

Prepared Testimony of
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Good afternoon, Chairman Phillips-Hill, Minority Chair Santarsiero, and Honorable Members of this Committee, I appreciate the opportunity to speak with you today regarding the prospects of accelerated rural broadband deployment in the Commonwealth of Pennsylvania.

The Commonwealth is at a critical stage on the issue of broadband availability that calls for new policies and new thought processes driven by a renewed sense of urgency to bring high-speed broadband to all Pennsylvanians, whether in urban, suburban, or rural areas. I would like to thank you for your recent adoption of Senate Resolutions 47 and 48 and for your continued support to further broadband initiatives.

Prior to the Pennsylvania Public Utility Commission (Commission), I spent most of my legal career representing and advising many telecommunications companies through the seismic technological changes of the 1970s, 80s, 90s, and into the new millennium. I was personally involved in drafting Pennsylvania's original Chapter 30 of the Public Utility Code, which set out the broadband service provisions for incumbent carriers in the Commonwealth. Working with the members of the General Assembly in 1993, we laid the foundation for a modern broadband network and regulatory scheme and then updated it in 2004.

The connection speeds set out in Chapter 30 (1.5 Mbps) were good at the time and still provide a baseline for all Pennsylvania citizens. But "the apps" have overtaken that

speed and accelerated the need more and faster connectivity. As a Commonwealth, we need to update the objective and expand the solution.

The Commission's current statutory role in broadband advancement is minimal. The Commission has limited authority over the incumbent telephone companies' deployment of "broadband" service under Chapter 30; basically, to ensure that the standards of that statute are maintained (1.5 Mbps service available within 10 days). The Commission does not regulate Internet service.¹ Nor does it regulate cable companies, wireless providers, or satellite operators.²

However, the Commission has a vast depth of experience in this area and a continuing objective of ensuring that all Commonwealth citizens have access and can participate in the digital advantages wrought by the Internet.

Today, I hope to share some thoughts and observations to assist you in creating policies designed to ensure high-speed Internet services are available to all Pennsylvanians, regardless of where they live and work. I hope that you will find this information of some value to you, as you begin to shape the policies that will drive the development of broadband for all of Pennsylvania. The Commission stands ready and willing to assist you in any way that we can.

¹ Internet access service rates, terms, and conditions are controlled by the FCC.

² Chapter 30 of the Public Utility Code, 66 Pa. C.S. §§ 3011-3019, stipulates a revised regulatory regime for the incumbent regulated telephone companies that volunteer to deploy a broadband network throughout their service territory that offers, through any technology, a minimum down speed of 1.544 Mbps and an up speed of at least 128 Kbps to any customer within 10 days of request. All jurisdictional ILECs have achieved their Chapter 30 network modernization plans and operate under some form of simplified ratemaking.

The Need for Rural Broadband

It is beyond debate that broadband provides a host of societal benefits. There is also no question that high-speed Internet has changed just about everything. Internet and broadband services have radically transformed our lives, business, education, medicine, news and information distribution, culture, entertainment, civic engagement, entrepreneurship, and more.

Access to broadband is no longer a want; it is a need. As the U.S. Department of Agriculture Task Force on Agriculture and Rural Prosperity concluded last year:

In today's information-driven global economy, e-connectivity is not simply an amenity - it has become essential. E-connectivity, or electronic connectivity, is more than just connecting households, schools, and healthcare centers to each other as well as the rest of the world through high-speed internet. It is also a tool that enables increased productivity for farms, factories, forests, mining, and small businesses. E-connectivity is fundamental for economic development, innovation, advancements in technology, workforce readiness, and an improved quality of life. Reliable and affordable high-speed internet connectivity will transform rural America as a key catalyst for prosperity.³

A study conducted by Purdue University in August of 2018 quantifies the real benefits and value of broadband deployment. In this study, researchers examined the economic impact that fully-available rural broadband could have in the state of Indiana.⁴

³ Report to the President of the United States from the Task Force on Agriculture and Rural Prosperity (October 21, 2017); available at <https://www.usda.gov/sites/default/files/documents/rural-prosperity-report.pdf>.

⁴ Alison Grant, Wallace E. Tyner, and Larry DaBoer, *Estimation of the Net Benefits of Indiana Statewide Adoption of Rural Broadband*, Center for Regional Development, Purdue University (August 2018); available at <https://www.pcrd.purdue.edu/files/media/006-RPINsights-Indiana-Broadband-Study.pdf>.

The report found that rural broadband has substantial societal benefits, including: reducing medical costs; improving education for children and workers, leading to improved median household incomes and driving down unemployment; stimulating economic growth in communities; saving consumers money with better shopping opportunities; and providing increased farm revenue. The report estimates the quantifiable impact of the benefits of rural broadband, if implemented fully across the state of Indiana, to be \$12 billion, annuitized out as \$1 billion per year for twenty years.

What is Broadband and Who Provides It?

The term “broadband” is currently defined in various ways, but the Federal Communications Commission (FCC) currently considers broadband to be a minimum speed of 25 Mbps down and 3 Mbps up (25/3 speed).⁵ At this speed, broadband is sufficient to stream high definition video and has earned the unofficial moniker of “Netflix speed,” although its importance is far greater than mere video entertainment.

Various entities in Pennsylvania offer Internet connectivity, generally referred to as Internet service providers (ISPs). Incumbent local exchange (telephone) companies (ILECs), competitive telephone companies (CLECs), cable companies, wireless service providers (sometimes called WISPs),⁶ and satellite companies all offer ISP service.

⁵ Federal Communications Commission, *2018 Broadband Deployment Report*, GN Docket No. 17-199, Adopted and Released on February 2, 2018; available at <https://docs.fcc.gov/public/attachments/FCC-18-10A1.pdf>.

⁶ The acronym “WISP,” or “wireless internet service provider,” refers to “fixed wireless” broadband access providers. Mobile wireless carriers that also provide broadband access services are classified as “commercial mobile radio services” carriers, or “CMRS” carriers.

Each network has different capabilities and challenges.⁷ The legacy copper network historically operated by the ILECs is ubiquitous (albeit aging) but faces deterioration of signal over longer distances.⁸ For this reason, many incumbent telephone companies have adopted fiber networks in whole or part. Cable companies operate hybrid fiber/coaxial cable networks that generally have higher bandwidth, but which do not reach all Pennsylvanians. Mobile wireless service generally is slower (for now) and is not universally built out. Fixed wireless is an alternative. Satellite service can reach most people but faces reliability and pricing challenges.

According to the FCC’s database, cable is the leader in provisioning 25/3 broadband services, followed by fiber and the other technologies as charted below:

Carrier/Provider	Speed	Availability⁹	Current Number of Subscribers (speeds at or in excess of 2 Mbps)¹⁰
Cable Modem	25/3 speed or faster	94.1% of Pennsylvania’s census blocks	2.768 Million Pennsylvanians
Fiber	25/3 speed or faster	56.11% of Pennsylvania’s census blocks	Proprietary
DSL	25/3 speed or faster	5.09% of Pennsylvania’s census blocks	638,000 Pennsylvanians
Fixed Wireless	25/3 speed or faster	2.15% of Pennsylvania’s census blocks	8,000 Pennsylvanians
Mobile Wireless	2 Mbps	N/A	11.575 Million Pennsylvanians
Satellite	25/3 speed or faster	100% of Pennsylvania’s census blocks	Proprietary

⁷ <https://www.fcc.gov/general/types-broadband-connections>.

⁸ Digital subscriber loop (DSL) is the technology that has been adopted for this network configuration.

⁹ <https://broadbandmap.fcc.gov/#/>.

¹⁰ Federal Communications Commission, *Internet Access Services: Status as of June 30, 2017*, Released on November 2018; available at <https://docs.fcc.gov/public/attachments/DOC-355166A1.pdf>.

Electric cooperatives have been exploring marketplace entry for telecommunications and broadband access services and, in some cases, such as the Tri-County Rural Electric Cooperative (Tri-County) in the northern tier of Pennsylvania, are doing so. There is a strong case for Cooperative entry in the marketplace, including: low customer acquisition cost, existing infrastructure (e.g., poles), billing relationships, and customer recognition .¹¹ Tri-County’s financing is a combination of: \$32.5 million from the federal Connect America Fund (CAF) Phase II (CAF II) auctions, a \$17.5 million grant from the Pennsylvania Department of Transportation, and a \$1.5 million grant from the Pennsylvania Redevelopment Assistance Capital Project program. These sources substantially fund a project that promises 1 Gbps (that’s a gigabit) in portions of Potter, Tioga, Lycoming, Cameron, Clinton and McKean counties. The Commission designated Tri-County Connections as an eligible telecommunications carrier (ETC) in April of this year.¹²

Where Is Broadband Service Available?

Rural infrastructure, including rural broadband, has always been a challenge, particularly because the cost per customer is high, given the comparative lack of customer density. Simply stated, greater infrastructure costs limit profitability and drive

¹¹ <https://www.cooperative.com/topics/telecommunications-broadband/pages/unlocking-the-value-of-broadband-for-electric-cooperative-consumer-members.aspx>. Unlocking the Value of Broadband for Electric Cooperative Consumer-Members, National Rural Electric Cooperative Association (2018).

¹² <http://www.tri-countyrec.com/content/puc-approves-first-ever-etc-designation-federal-broadband-deployment-program-rural>. Tri-Co’s designation as an ETC was a prerequisite for the availability of federal CAF II funding.

up price suppressing profitability even more. As observed by a study commissioned by NTCA – The Rural Broadband Association:

Networks in general exhibit economies of density; that is, costs per user (or usage unit) are lower in high density areas. As one moves to more rural areas, with any network, the costs per user become increasingly high, eventually leading to unsustainable business models to provide network services.¹³

It should come as no surprise then that rural broadband deployment has lagged in the less populated areas of the country, including those in the Commonwealth.

The FCC’s Availability Numbers

By the FCC’s most recent estimate, as set forth in its 2019 Broadband Deployment Report, over 12 million, or 95% of Pennsylvanians, have access to broadband from a fixed carrier at the 25/3 speed.¹⁴ However, only 84% of Pennsylvanians in a rural area enjoy similar access. These statistics demonstrate that there continues to be a digital divide between rural and urban areas in Pennsylvania.¹⁵ The FCC has published an online map on its website visually representing its data.¹⁶

¹³ https://www.ntca.org/sites/default/files/documents/2018-07/CQA-RuralBroadbandEconomics-AReviewofRuralSubsidies_FinalV07112018.pdf. Rural Broadband Economics: A Review of Rural Subsidies, By Steve G. Parsons and James Stegeman (July 11, 2018).

¹⁴ Federal Communications Commission, *2019 Broadband Deployment Report*, GN Docket No. 18-238, Adopted on May 8, 2019; <https://docs.fcc.gov/public/attachments/FCC-19-44A1.pdf>. (“FCC 2019 Broadband Report”).

¹⁵ Appendix 5 contains reported deployment results on a county-by-county basis.

¹⁶ <https://broadbandmap.fcc.gov/#/>.

However, it is widely acknowledged, even by the FCC Commissioners,¹⁷ that the FCC’s analysis is flawed; over stating the availability of broadband services across the nation. This is true for several reasons. First, the FCC relies upon reports filed by the carriers with the FCC, the data of which is not confirmed.¹⁸ Moreover, the model employed by the FCC designates every census block as either served or unserved with high-speed broadband – with no regard for the service levels within that census block. In other words, *if a single user* within a census block is reported as having access to broadband service, then *the entire census block* is deemed to have service. This approach is particularly problematic where service within a rural population center (a town) may skew the results for a larger geographic area that has no service. Thirdly, the question posed by the FCC to the carriers in the report is whether they are “providing or could ...without an extraordinary commitment of resources provide broadband service to an area.” If the response is affirmative that census block is marked as having access even though providers are not required to have any plans to do so.

As such, there are significant limitations with the FCC’s mapping and reports, with most objective observers agreeing that the FCC’s broadband maps are distorted and overstate the availability of broadband services.¹⁹

¹⁷ <https://docs.fcc.gov/public/attachments/FCC-19-44A4.pdf> (Rosenworcel) and <https://docs.fcc.gov/public/attachments/FCC-19-44A5.pdf> (Starks).

¹⁸ <https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477>.

¹⁹ U.S. Government Accountability Office, Broadband Internet, *FCC’s Data Overstate Access on Tribal Lands* (September 2018); available at <https://www.gao.gov/products/GAO-18-630>.

There is a movement in Congress and at the FCC to address these shortcomings. The United States Senate Committee on Commerce, Science, and Transportation has held a series of hearings on broadband issues, including the mapping issue; with the most recent hearing occurring on June 12, 2019.²⁰ Consistent with testimony of FCC Chairman Ajit Pai, the FCC released, on July 11, 2019, a draft notice of proposed rulemaking seeking comment on the need and means of collecting “more granular data” on broadband coverage.²¹ The effort suggests new data collection from the ISP and the addition of “crowdsourcing” techniques.

Efforts at Better Mapping

There are alternative data sources available. As you are aware, the Center for Rural Pennsylvania released a report in June of this year based on more than 11 million broadband speed tests from across Pennsylvania.²² The study found that “median speeds of 25 Mbps-speed broadband were not available in any county in Pennsylvania.”²³ Additionally, this report found that connectivity speeds were substantially slower in rural counties.

²⁰ <https://www.commerce.senate.gov/public/index.cfm/hearings?ID=AE64FD09-95B1-407D-8A87-8CBEE10665A4>.

²¹ <https://docs.fcc.gov/public/attachments/DOC-358433A1.pdf>.

²² The Center for Rural Pennsylvania, *Broadband Availability and Access in Rural Pennsylvania* (June 2019); available at https://www.rural.palegislature.us/broadband/Broadband_Availability_and_Access_in_Rural_Pennsylvania_2019_Report.pdf.

²³ *Id.* at 70.

The report concluded that the methodology used by the FCC “not only overstates broadband speeds and availability, but are showing results that are less and less accurate year-after-year.”²⁴ The report recommends: (1) increasing the level of granularity of Pennsylvania’s broadband maps and (2) ensuring regular updating of these resources. These efforts will enable “more informed (and targeted) policy interventions and ensure that more communities are eligible for earmarked support to help bridge existing digital divides.”²⁵

Microsoft has also undertaken mapping efforts. Through its “Airband Initiative,” Microsoft has committed to provide broadband to 3 million people in rural areas across the nation over a 5-year period by using a mixed model that combines wireless technologies including 4G and TV white spaces, traditional fiber-based connectivity, and satellite coverage.²⁶ To obtain more accurate broadband mapping information, Microsoft used its own software data sources (e.g., measured during online software upgrades) to test broadband availability across the nation.

Microsoft’s effort, which focuses on usage rather than availability,²⁷ found that although the FCC reports that about 95% of Pennsylvanians have access to broadband,

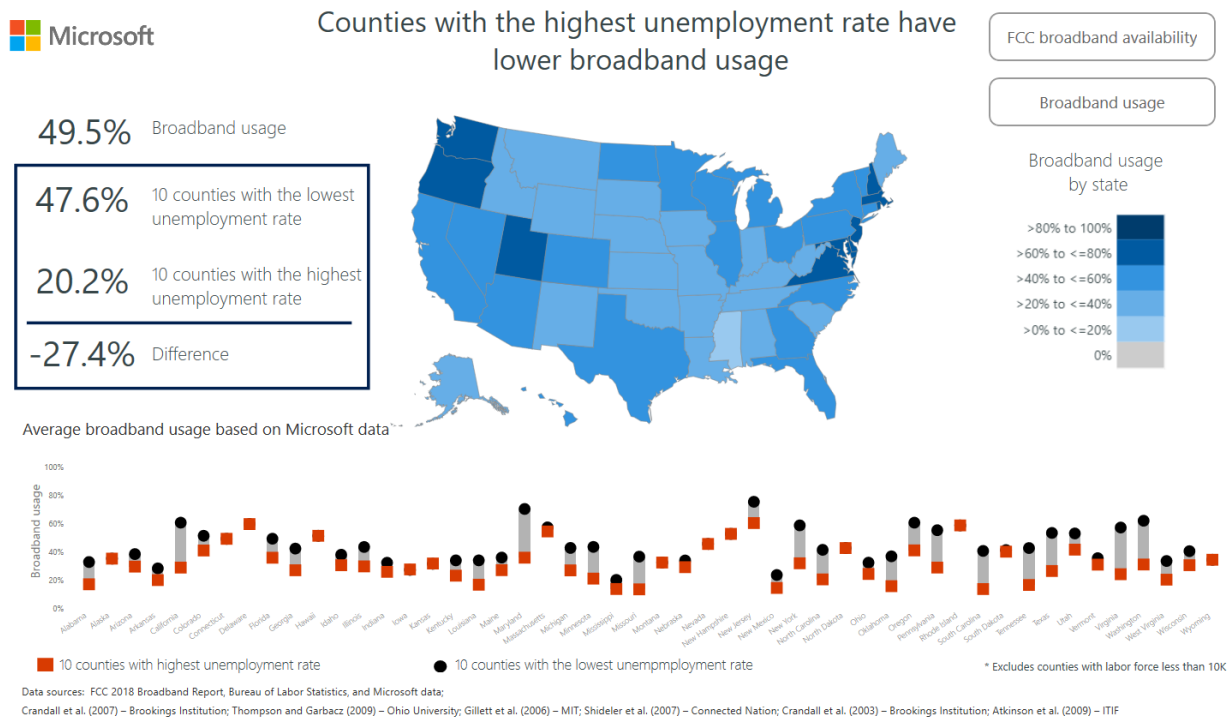
²⁴ *Id.* at 75.

²⁵ *Id.*

²⁶ <https://blogs.microsoft.com/on-the-issues/2018/12/03/the-rural-broadband-divide-an-urgent-national-problem-that-we-can-solve/>.

²⁷ “Our results align well with the FCC’s broadband subscription data and the Pew Research numbers, which suggests these data sets are far closer to the mark than the broadband access data reported by the FCC and leaves us with the unescapable conclusion that today there exists no accurate, comprehensive and public estimate of broadband coverage in the United States.” “It’s time for a new approach for mapping broadband data to better serve

only 52% of Pennsylvanians use the Internet.²⁸ On a national level, the FCC reports that there are about 24 million Americans (19 million rural) lacking broadband access,²⁹ as compared to the Microsoft data which indicates that 163 million people do not use the Internet at broadband speeds. Of course, figures are much lower in economically disadvantaged areas, which includes rural territories:



The Commission recently hosted a presentation by Microsoft representatives, who compared to their own calculations of 52% usage to the 95% statewide Pennsylvania availability reported by the FCC. By way of example, the biggest disparity noted by

Americans,” John Kahan - Chief Data Analytics Officer (April 8, 2019); available at <https://blogs.microsoft.com/on-the-issues/2019/04/08/its-time-for-a-new-approach-for-mapping-broadband-data-to-better-serve-americans/>

²⁹ <https://blogs.microsoft.com/on-the-issues/2018/08/16/better-broadband-data-can-lend-a-voice-to-rural-americans/>.

Microsoft was in Elks County where the FCC reported that broadband was 95% “available” compared to Microsoft’s calculations of 16% actual usage.

Demand for Broadband

According to the FCC’s most recent subscription data for wireline broadband service, 55% of Pennsylvanians take service at speed of 50/5 or greater, 64% take service at a speed of 25/3 plus, and 70% of Pennsylvanians use service of at least 10/1.³⁰ These “take rates” are approximately equal to or slightly higher than the national averages.

Of course, Internet usage growth rates have been explosive over the last decade. A recent Pew Research study reveals that Internet use is trending up across all demographic groups in the nation. More specifically, this study shows that only about 10% of all adult Americans currently do not use the Internet, as compared to 48% of adult Americans in 2000.³¹ Interestingly, this study reveals that groups like senior citizens, age 65 and older, are part of this trend – with 14% of seniors using the Internet in 2000 as compared to 66% of seniors currently going on-line. However, the Pew study also noted that for the rural population, this percentage is higher, with 22% of adult Americans currently not using the Internet. This data is indicative that our society is driven by the Internet and that all demographic and age groups are using the Internet more and more.

³⁰ FCC 2019 Broadband Report. Appendix 8.

³¹ <https://www.pewresearch.org/fact-tank/2019/04/22/some-americans-dont-use-the-internet-who-are-they/>. Indeed, last year’s Pew report was entitled, “11% of Americans don’t use the Internet. Who are they?” (March 5, 2018).

Availability, even if accurately measured, however, does not take affordability into account or other factors that constrain demand. A 2013 Pew study found that: “[c]ost was also a barrier for some adults who were offline – 19% cited the expense of Internet service or owning a computer.”³² In 2018, Pew stated that “[h]ousehold income and education are also indicators of a person’s likelihood to be offline. Roughly three-in-ten adults with less than a high school education (29%) do not use the Internet in 2019, compared with 35% in 2018.” But that share falls as the level of educational attainment increases. Adults from households earning less than \$30,000 a year are far more likely not to use the Internet than the most affluent adults (18% vs. 2%).

There is a portion of the population that may never subscribe to broadband or even use the Internet. Again, the 2013 Pew study is relevant: “[a] third of non-Internet users (34%) did not go online because they had no interest in doing so or did not think the Internet was relevant to their lives. Another 32% of non-users said the Internet was too difficult to use, including 8% of this group who said they were ‘too old to learn.’”

This underscores the need for customer education as a part of broadband rollout. Obviously, greater customer subscription improves the profitability of any broadband deployment. In the rural situation of fewer customers per mile of fiber (or antenna nodes) the customer take rate becomes particularly important.

³² Pew Research, Who’s Not Online and Why (September 25, 2013); available at <https://www.pewinternet.org/2013/09/25/whos-not-online-and-why/>.

Federal Broadband Funding Through the Universal Service Fund

Certain providers of telecommunications must contribute to the federal Universal Service Fund (USF) based on a percentage of their interstate and international telecommunications revenues. Those required to pay into the fund include wireline phone companies, mobile wireless phone companies, paging service companies, and certain Voice over Internet Protocol (VoIP) providers. The FCC establishes the “contribution” factor on a quarterly basis, based upon the needs of the federal USF in the upcoming quarter. The current contribution assessment factor is 24.4%.³³ This revenue is then collected by carriers from customers on the billing line entitled “federal universal service fund” (or something similar).³⁴

The FCC’s universal service programs encompass four initiatives: low income sustenance through Lifeline services, educational access for eligible schools and libraries, support for rural health care facilities, and carrier support, including the CAF program which is dedicated to accelerating broadband development to Americans. Phase I of the CAF auction (an open bid to providers for designated areas without broadband service), held in 2012, resulted in over \$438 million dollars in awards by the FCC. In 2018, the FCC awarded \$1.49 billion dollars during Phase II of the CAF auction for broadband, designated for service to over 700,000 locations in 45 states.³⁵ In Pennsylvania, five

³³ <https://www.fcc.gov/document/3rd-quarter-2019-usf-contribution-factor-244-percent>. For a history of the charge see <https://www.usac.org/cont/tools/contribution-factors.aspx>.

³⁴ Carriers are not required to pass the costs through to customers but most, if not all, do so.

³⁵ <https://www.fcc.gov/auction/903>.

bidders were awarded over \$56.8 million over ten years, to provide service to 54,812 locations within the Commonwealth.³⁶

The FCC’s most recent report on federal USF, released this year,³⁷ notes that Pennsylvania consumers’ estimated contribution of \$398 million exceed the federal USF funds paid back to in-state service providers by approximately \$192 million dollars. Pennsylvanians have been in this “net contributor” position for as long as I can remember.

USDA Funding Project

The United States Department of Agriculture (USDA) has had a long standing presence in rural telecommunications notably through the loans (more than \$700 million per year) created by the Rural Utilities Service (RUS) program.³⁸ The USDA recently announced that it added to this portfolio of additional funds for expanding rural broadband infrastructure in unserved rural areas and tribal lands.

The Consolidated Appropriations Act of 2018 appropriated an additional \$600 million to be used on an expedited basis through a newly established broadband loan and grant pilot program, called the “Rural eConnectivity Pilot Program,” or ReConnect

³⁶ <https://docs.fcc.gov/public/attachments/DA-18-887A2.pdf> (the winning bidders in Pennsylvania were: Velocity.Net Communications, Inc., Verizon Communications, Inc., Viasat, Inc., Armstrong Telephone Co.-Northern Division, and Tri-County Rural Electric Cooperative, Inc.).

³⁷ Federal Communications Commission, *Universal Service Monitoring Report- 2018*, Table 1.9 at 18; available at <https://docs.fcc.gov/public/attachments/DOC-357769A1.pdf>. Alaska was the largest net recipient at a positive inflow of \$324 million.

³⁸ <https://www.rd.usda.gov/programs-services/all-programs/telecom-programs>.

Program.³⁹ The main goal of the ReConnect Program is to expand broadband service to rural areas without sufficient broadband access, defined as a 10/1 speed.

The Reconnect Program offers three separate funding categories as follows: a 100% loan,⁴⁰ a 50% loan/50% grant,⁴¹ or a 100% grant.⁴² The \$600 million is to be split evenly with \$200 million to be available for each of these three funding categories. To be eligible for a 100% loan or 50% loan/50% grant, the proposed funded service area must be in a rural area where 90% of the households do not have sufficient broadband access. To be eligible for a 100% grant, the proposed funded service area must be in a rural area where 100% of the households do not have sufficient broadband access. No matter which type of funding an applicant requests, the proposed network must be capable of providing service to every premise in the proposed funded service area at a minimum 25/3 speed.

The following entities are eligible to apply for assistance under the ReConnect Program: non-profit entities; for-profit corporations; limited liability companies; cooperative or mutual organizations; states, local governments, or any agency,

³⁹ <https://www.usda.gov/reconnect/program-overview>.

⁴⁰ Under the 100% loan funding category, the maximum amount that can be requested in a single application is \$50,000,000. Applications under this category were due to the USDA by June 28, 2019, although the USDA did evaluate and award loan-only projects on a first-come-first-serve basis, beginning in March 2019.

⁴¹ Under the 50% loan/50% grant funding category, the maximum amount that can be requested in a single application is \$25,000,000 for the loan and \$25,000,000 for the grant. Loan and grant amounts must always be equal. Applications under this category were due to the USDA by May 29, 2019.

⁴² Under the 100% grant category, the maximum amount of funding that can be requested in a single application is \$25,000,000. Applications under this category were due to the USDA by April 29, 2019.

subdivision, instrumentality, or political subdivision thereof; a territory or possession of the United States; and an Indian tribe (as defined in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. § 450b)).⁴³

The ReConnect Program offers funding for the following eligible purposes: (1) the construction or improvement of buildings, land, and other facilities that are required to provide broadband service; (2) reasonable pre-application expenses, not to exceed 5% of the award amount; (3) the acquisition and improvement of an existing system that is currently providing insufficient broadband service (eligible for 100% loan requests only); and (4) terrestrial based facilities that support the provision of satellite broadband service.

Only projects that the USDA determines to be financially feasible and sustainable will be eligible to receive awards from the Reconnect Program. Additionally, ReConnect Program funds cannot be used to build-out service areas that fall within the census block groups of CAF II Auction 903 recipients, unless the entity requesting additional support is the CAF II recipient in that area. CAF II winners seeking additional funding to buildout its awarded census block groups may only apply for funds under the 100% loan offering category.

⁴³ *Id.*

State-level Broadband Funding Methodologies and Initiatives

From a policy perspective, states across the nation are recognizing high-speed broadband, particularly in the underserved rural and remote areas, is important infrastructure that requires investment by the local, state, and federal government. As you formulate policies to incentivize broadband, you should be aware that there are a variety of means that are in use, including large dedicated funds, bonds issued for these purposes, and surcharges on a variety of services ranging from telecommunication-specific fees to vehicle tolls.

Dedicated Broadband Funds

Many states have supported broadband initiatives through dedicated broadband funding programs. These funds are typically administered by an agency, who then awards grants and loans dedicated to broadband projects. This policy approach is well understood, as it functions much like the host of other programs that already exist in Pennsylvania. The biggest challenge, of course, is in the funding. One of the largest funds created for broadband is in New York, where bank settlements provided \$500 million in funding for the state's broadband initiatives. New York then successfully leveraged this \$500 million to secure an additional \$170 million in CAF II funds from the FCC. This approach, obviously, requires a one-time, large amount of undedicated funds and has not been replicated by any other state.

Consumer Surcharges and Fees

California has also created a large fund for broadband development, approximately \$645 million, but funded it through surcharges. This fund, known as the “California Advanced Services Fund,” is administered by California Public Utility Commission and provides targeted grants and revolving loans for broadband initiatives. The funding stream for this fund is a surcharge rate, found as a line item on intrastate service bills, collected from California’s consumers.

Like California, but to a much lesser degree, several other states have also used universal service funds to provide grants for broadband deployment initiatives, including: Maine, Nevada, West Virginia, Delaware, and Colorado.⁴⁴ The legislature in the State of Washington also passed a bill that would use universal service funds for broadband grants to rural areas for 5G service. The common theme among these fees is that they are collected from the consumers of telecommunication services, which is an important policy consideration.

In Minnesota, matching state grants and local funds have been used to create a state grant program that covers up to 50% of broadband development costs for applicants, including municipal entities and non-profits created specifically for broadband development. This program is administered by Minnesota Office of Broadband

⁴⁴ <http://nrri.org/wp-content/uploads/2016/04/2015-Feb-Sherry-Lichtenberg-State-Universal-Service-Funds.pdf>. *State Universal Service Funds 2014*, Lichtenberg, Nat’l Reg. Research Institute (June 2015). Pennsylvania operates a revenue replacement fund, which is labeled universal service fund but serves a different purpose.

Development. In Ohio, there is proposed legislation that would float a bond for \$50 million in annual funds for broadband development.

Other states, like Oregon, have created policies and funding that are designed to capture maximum federal funds. Specifically, Oregon created a dedicated fund to ensure that all K-12 public schools in the state have high speed, affordable broadband by matching state funds with federal funding received through the FCC's E-rate school Internet access program.

Using a different model, the Governor of Indiana announced a \$100 million-dollar broadband initiative to push broadband into underserved areas, that will be financed by tolls on heavy trucks on one of the state's toll roads.

Tax Credits

Another popular approach to incentivizing broadband is through tax policy. New Jersey, for example, has already used this concept to establish a tax credit for carriers installing broadband facilities in unserved and underserved areas. Pennsylvania already has several programs that use this creative approach, including the Keystone Opportunity Zone (KOZ) or Neighborhood Improvement Zones (NIZ), although those have been focused on general economic development and not broadband specifically. There may be opportunities to incentivize broadband in rural areas, in much the same way the KOZs and NIZs return tax revenues to participants in the dedicated areas.

Local Government and Quasi-Government Investment

Another model for investment in broadband deployment resides at the municipal government level. For example, in Pennsylvania, the Bradford County Authority is working on the installation of a dark fiber loop for other service providers to use for provision of services. We find this same approach has been implemented in Maine, where a quasi-municipal broadband utility in Maine, known as “Downeast Broadband Utility,” was created earlier this year to install fiber in rural communities. This regional utility plans to create an open-access fiber optic network, 87 miles in length, to bring high-speed broadband to several rural areas in Maine that lacked the service.

Anchor Tenant Model

Another model for public and private investment is to use “anchor-tenant” projects by which a large corporate entity “tenant” invests in fiber installation. Once the fiber is installed by a large entity, the fiber line can be leveraged by other individuals and/or entities within close proximity to the line.⁴⁵

⁴⁵ A detailed analysis is available at <http://www.ctcnet.us/publications/a-model-for-understanding-the-cost-to-connect-anchor-institutions-with-fiber-optics/>. A Model for Understanding the Cost to Connect Anchor Institutions with Fiber Optics Prepared for the Schools, Health & Libraries Broadband (SHLB) Coalition (February 2018).

Private Investment

Additionally, public-private partnership projects have proven very successful for broadband deployment. For example, beginning in 2012, Google Fiber has used public-private partnership money to deploy fiber in certain parts of the Mid-West and the South. The state of Kentucky has also specifically used private-public partnerships for investment in broadband deployment.

Public vs. Private Networks

Although this testimony does not linger on the issue, one threshold issue that you will need to address is the relative benefits of private and public networks. Supporters of public networks argue that municipal broadband can provide access more cheaply than private service providers, if not for free. Critics argue that the offering of broadband service is an inappropriate use of public funds that relies upon hidden subsidies from taxpayers, while private networks are tax generators.

There are several public networks in Pennsylvania, some successful, some less so. A recent study at the University of Pennsylvania extensively analyzed 20 governmentally owned networks, including a network in Kutztown, Pennsylvania.⁴⁶

⁴⁶ Municipal Fiber in the United States: An Empirical Assessment of Financial Performance, Christopher S. Yoo; available at <https://www.law.upenn.edu/live/files/6611-report-municipal-fiber-in-the-united-states-an>.

Commission's Broadband Initiatives

The Commission is working diligently to explore its options to expand access to rural broadband. At its June 14, 2018 Public Meeting, the Commission unanimously approved my proposed motion to begin a rulemaking to assert Commission jurisdiction over pole attachments pursuant to the Telecommunications Act of 1996. That action led to a Notice of Proposed Rulemaking Order that proposed to adopt the FCC's existing regulations over pole attachments and create a forum for dispute resolution.⁴⁷

The purpose of the rulemaking is to: (1) decrease regulatory uncertainty for pole owners and pole attachers; and (2) to provide a local forum for pole owners and pole attachers to get relief quickly. The rulemaking was published in the *Pennsylvania Bulletin* on September 29, 2018. Comments and reply comments to the Commission's Notice of Proposed Rulemaking Order were filed by various interested parties and the Commission plans to issue the Final Rulemaking Order in the very near future.

Additional Regulatory Options

I would like to close by providing some thoughts about obstacles to broadband that don't involve funding. In my opinion, there are several legislative and regulatory

⁴⁷ *Notice of Proposed Rulemaking In re: Assumption of Commission Jurisdiction over Pole Attachments from the Federal Communications Commission*, PUC Docket No. L-2018-3002672 (Order entered July 13, 2018); available at http://www.puc.pa.gov/about_puc/search_results.aspx?advanced=true.

improvements that would maximize the deployment of broadband, especially in rural areas. These improvements include, but are not limited to the following:

- Better collaboration between local, state and federal agencies;
- Leveraging state and local government resources and assets (buildings and rights-of-way) to serve underserved or unserved areas;
- Developing a map of all state and local agency assets for antenna (buildings, towers, other structures);
- Developing standards for conduit installation; and
- Reducing permitting times, increasing access to rights-of-way and implementing reasonable permit fees.

Some of these options are being developed or are under active consideration, so you may be familiar with them and/or actively involved with them already.

Conclusion

Expanding access to rural broadband is an important issue and the Commission stands ready to assist in any way we can to develop solutions to provide greater access to Pennsylvanians. We are focusing our attention on this topic and are diligently exploring options and seeking solutions within our own sphere.

Thank you again for inviting me here to speak today. I hope that my testimony has been helpful. I welcome the opportunity to answer any questions you may have.