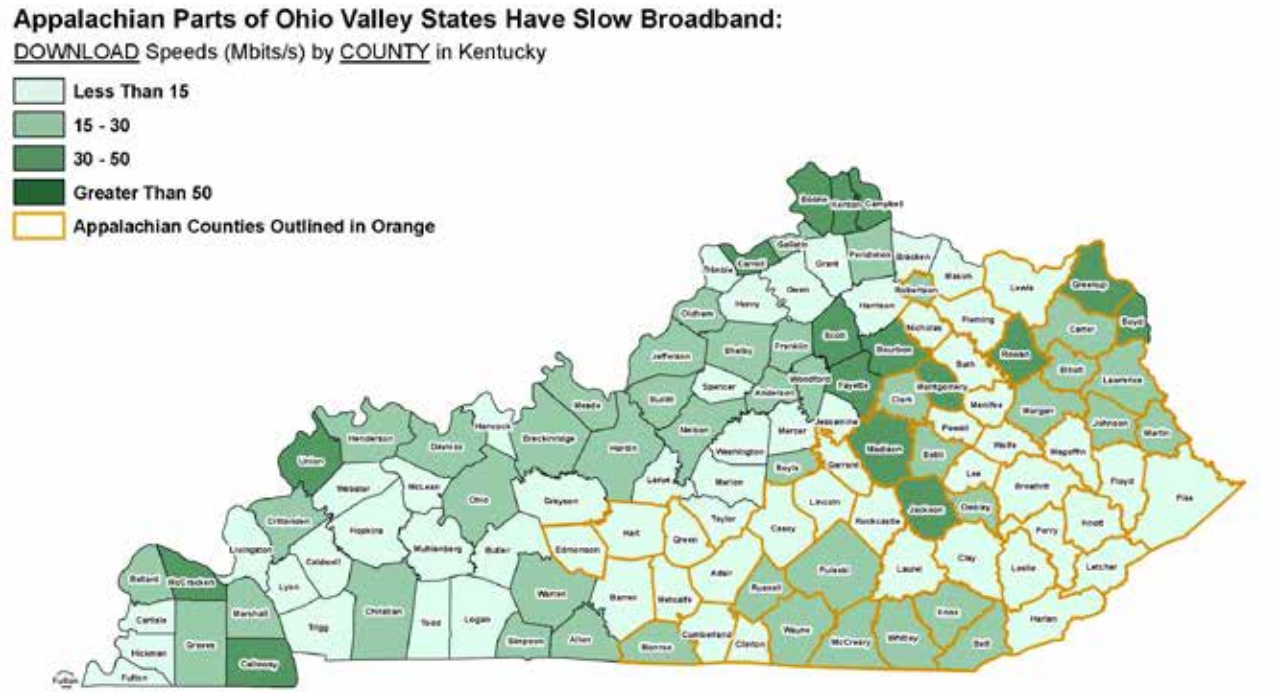

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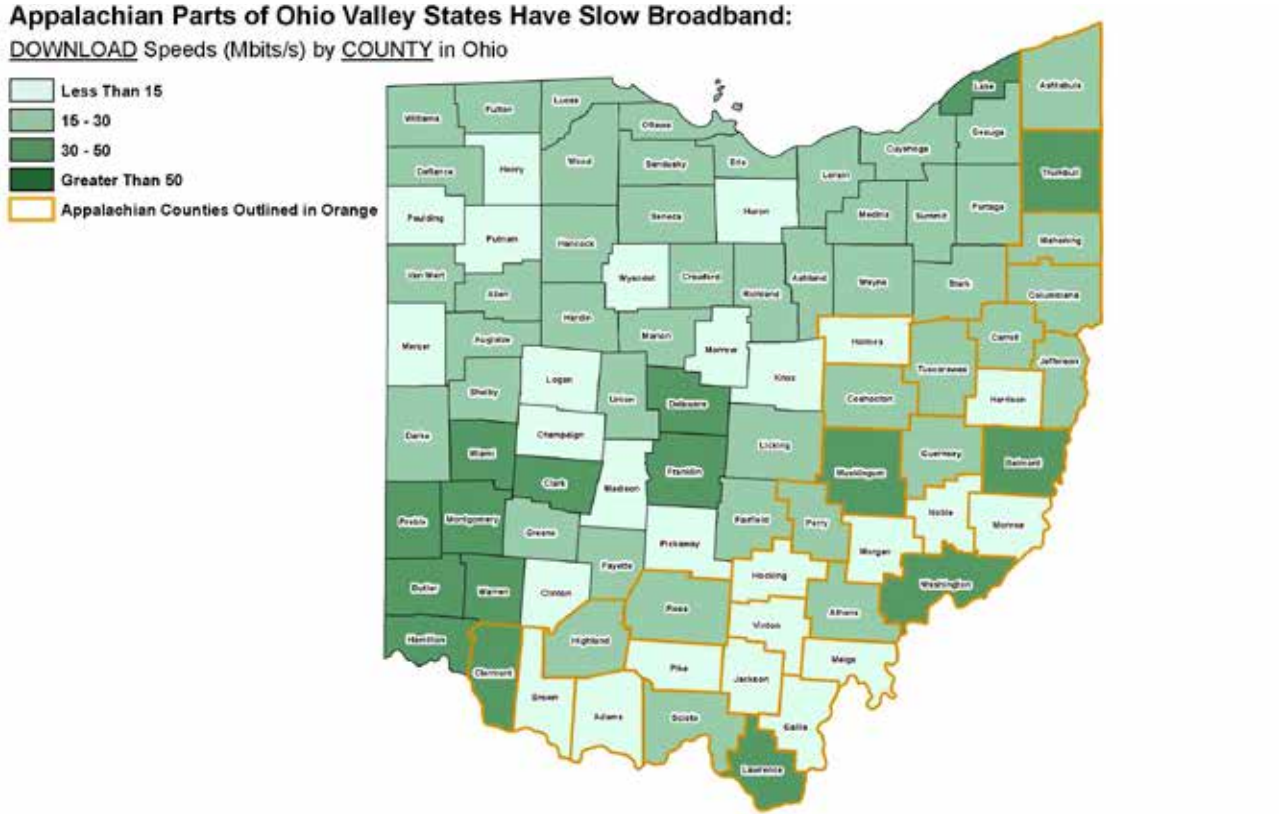

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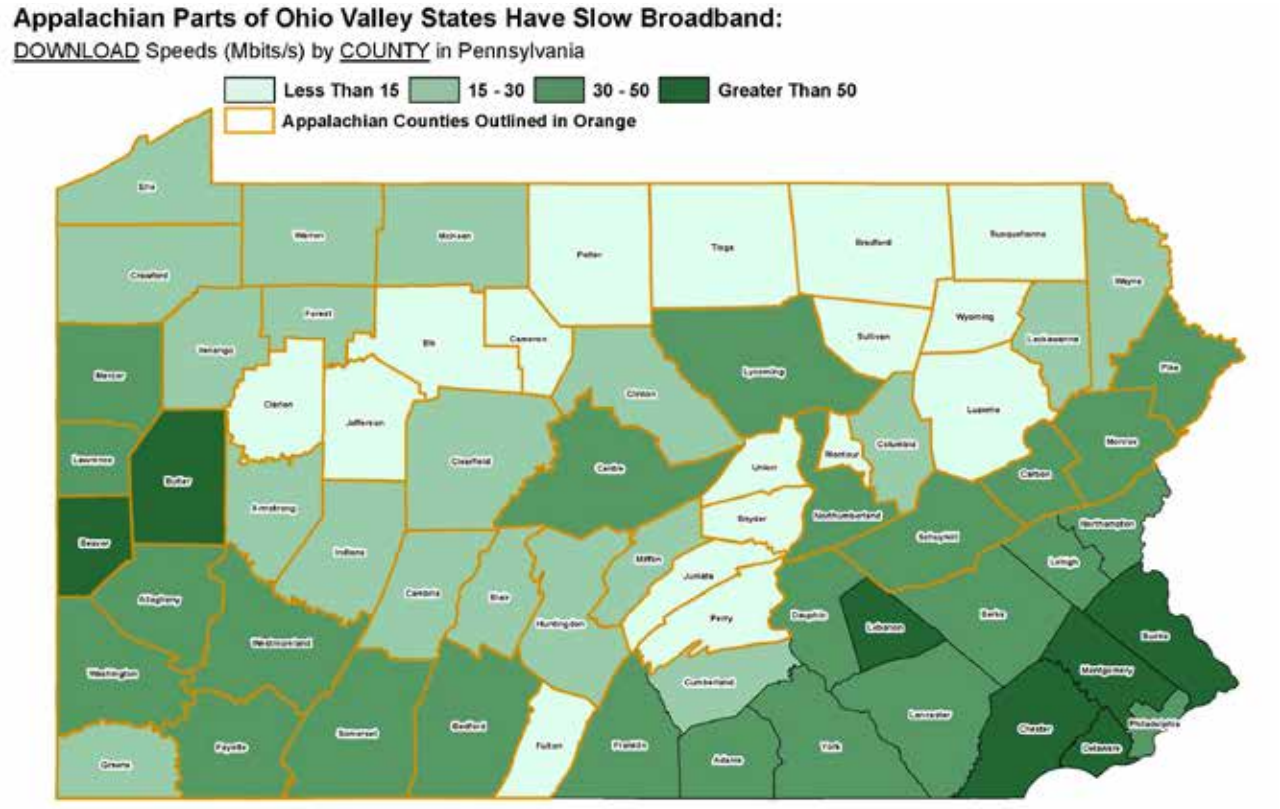

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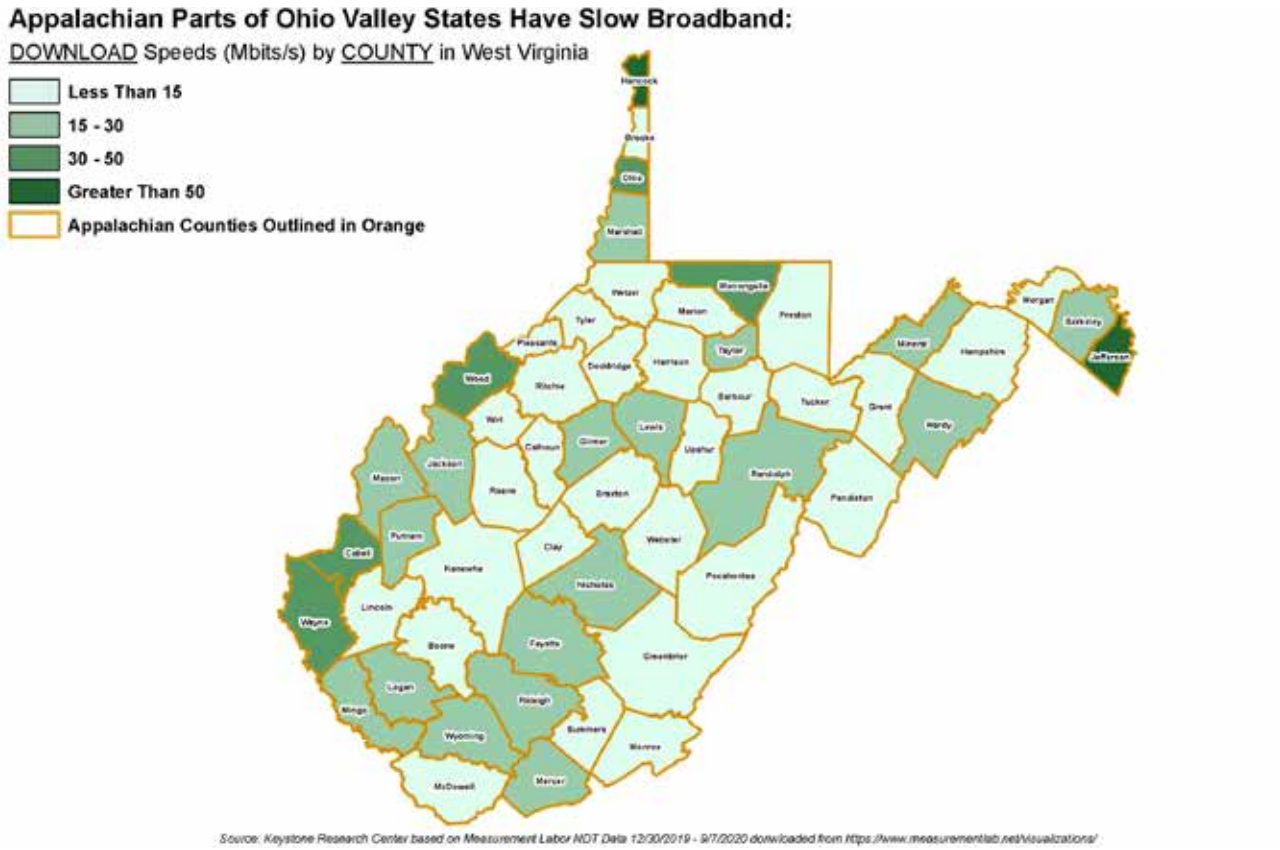

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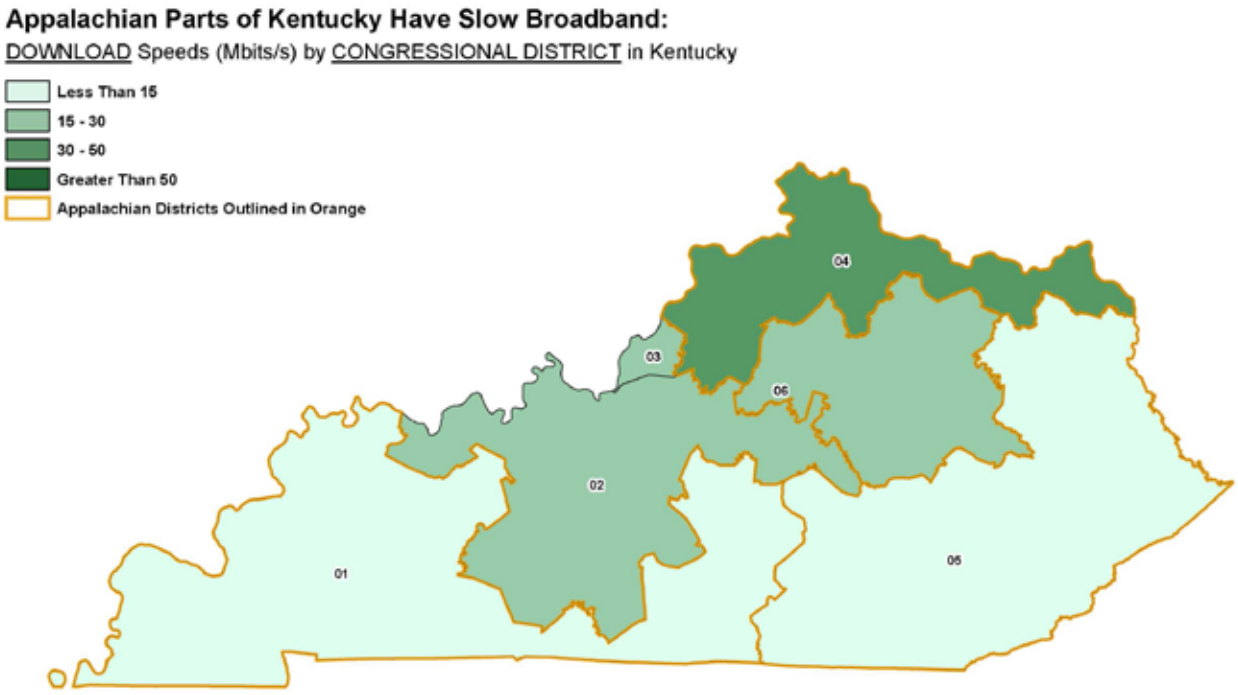

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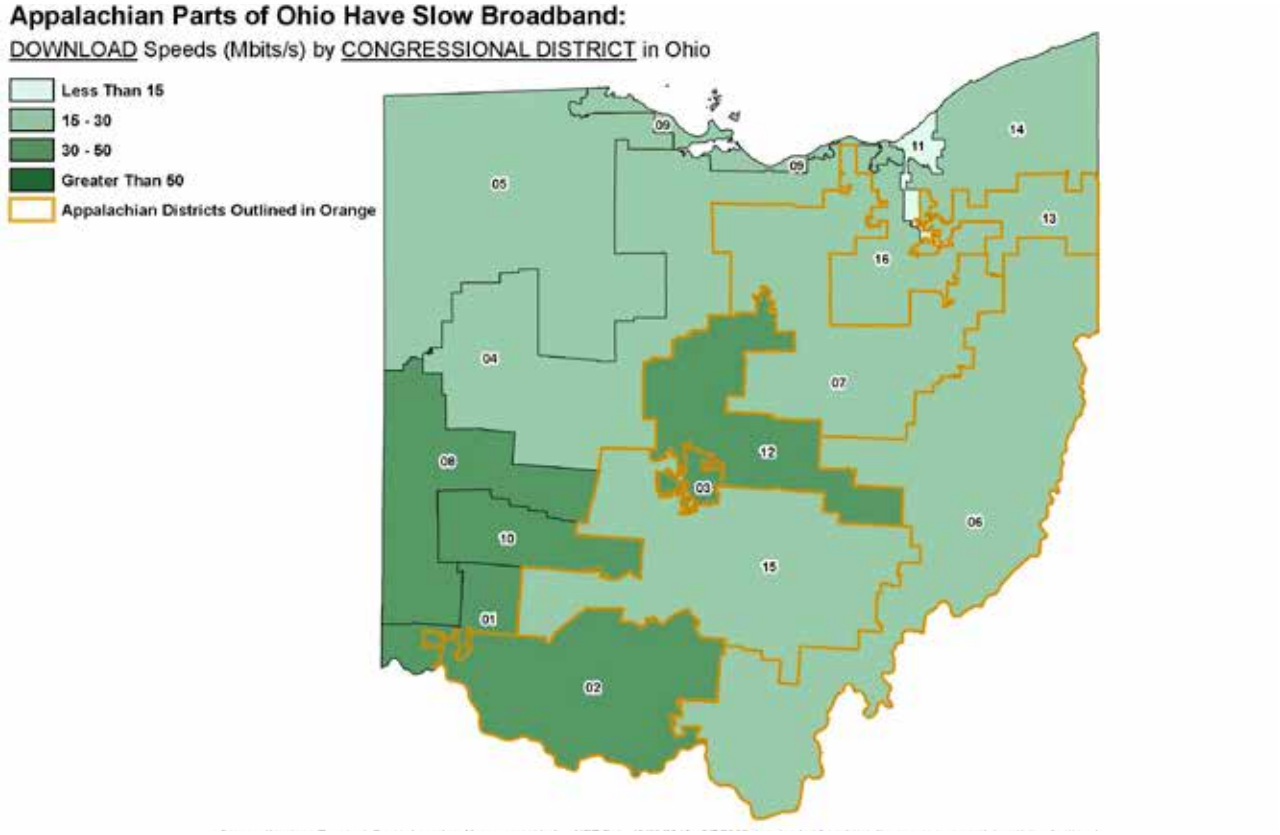

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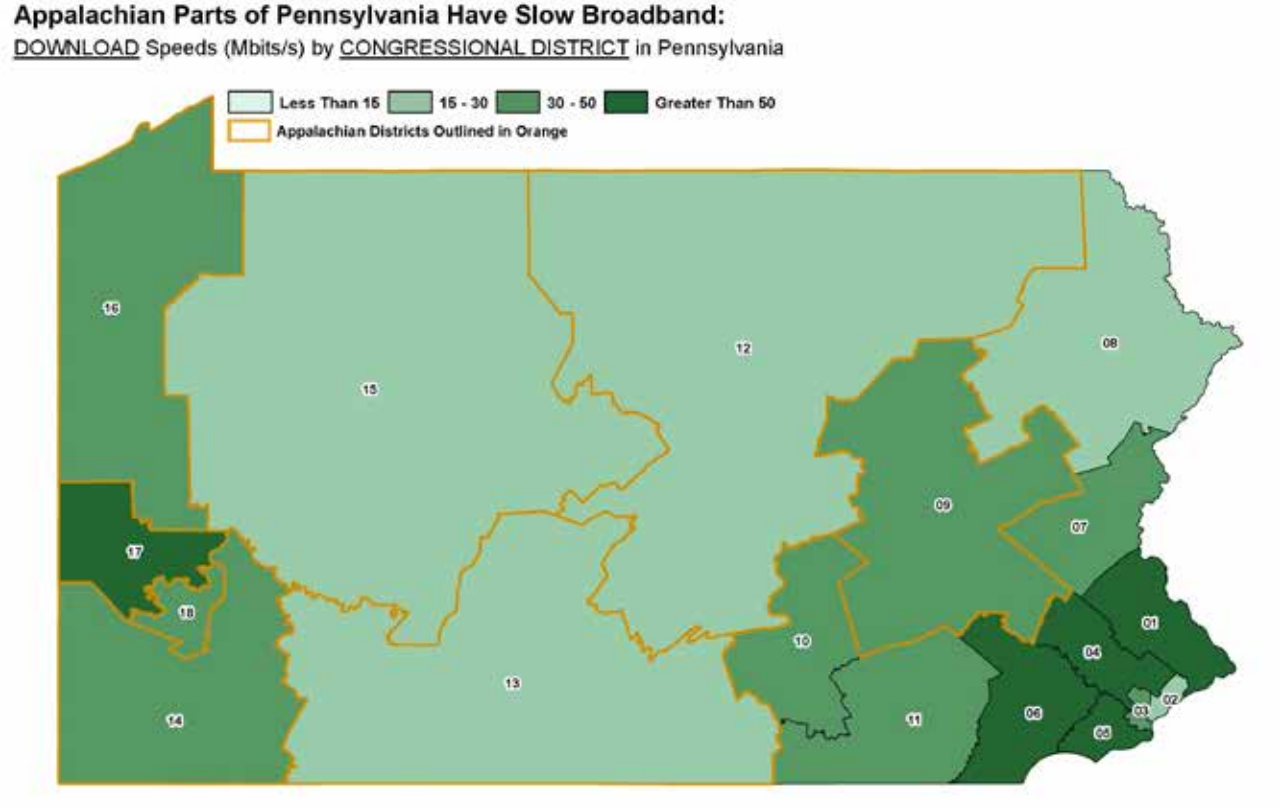

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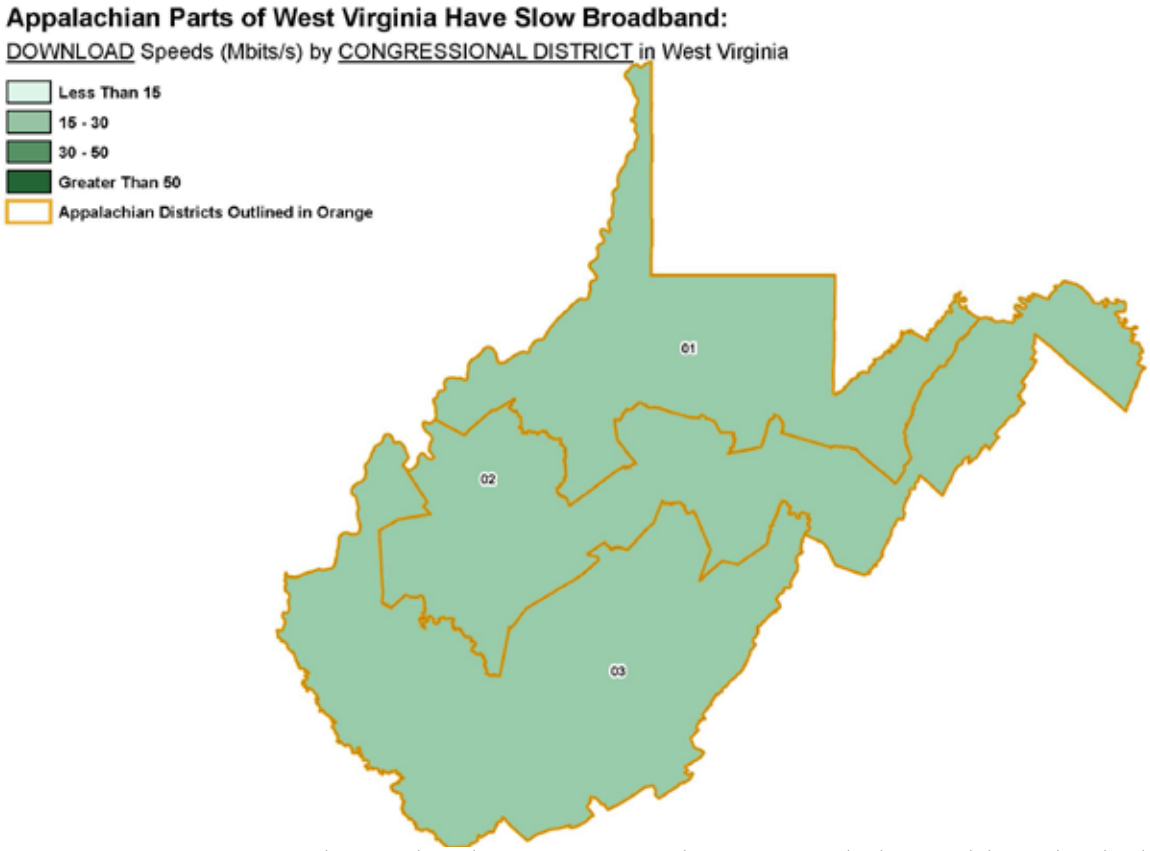

Source: Keystone Research Center based on Measurement Labor NDT Data 12/30/2019 - 9/7/2020 donwloaded from https://www.measurementlab.net/visualizations/

ENDNOTES

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