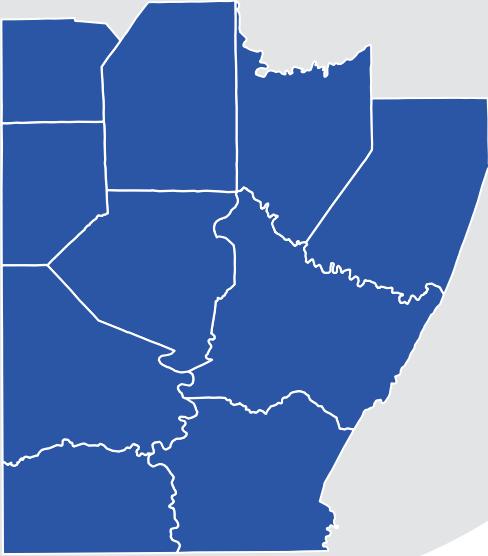




Southwestern Pennsylvania
Connected

Equitable Broadband Access



CONNECTIVITY ROADMAP

April 2022

Southwestern Pennsylvania Commission
Allies for Children
Carnegie Mellon University

Southwestern Pennsylvania Commission 2022

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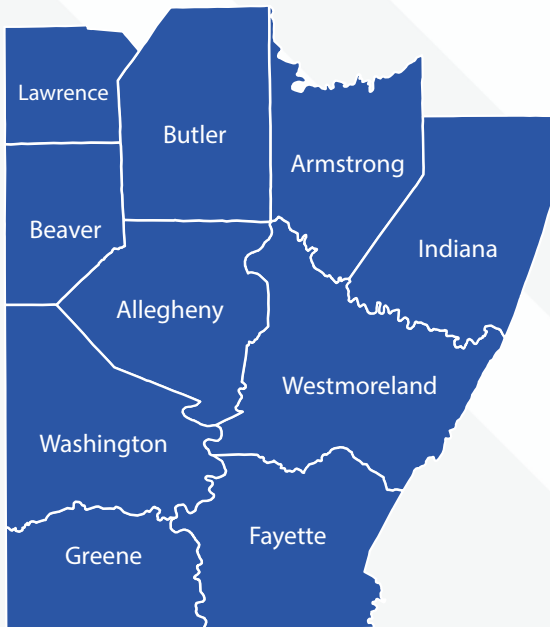
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Consortium Partners



This Roadmap was prepared in collaboration with the guidance and expertise from many regional partners. Our Steering Committee and Regional Advisory Committee represent the 10 counties and the City of Pittsburgh; as well as research, community, and industry leadership. We thank them for their help in creating this plan for improving broadband connectivity for all residents across southwestern Pennsylvania.

Funding for the Connectivity Roadmap was provided by the Henry L. Hillman Foundation. The resulting report and recommendations are the result of a regional, stakeholder-based process and do not necessarily reflect the views or priorities of the Henry L. Hillman Foundation.

*Thank you to all those who lent their expertise to advise and guide
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Introduction

Creating a Roadmap

The Southwestern Pennsylvania Commission (SPC), Allies for Children, Metro21 and Traffic21 at Carnegie Mellon University, and a diverse, regional coalition of stakeholders recognize broadband as a basic utility that is necessary for daily functionality and of equal importance as our roads and electricity. Emergency management services, healthcare, government, utility, education, and transportation sectors depend on broadband to perform essential services. Businesses from small enterprises to global corporations rely on connectivity to operate. Most of southwestern Pennsylvania has insufficient broadband infrastructure to support these needs. This regional Connectivity Roadmap is a guide to build a broadband network that is available, accessible, and affordable to all to ensure the region is connected and thriving socially and economically.

High-speed connectivity is essential in the 21st century. Our daily activities, from social interactions to municipal services, are increasingly coordinated and communicated online. Schools and educational institutions, medical facilities, and businesses need high-speed internet to properly connect residents, students, and medical and business communities to the world. Digital connectivity and digital tools attract new businesses, create jobs, support increased tourism, and help drive population growth. For the southwestern Pennsylvania region to be globally competitive, the unserved and underserved areas of the region must be addressed equitably and systematically. Advanced and proactive planning is critical to leverage the broadband funding that is available now and in the future. This Connectivity Roadmap establishes the groundwork to begin this effort.

The Connectivity Roadmap will act as a catalyst in assisting SPC, county leadership from the 10 counties of southwestern Pennsylvania, and regional stakeholders in researching, collecting, developing and prioritizing a pipeline of connectivity projects and initiatives to secure funding for implementation. It clearly articulates needs and gaps, and positions the 10 counties, city and municipal leaders, and partner entities within our region to qualify for our share of state and federal funding.

HOW TO USE THE CONNECTIVITY ROADMAP

..... **Broadband Network and Access in 2022** provides an existing conditions analysis that documents the true state of the region's internet connectivity in relation to its demographic and socioeconomic composition.

..... **Goals for a Connected Future** identifies 12 regional goals to improve broadband infrastructure, tools, and skills across southwestern Pennsylvania.

..... **Closing the Gaps: What We've Heard** provides a summary and the results from the community engagement process undertaken throughout the development of this Roadmap.

..... **Programs & Projects** shares tools to identify projects to further the regional goals with suggested initial projects for each county.

..... **Funding** identifies funding options that can be leveraged to support the goals and projects.

..... **Governance Types** provides suggestions for a regional governing body to guide and promote the region's combined efforts.

..... **Recommendations and Next Steps** identifies clear first steps for SPC, county and city leadership, and other partners.

What is Broadband?

The term broadband is used to describe a range of technologies that provide high-speed internet access. Broadband commonly refers to high-speed internet access that is faster than traditional dial-up access. Unlike traditional dial-up, which requires a telephone line to connect and is not always connected, broadband access is considered “always-on,” making it much more efficient to use. The Federal Communications Commission (FCC) defines broadband by its speed: minimum download speed of 25 megabits per second (Mbps) and minimum upload speed of 3 Mbps. However, as modern internet usage has soared and our online activities consume more and more data, this definition is outdated. Investing in broadband infrastructure requires us to anticipate the speeds we will need in the future.

FIXED AND MOBILE BROADBAND

Broadband can be split into two types, fixed and mobile. Fixed broadband transmits data through physical wires and cables and connects networks to the internet. Some fixed broadband technologies include fiber optic, cable modem, and satellite. Mobile broadband connects devices to the internet via a short-range wireless connection, like mobile 5G. Both fixed and mobile broadband are capable of providing high-speed internet connections, offering flexibility in the way internet is delivered to homes, businesses, and institutions.

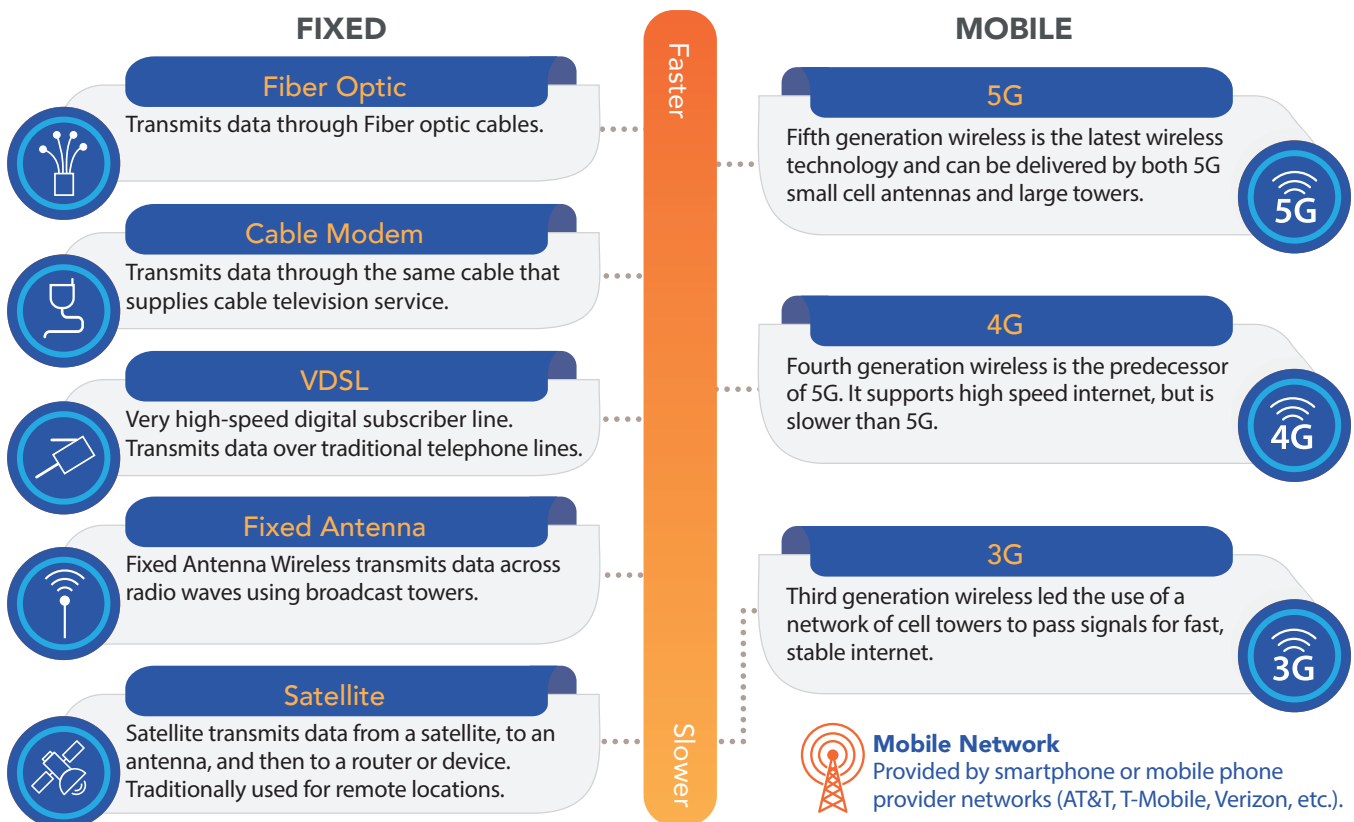
WHAT QUALIFIES AS HIGH-SPEED?

25/3

In 2015, the FCC defined high-speed internet as download speeds of at least 25 Mbps and upload speeds of at least 3 Mbps.

100/20

In order to keep up with increasing data demands, a new definition of “high-speed” is recommended by the 2021 Infrastructure Investment and Jobs Act (IIJA). The law sets a minimum threshold of 100 Mbps download speed and 20 Mbps upload speed for new projects to receive federal broadband funds.



HOW IS BROADBAND MEASURED?

When measuring the speed of broadband, there are three main metrics which must all be adequate for internet to be considered high-speed.



SPEED is typically measured in Mbps, which is a measurement of the amount of data capable of being transmitted each second.



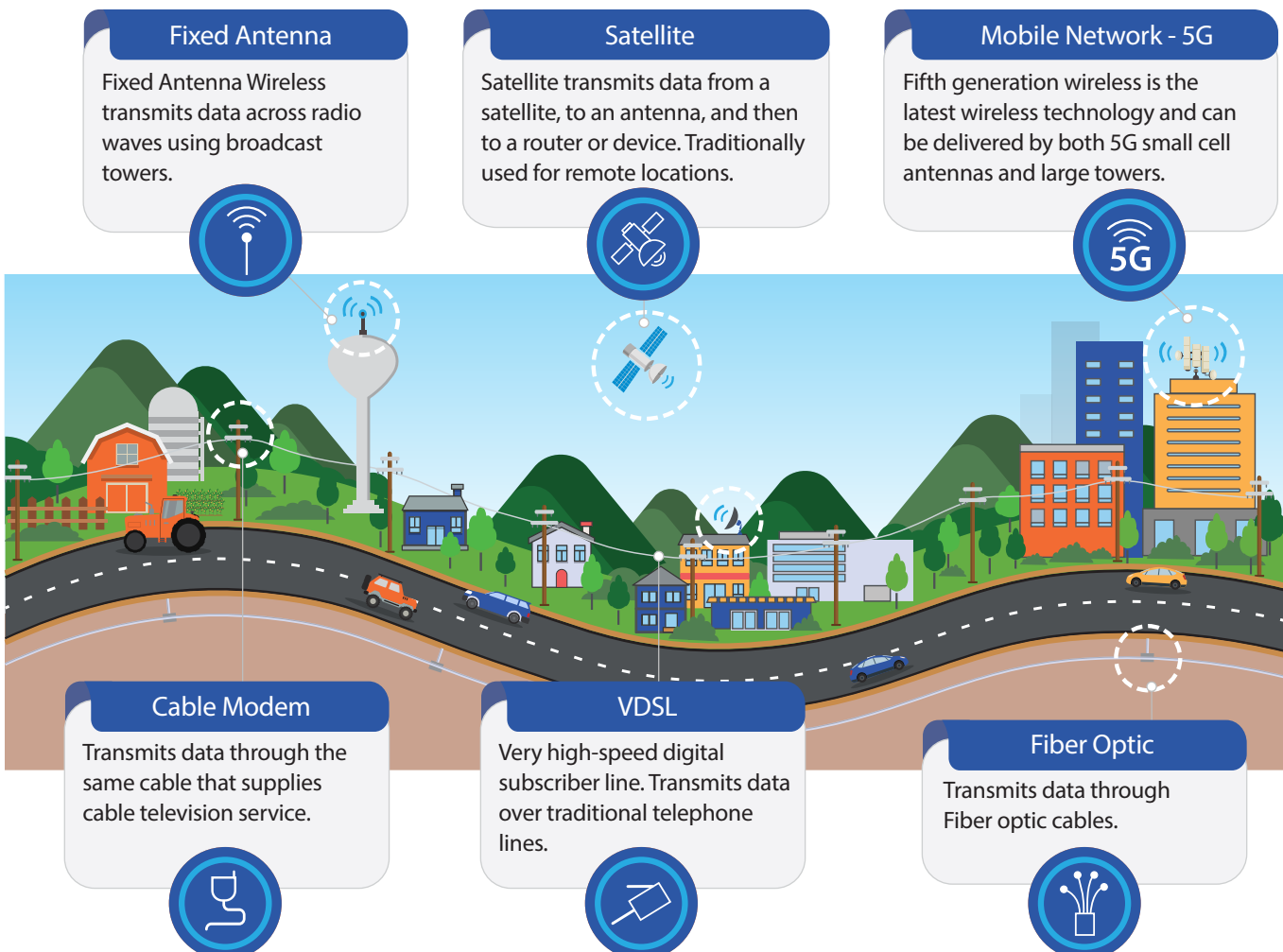
BANDWIDTH is the connection's capacity for transmitting data. Broadband is like an internet highway. The higher the bandwidth, the more lanes your internet highway has and the more devices you can connect simultaneously.



LATENCY is the time it takes for information to reach its destination related to potential delays. It is critical to applications that use live connections (i.e., Zoom, voice over internet protocol (VoIP), etc.). The effects of high latency include jittery connections and frequent pauses while connected.

HOW DOES BROADBAND GET TO YOU?

Broadband service is delivered through multiple technologies. Internet Service Providers (ISPs) typically provide fixed broadband services and mobile network carriers typically provide mobile broadband services. The service provider offers their service through an infrastructure network and typically sells this service for a fee. The most common technologies used in these infrastructure networks are shown below:



Barriers may occur at multiple places throughout the delivery process. Typically for an end user to receive service, the infrastructure must reach their address, the user must purchase service from the provider, and they must have an appropriate device to receive the service.

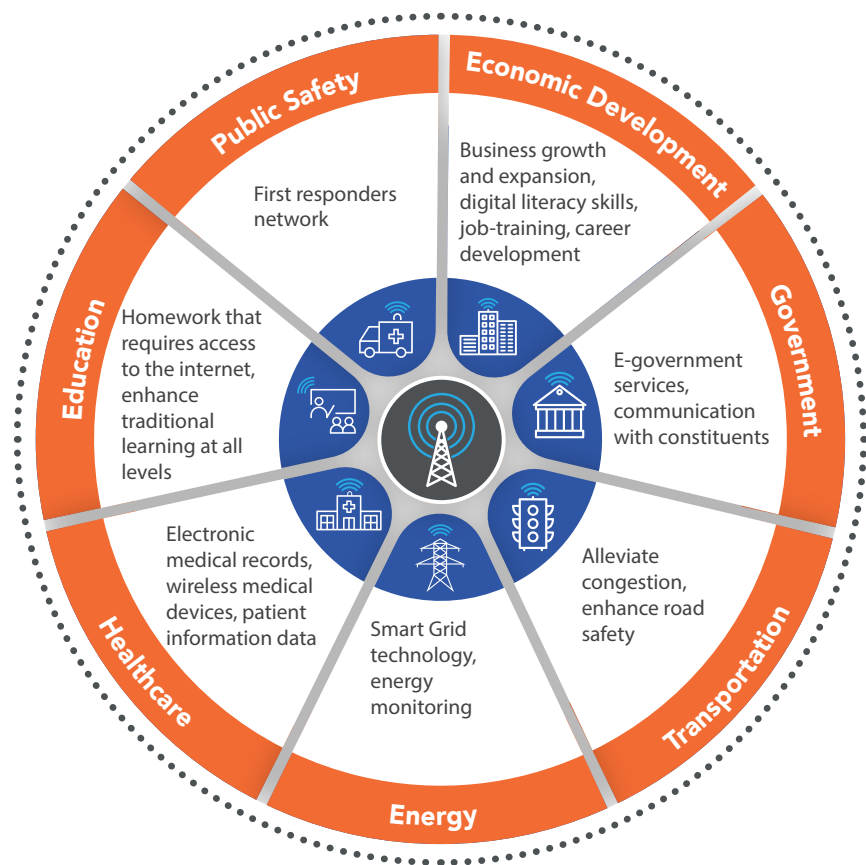
Investment in broadband considers not only where infrastructure is needed to expand the fixed or mobile networks, but also where or how users need financial and technical support in accessing the service once it is made available.

Value of Broadband

Broadband is the gateway that allows communities and individuals across the region to access information that is essential to everyday life. Without broadband, it is difficult to participate in society, creating negative impacts on individuals and communities. Rather than viewing high-speed internet as a luxury, it is becoming increasingly clear that broadband needs to be viewed as a necessity, like electricity or water.

FUELING OUR ECONOMY

Within the last 20 years, the advancement of digital technology has greatly improved, helping to facilitate economic growth. Many different sectors rely on broadband infrastructure to operate every day. Broadband enables government e-services, online homework, virtual classes, and daily operations for small, home-based businesses. Given how much our society relies on internet-based programs and services, the economic impact of having quality broadband is evident.



As we progress further into this digital era, we have an obligation to make sure that **NO ONE IS LEFT BEHIND.**

DIGITAL EQUITY, A RISING TIDE

Digital equity is achieved when all individuals and communities have the same information technology and capacity needed for full participation in our society, democracy, and economy. Technology will play a bigger and bigger part of all of our lives and it is our obligation to invest holistically and equitably in our communities to ensure that everyone has the opportunity to thrive.

In the 10-county region and the City of Pittsburgh, rural and urban areas are lacking access to high-speed internet and equipment that is fast and reliable. This impacts the quality of life for our residents and communities. For rural communities, service is the main issue. High-speed broadband service is often unavailable. For urban communities, the issue is affordability. The cost of high-speed broadband is often a burden for low-income households. With technology and the internet constantly evolving and becoming more integrated into our society, equal access to digital resources can eliminate gaps in our digital and social infrastructure that prevent people and communities from participating in society.

INVESTING IN DIGITAL EQUITY MEANS improving access in each of these categories to ensure our residents not only have high-speed access, but also the means and the ability to benefit from it.

In southwestern Pennsylvania, the 2020 pandemic led to a shift towards remote learning, telehealth, and other online services. This revealed the scale of the digital equity gap. For example, COVID test and vaccination appointments were available online, but many residents struggled to use the online service because they did not own a computer or did not know how to navigate the site. Telework offers flexibility within some fields, but is not equally available across all industries. Many low-income populations, minorities, and rural communities with limited access to technology and lack of space face career challenges as the workforce shifts to remote opportunities. Online services and information hubs will leave residents behind if improved access to devices and education to expand digital literacy are not prioritized.



HOMework GAP

An example of digital equity in education is the “Homework Gap,” a term that refers to when students do not have sufficient internet access. Homework assignments increasingly rely on internet access at home, creating a “gap” in learning outside of the classroom for those with limited or no internet. Many low-income families cannot afford the cost of high-speed internet,

which limits their childrens' ability to participate in the full educational system. Access to education should be available for all who want to learn. Broadband access will play a vital role in making sure that happens.

Communities feel the impact of digital equity, or lack thereof, in **THREE KEY WAYS:**



access to high-speed internet



access to devices to use the internet



skills and knowledge to use the internet (i.e. digital literacy)



Broadband Network and Access in 2022

Current Connectivity Status

Understanding the current state of broadband coverage, speed, technology, resources, gaps, and needs in relation to the region’s demographic and socioeconomic conditions is key to understanding areas of greatest need and opportunity. The Connectivity Roadmap conducted an existing conditions analysis, developed two indices to measure existing coverage through the lenses of access and equity, and then identified areas of greatest need and opportunity. This analysis clearly illustrates a misrepresentation in the reported data and gaps in regional access, adoption, and affordability.

Current FCC Data Overstates Coverage

The existing broadband coverage for the 10-county region was mapped based on reported data and measured speeds. While the reported data shows the region to be well covered by broadband, the measured speeds data tells the reverse story – showing a region unsupported by the necessary broadband infrastructure to survive, let alone compete, in the current world.

The reported data comes from the FCC’s Form 477 that ISPs are required to submit to the FCC twice per year. This form collects the ISPs self-reported data on where they offer internet service with at least 0.2 Mbps in at least one direction (download or upload) to at least one location within a census block. As seen in the maps below, this data makes southwestern Pennsylvania appear to be very well served with high-speed internet available everywhere. **This is a misleading representation.**

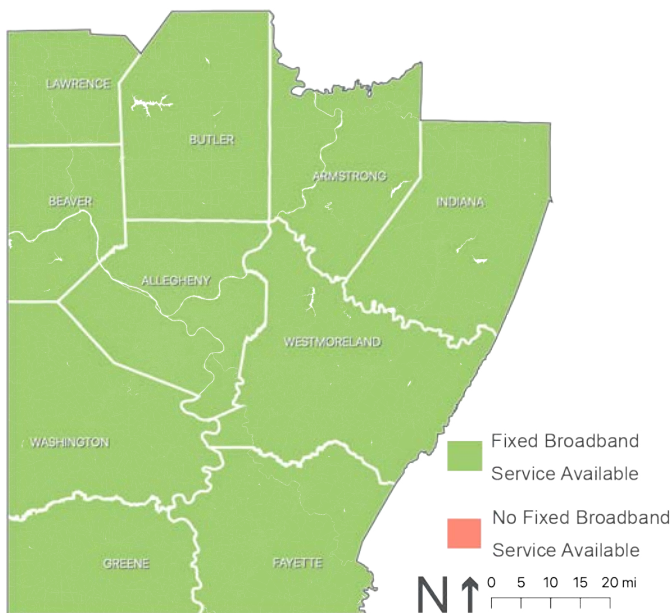


Figure 1: Fixed Broadband Access
Source: FCC Form 477, as of June 30, 2020

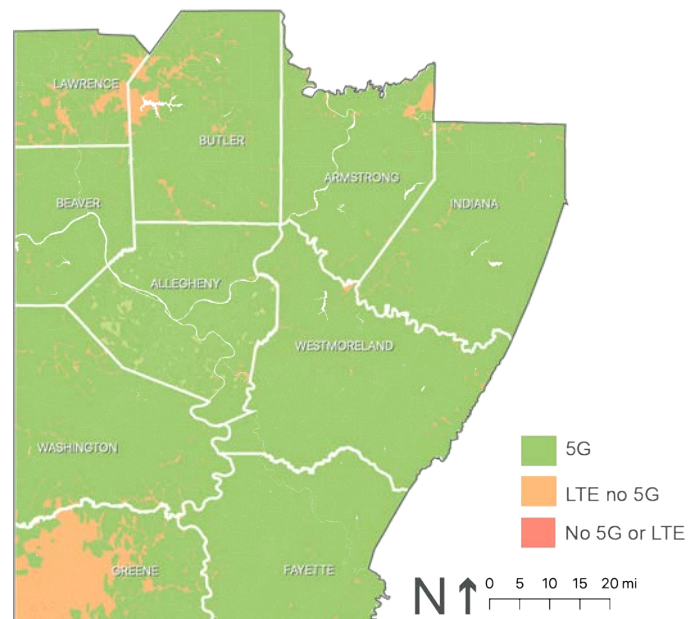



Figure 2: Mobile Broadband Access
Source: FCC Form 477, as of June 30, 2020

To correct for the overstated conditions found in the Form 477 data, the actual measured speeds were mapped for the 10-county region. This data was then rated according to the 100 Mbps download/20 Mbps upload speeds threshold in IJJA. This adjustment reveals stark truths about the current conditions and geographic disparities in the region.

Most of the region falls short of the proposed 100/20 threshold for defining broadband (100 Mbps download/20 Mbps upload) that this Roadmap recommends and which is increasingly reflected in national policies.

- The areas of the region that have access to speeds meeting the 100 Mbps download/20 Mbps upload threshold are too small to be visible on the map.
- Download speeds between 50 and 99 Mbps are more common in Allegheny and Butler Counties, but are found only in small areas throughout the remaining eight counties.
- Most of the southwestern Pennsylvania region has download speeds less than 50 Mbps (underserved) or less than 25 Mbps (unserved).



The 2021 Infrastructure Investment and Jobs Act (IIJA) defines broadband speed at a 100/20 Mbps threshold that PROJECTS MUST MEET to qualify for government funding.

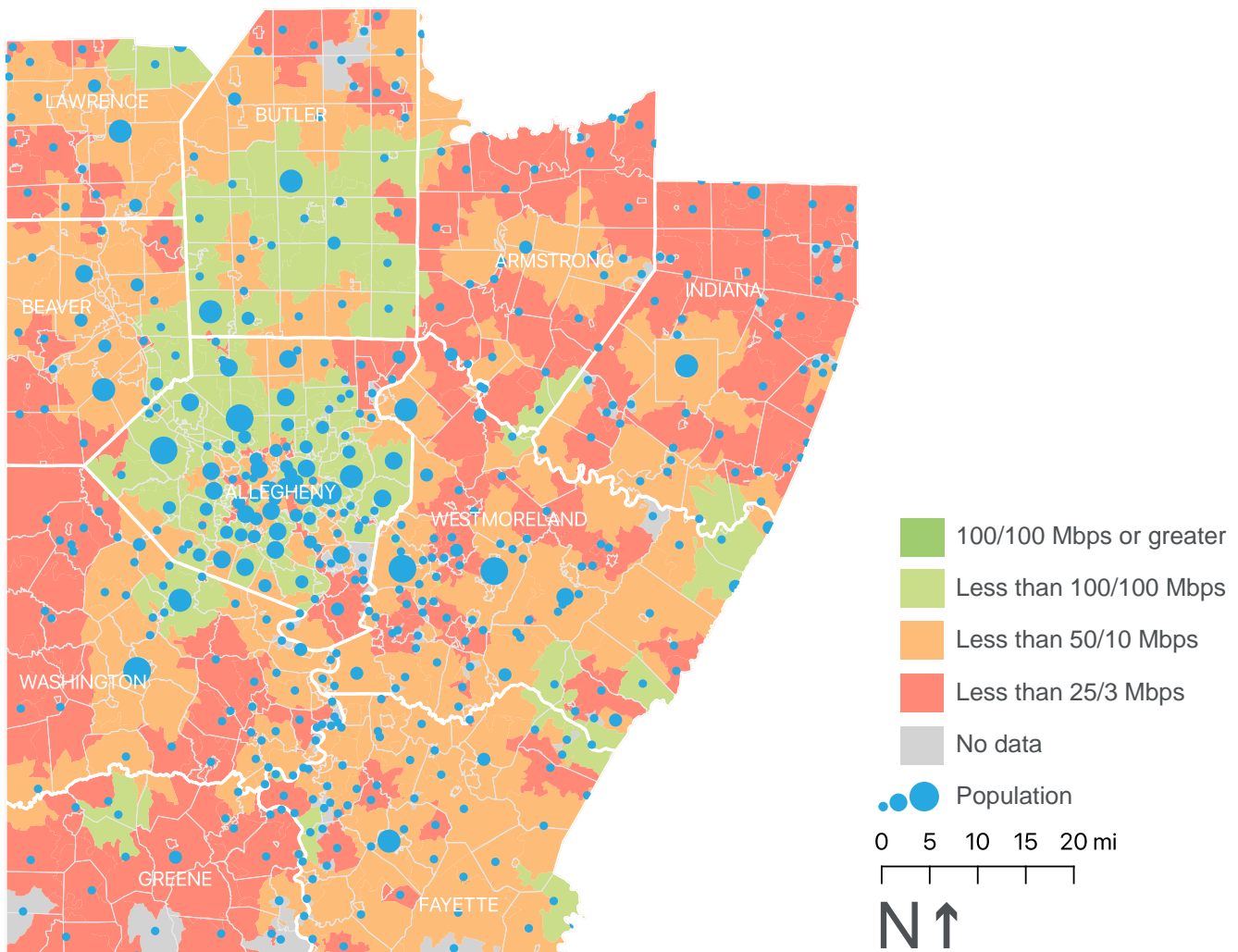


Figure 3: SWPA Connectivity Broadband Speed Map
Source: Open source data gathered by Measurement Lab, 2021

The **UNDERSERVED AND UNSERVED** areas identified in the Speed Map (Fig. 3)



include:

 **36,000** households
(3%)

 **15,000** businesses
(4.7%)

 **over 500** community anchor institutions*
(4.6%)

These areas are primarily rural and reveal a large divide in digital access between urban centers and rural towns. A large portion of properties in the region capable of growth and development are impeded by poor or no access to broadband limiting the potential for economic growth.

Understanding broadband provider options is also key to evaluating broadband access and connectivity. Within the 10-county region, the majority of households, businesses, and community anchor institutions are served by two to three providers. Nearly 5% are served by only one provider, which limits options, services, and affordability.

Additionally, the cost of broadband can be a limiting factor for connectivity. The vast majority (more than 87%), of households, businesses, and community anchor institutions pay more than \$75 per month for internet service. This is higher than the national average cost of broadband service of \$64 in 2021 (*source: Parks Associates Consumer Insights Dashboard*), although this number does not differentiate between different service types and data plans. Under Pennsylvania law, the PA Public Utility Commission does not define internet as a utility. Thus financial support and rate increase protections that are available for other utilities, such as water, sewer, gas, and electric, do not apply.

How does lack of choice impact broadband service?



60% of households

with internet speeds below 25 Mbps download and 3 Mbps upload have **only 1 provider available**



48% of community anchor institutions

with internet speeds below 25 Mbps download and 3 Mbps upload have **only 1 provider available**



36% of businesses

with internet speeds below 25 Mbps download and 3 Mbps upload have **only 1 provider available**

When provider choice is limited, users who find that **service is unreliable or prices are unaffordable** have **NO OTHER OPTION** to access high-speed internet.

*Per the FCC, "community anchor institutions" are schools, libraries, medical and healthcare providers, community colleges and other institutions of higher education, and other community support organizations and entities.

Analyzing and Measuring Access to Connectivity

Two indices were developed for this Roadmap to better analyze the true accessibility and usage of broadband connectivity in the region. The SPC Broadband Access Index and the Adoption and Equity Index provide a more detailed and nuanced measurement of broadband accessibility in the region compared to the FCC Form 477 data alone. The Connectivity Indices incorporate and analyze Environmental Justice and Title VI data, including minority and low-income populations, Limited English Proficiency (LEP) populations, disabled populations, households with no vehicle available, and populations 65 years and older.

Broadband Access Index

The Broadband Access Index assigns connectivity scores based upon available service technologies, the speed of service, number of providers, Rural Digital Opportunity Fund (RDOF) eligibility, federal opportunity zones, and household connectivity variables. Areas with high Broadband Access scores reflect reasonably high-speeds of service and a choice of provider, which lowers costs. Areas with low scores reflect a lack of provider choice and low speeds that fail to meet the threshold of broadband. This index shows how reliability and coverage cannot be defined by a single factor. For example:

- In Allegheny County, although speed and coverage are higher on average than surrounding counties, the index shows pockets where access lags. Many communities along the Monongahela River, for example, lack the same connectivity opportunities enjoyed by their neighboring municipalities.
- Western Washington County, Greene County, and much of Indiana County (historically an Amish community), score low on the index. These areas lack broadband resources on multiple levels, from poor coverage to lack of provider choice and poor affordability.
- Higher scores often correlate with larger population clusters. However, there are many smaller towns and population centers in areas with low index scores. For example, communities along the Beaver River and around Greensburg have concentrations of population but moderate to low index scores.

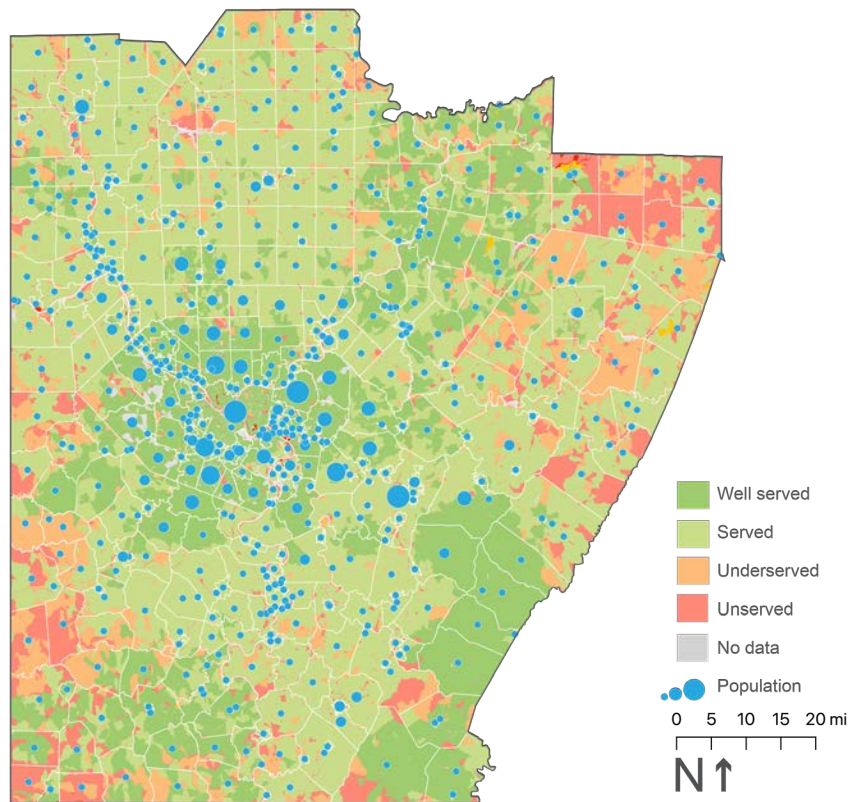


Figure 4: SWPA Connectivity Broadband Access Index

Adoption and Equity Index

The Adoption and Equity Index scores reflect the social needs and demographics of the people in each area. It also reflects the monthly cost of internet in assigning connectivity scores. Low scores correspond to areas with more residents who are disproportionately affected by the cost and access to broadband, typically those who fall within Environmental Justice and Title VI categories. These areas have a high potential for broadband expansion to positively impact many people in need within these typically overlooked communities. For example:

- Within Allegheny and Beaver Counties, many town centers and urban neighborhoods show low scores.
- Greene, Washington, and Fayette Counties have large swaths of contiguous low scoring areas to examine for greater infrastructure investment.
- Indiana and Armstrong Counties show a substantial need for future projects and programs to address gaps in equity.
- In Lawrence and Butler Counties, the Access Index and Equity Index show contrasting scores, which indicates that different project types may be needed to balance the need for coverage with the need for equitable service.

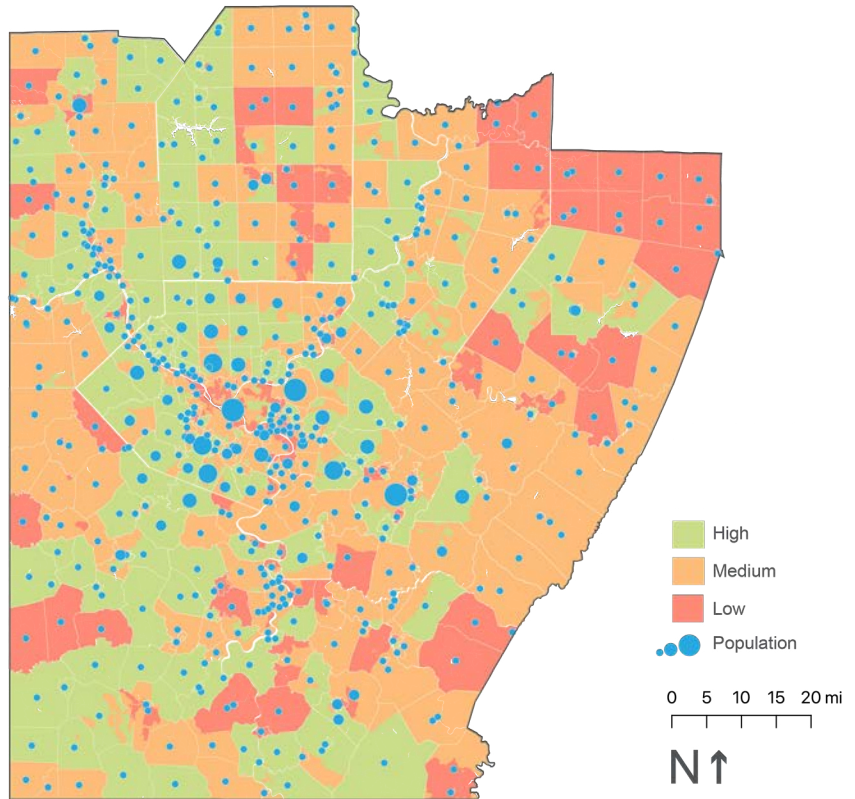


Figure 5: SWPA Connectivity Adoption and Equity Index



AVAILABLE RESOURCE

Both the Broadband Access Index Dashboard and Adoption and Equity Index Dashboard provide this data and mapping at the census block level. This online resource is available to counties, municipalities, and the public for use in project planning, prioritization, and funding applications.

www.spcregion.org/connected

An Issue of Scale

The challenges that impact urban, suburban, and rural locations vary, and thus the potential solutions and highest needs will vary as well. In the City of Pittsburgh, access is a less frequent problem than affordability of broadband services. Digital literacy and lack of devices for residents is a substantial need that also impacts some populations more than others. Future projects will need to take into account the specific needs of a municipality or population, understanding that the top priorities will vary by location.

Several counties in southwestern Pennsylvania have already implemented broadband programs, and the City of Pittsburgh has also developed substantial planning and policies to advance broadband access and equity within the City. The City of Pittsburgh offers some lessons and examples for other municipalities to build upon, particularly in urban areas:

- The Department of Innovation and Performance performed a study of the City's optical fiber network, including potentially extending it to other governmental and nonprofit users.
- A Pittsburgh Roadmap for Inclusive Innovation was prepared in 2015 to guide the City through goals and best practices for bridging the digital divide.
- The City is about to launch the implementation of a dark fiber network to provide stronger Information Technology infrastructure for municipal government.

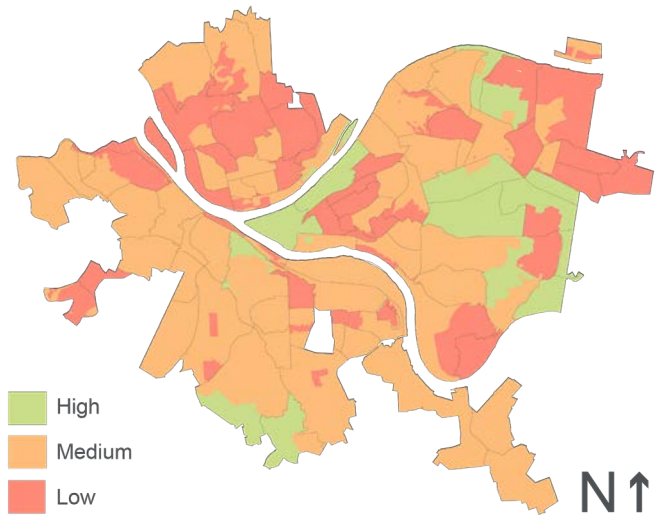


Figure 6: SWPA Connectivity Adoption and Equity Index for the City of Pittsburgh

The Rural-Urban Divide

Broadband access and coverage are clearly tied to population centers. Despite this, many people are left out in cities where service is available. Further, it's important to note that even relatively high index scores often fall short of the recommended 100/20 (100 Mbps download/20 Mbps upload) speed for broadband.

Urban areas have greater speeds and provider choices in general, but with larger populations the network must carry a heavier load. In cities, a large number of people are uploading and downloading data within a small area at any given time. Even a small, localized outage may have a massive impact on many people. In rural areas, poor coverage is an issue but must also be weighed against population. There are large swaths of rural and agricultural land where few people reside, and while broadband is a goal for everyone, the means of delivery may be targeted when few people are affected. Regionally, inconsistent connectivity scores exist in suburban and small town centers which supports the need for targeted infrastructure projects and ubiquitous programs to support adoption, digital literacy, and affordability.



LEARN MORE

More details about each county and for the City of Pittsburgh are available in Appendix A: County Profiles.

Identifying Connectivity Opportunity Areas

The two Indices described above furthered the analysis in disparity of connectivity access in the region. Through identifying and evaluating access based on coverage, speed, and affordability available to rural, suburban, and urban populations in comparison to demographic and socioeconomic conditions, several key areas were identified. These areas are designated Connectivity Opportunity Areas (COAs) and have been identified in each of the 10 counties and the City of Pittsburgh.

The COAs are used as the equity component in the project analysis and prioritization process for future connectivity project development efforts. The COAs are also areas where incentives, such as streamlined permitting and tax credits, may have the biggest impact in spurring high-speed connectivity deployment.

Different data factors were used to represent the COAs for the Broadband Access and the Adoption and Equity Indices. The Broadband Access COA results factored in fixed and mobile broadband speeds, provider availability, and FCC Rural Digital Opportunity Fund locations throughout the region. The Adoption and Equity COA results took into consideration home internet pricing affordability and Federal Opportunity Zone locations, along with household, age, and race population internet connectivity variables. Both Indices also included Environmental Justice and Title VI data factors to identify COAs in the region.



AVAILABLE RESOURCE

The Connectivity Indices can be used to evaluate and prioritize projects. The COAs are areas, identified through use of the indices, which have high scores and show a strong need for better access, more equitable access, or both. This data is available within each Index Dashboard at:

www.spcregion.org/connected

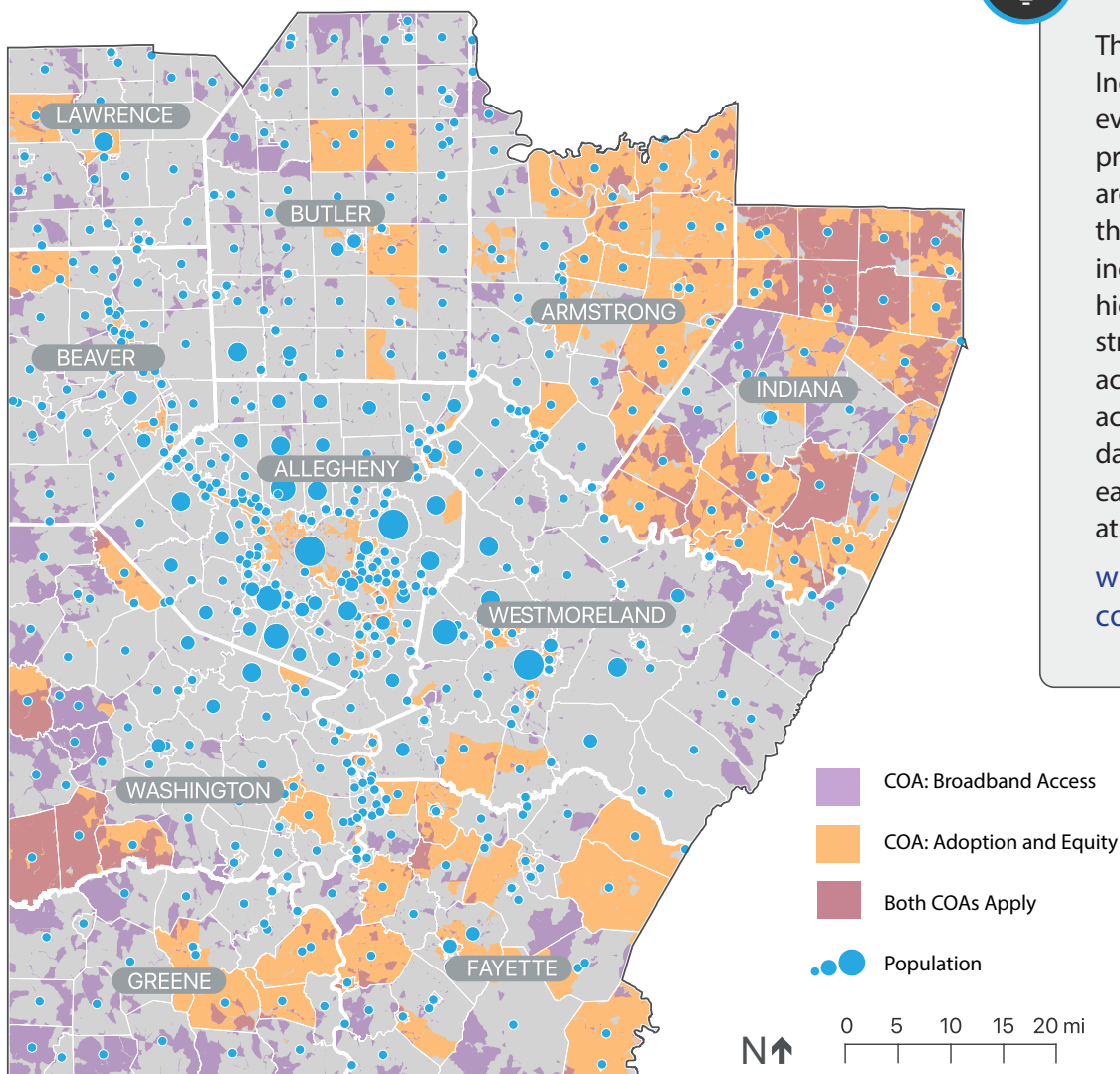


Figure 7: SWPA Connectivity Opportunity Areas, per the Connectivity Indices



Goals for a Connected Future

A Regional Vision

The southwestern Pennsylvania region will collaborate to invest efficiently and equitably in high-speed internet networks and programs that are available, accessible, and affordable to all to ensure our region is connected and thriving socially and economically.

The vision for a more connected future for southwestern Pennsylvania illustrates the vast potential of high-speed internet to transform our lives across numerous industries and activities and spur new economic opportunities for all residents. As technology continues to advance, we cannot afford to allow our infrastructure to age and fall behind. The internet increasingly connects us to not only news and friends, but also job security, health services, education, and training to advance towards better opportunities, food, and more. Technology also improves workflows and reduces waste, from physical waste and pollution to wasted time. Smart technology applications are wide-ranging and can transform our lifestyles, but they require an underlying network capable of transmitting and processing real time data dependably and continuously.

The Regional Vision narrates how our region imagines its future with broadband infrastructure and connectivity prioritized.



Collaborative Goal Setting

Southwestern Pennsylvania has a long history of manufacturing and industry that supported economic prosperity. As the economy shifted and evolved into the 21st century, regional industries have continued to shape the landscape through innovation in technology. From robotics used for healthcare and autonomous vehicles, to green energy and technology aimed at refocusing the economy towards more sustainable products and jobs to support them, the southwestern Pennsylvania region has continuously shown a dedication to local jobs, local skills, and local prosperity. These technologies are constantly evolving and increasingly rely on broadband. Southwestern Pennsylvania must invest in broadband as the infrastructure for the future.

THE REGIONAL GOALS provide a **framework for each county, municipality, or partner** to situate themselves within regional efforts and **identify strategies** to build upon.

HOW WERE GOALS ESTABLISHED?

State and Regional Expert Guidance

This Connectivity Roadmap was prepared with the involvement and expertise of a highly knowledgeable Steering Committee. Leaders in technology, innovation, industry, economic development, and broadband issues at regional and state levels guided the development of goals and strategies that respond to existing programs, meet documented needs, and build upon available funding sources.

Participation from Local Leaders

The development of the Connectivity Roadmap engaged stakeholders across the 10-county region to assess needs, gaps, and solutions in the development of a Regional Vision for broadband. In October and November 2021, a series of visioning workshops were conducted with leaders in local government, various industries, and communities. The outputs from these workshops form the basis of the vision and goals for the future of broadband connectivity in the region, and the applications of high-speed internet to support and improve the activities and quality of life for residents.

Public Engagement Throughout the Region

Public engagement was a key part of the planning process using digital and in-person engagement tactics. A public survey was conducted to measure levels of service across the region and user accessibility. The responses complemented the numerous ideas shared by state, county, municipal, community, and nonprofit stakeholders during the workshop series, and helped to refine and prioritize goals and strategies that address the needs revealed through the survey results. A series of in-person meetings were also conducted across all 10 counties in accessible locations such as libraries and town halls.

Best Practices

These goals and strategies are also informed by other case studies and example projects and programs implemented across the nation.

Challenges to Overcome

Physical Barriers



There are gaps in infrastructure, and service is not available in some areas of southwestern Pennsylvania. There is a lack of providers and few financial incentives for ISPs to connect rural areas in the state. In addition, some locations have dated infrastructure that cannot handle the bandwidth needed and the state's rolling topography creates issues with connectivity. Beyond the physical infrastructure, there is also a need to expand access to equipment like computers and increase digital literacy so that people have meaningful access once they are connected.

Awareness & Understanding



There is a need for public outreach and education on what broadband internet services are, what options exist, and how to compare value in the market. To that end, many are unfamiliar with technical terms and jargon and how it relates to their services and costs. There is also a general lack of knowledge about ISPs and their role in providing services. Digital literacy is low among seniors, those with disabilities, English as a Second Language speakers, and immigrants, creating barriers to success for these groups. Privacy and security concerns create hesitancy that may be reduced through education on how to be safe online and how to protect personal identifiable information when accessing and utilizing the internet.

Securing Funding



The development of clear and concise channels of communication and governance between governments including county, regional, and state should be established for funding opportunity communication, grant processes, and fast, equitable distribution of funds. In addition to the collaboration on funding efforts, an effort should be made to develop a consortium between service providers, academia, school districts, library systems, and community institutions at the county and municipal levels to assist in closing the digital divide.

Affordability

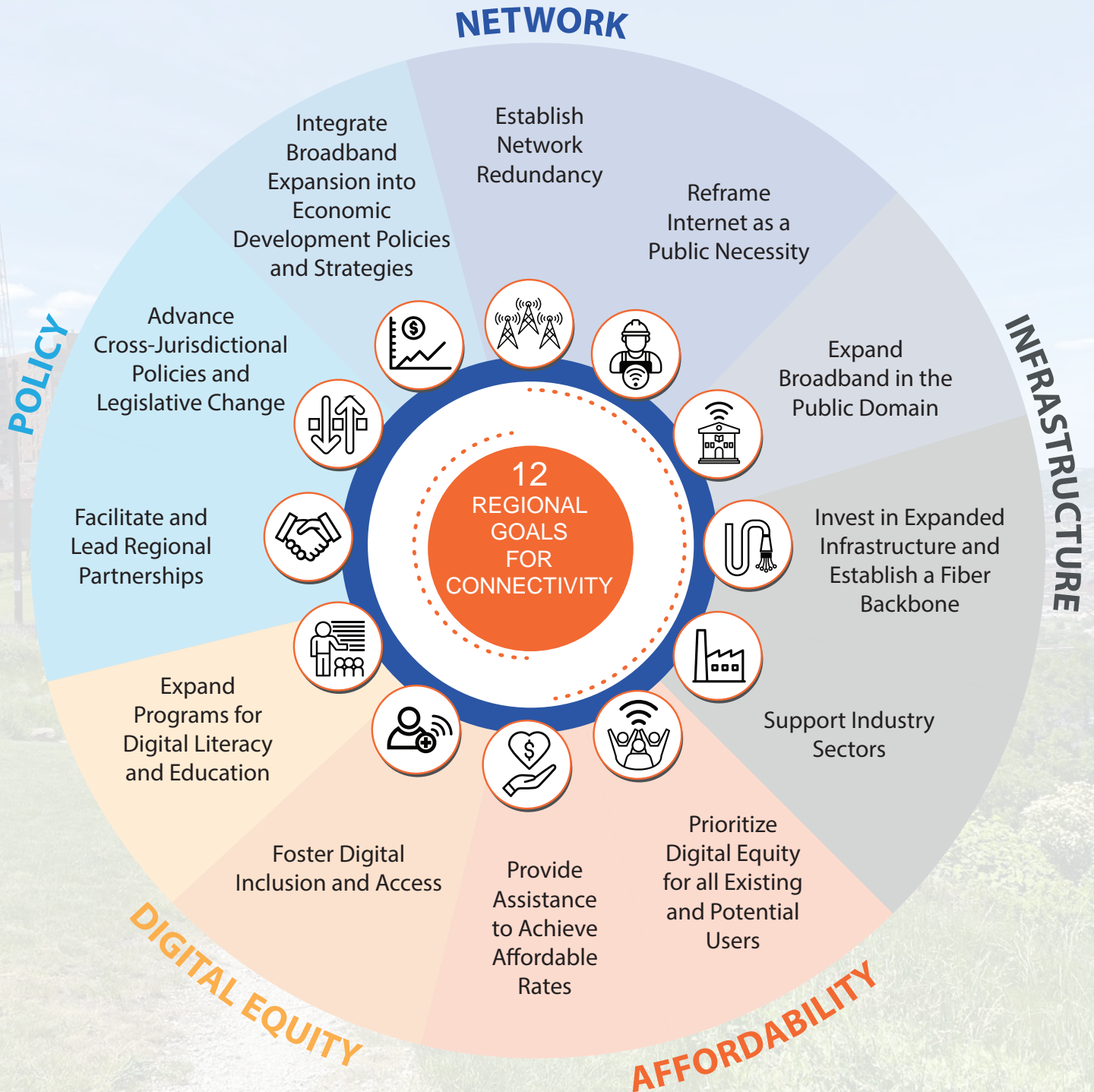


There is a clear distinction that low-income homes and families are disproportionately affected by lack of connectivity. In addition, these individuals may be blocked from receiving services if they fall behind in payments to service providers. Lower-cost services tend to have slower speeds and do not provide the necessary bandwidth needed for teleworking, job searching, telehealth or online education. Connectivity itself is not the only affordability barrier; the cost of computers and associated hardware can also be prohibitive.

Goals and Strategies to Improve Broadband Connectivity

Out of all the collectively shared and discussed issues and ideas, a series of major themes emerged as primary community-backed goals. In order to achieve the Vision and continue to promote innovation and community quality of life, clear patterns were identified from the ideas and knowledge shared throughout the Roadmap process. These patterns were organized into goals.

These 12 Regional Goals for Connectivity include comprehensive strategies to achieve the Regional Vision. Each goal is central to the Regional Vision for a connected future.





GOAL

Establish Network Redundancy

As technology continues to advance and smart devices allow more efficient and connected workflows and lifestyles, internet reliance will become even more embedded in our daily lives. A connected lifestyle requires an energy source to power the increasing number and type of devices we use. A smart phone that is not charged cannot look up a bus schedule or place an order for food. Of even greater concern, a short internet outage can be catastrophic as our daily activities are conducted online. For example: during an outage, contacts and online documents will be inaccessible, smart vehicles and emergency services will lose access to their navigation systems, and calls will not be able to be placed to 911 or elsewhere. Network redundancy acknowledges that our region wishes to increase resiliency and anticipates ways to strengthen our energy grid and build redundancy into each level of the communications system.

STRATEGIES

1

Assist counties with needs assessments to analyze where emergency vehicles experience poor connectivity and identify opportunities where equipping vehicles with hotspots will support more continuous emergency response.

2

Include solar-powered charging stations in new broadband infrastructure projects to build redundancy in the energy network and enable advancements in smart technology (devices and equipment) that will use the expanded connectivity network.

3

Require that all transportation and development projects, where appropriate, consider sustainable charging and ample available electrical charging outlets to qualify for funding in anticipation of increasing reliance on internet usage and smart devices.

4

Pair investments in fiber that will provide long-term efficiency and capacity in urbanized areas with cell towers in low density areas that will fill gaps and provide complete coverage to advance the fiber network. Allocate broadband funding equitably between fiber and cellular using the Roadmap's project evaluation rubrics to gauge needs met.

5

Collaborate with schools, libraries, and community organizations to make hotspots available on loan as a short-term option to expand access to low-income areas.

6

Embed redundancy in material and equipment investments by investing in generators and battery backups for critical locations serving a public interest, including medical centers and shelters.



GOAL

Reframe Internet as a Public Necessity

The past century has seen a massive expansion of infrastructure, accompanied by an evolution of ownership and management approaches. Our transportation network has evolved into a fully public system of roads and highways, owned and managed at local, state, and federal levels with departments created to oversee them. Water, electricity, and heat are viewed as public health issues and access to them is protected through various laws and assistance programs. High-speed internet has not yet been elevated to the same status, and although subsidies do exist, it is not treated as a public necessity. Landlords do not have to guarantee access to internet, public buildings do not have to provide it, and there is no governmental entity to oversee and enforce its accessibility. The Regional Vision clearly articulates a desire for broadband to be expanded into the public domain through public policy and public funding.

STRATEGIES

1

Create a regional entity to oversee, catalog, and provide a centralized hub for planning and funding coordination for the southwestern Pennsylvania broadband network, modeled after the duties and approaches of regional transportation planning organizations.

2

Conduct a public service campaign with targeted messaging to increase awareness and build advocacy for broadband as a public necessity.

3

Acknowledge that regionally accessible broadband is not profitable in itself, analyze the social and economic benefits to capture the true value, and publish annual economic impact reports on the value generated by county in order to justify investment.

4

Identify available sites that are ready or near ready to accommodate fiber expansion in unserved areas, focusing on opportunity sites and areas with the highest rates of no service per square mile.

5

Set a regional definition of broadband with future applicability (i.e., 100/20 Mbps or as determined appropriate) that will be used as the bar to judge and measure all broadband programs and projects approved and funded regionally.

6

Identify gaps in the regional broadband network and prepare an inventory of land acquisition status and needs, including land banking critical parcels, documenting land ownership and identifying acquisition approaches, and documenting permit requirements per area.

7

Using the annual economic impact of broadband reports (in Strategy #3), explore options for development impact fees levied on new business growth or establishment to tax economic growth for its use of or impact on publicly funded broadband infrastructure.



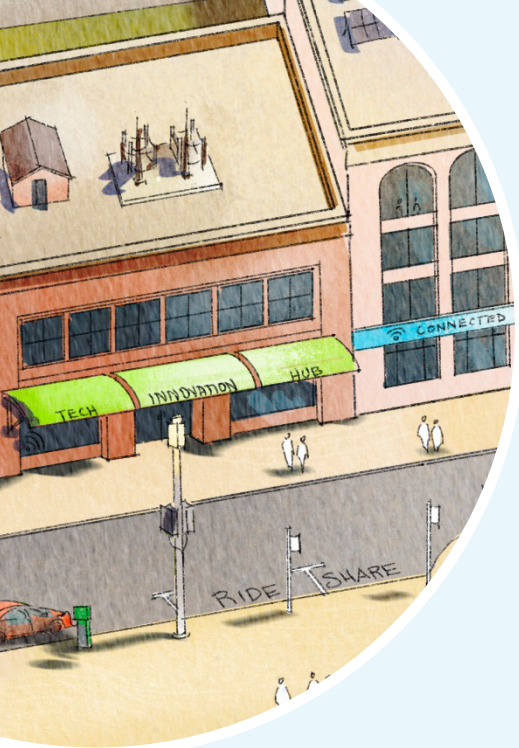
GOAL

Expand Broadband in the Public Domain

Following up on reframing broadband as a public necessity, the Regional Vision imagines high-speed internet being made available within the public realm. Public buildings and spaces should consider providing internet as they provide light and water. Building publicly accessible internet networks will make access more equitable and affordable while supporting expansion of the network and smart technology through cities and towns, without requiring individual home service plans. Live data tracking for food banks and emergency services, or mobile application of benefits towards bus fares, are a few examples of how equitable public realm broadband will enable our region to excel and lead in technology and innovation.

STRATEGIES

- 1 Create a grant program and application guide for community centers, religious institutions, and Registered Community Organizations (RCOs) to provide free Wi-Fi within publicly accessible shared spaces, potentially through the use of mesh networks.
- 2 Create a database of potential “community connectivity anchors,” including libraries and public institutions, and highlight those with poor or lacking internet access to prioritize network expansion projects in these locations.
- 3 Provide public Wi-Fi in community spaces in remote rural areas to bring accessible and affordable connectivity within 5 miles of residents where gaps in the network impede reliable home service.
- 4 Invest in community-wide Wi-Fi in urbanized neighborhoods with high rates of poverty and transient and/or unhoused populations to provide connectivity throughout public spaces and within residences.
- 5 Invest in public Wi-Fi in public parks to establish continuous coverage that enables smart technology advancements, and continuous connectivity including access for private users, smart vehicles and related technology, emergency systems, and more.
- 6 Partner with school transportation services and transit authorities to provide funding and resources for public Wi-Fi at transit stops and on board vehicles to establish continuous coverage that enables smart technology advancements and continuous connectivity, including access for private users, smart vehicles and related technology, emergency systems, and more.
- 7 Partner with community anchor institutions, including libraries, to provide funding and program assistance for high-speed internet access onsite and access to devices.
- 8 Prepare public education campaigns to educate users on privacy and security practices when using public Wi-Fi networks. Include best available security measures where possible in public networks, prioritizing those intended for indoor community use (such as libraries) that support an expectation of privacy.



GOAL

Invest in Expanded Infrastructure and Establish a Fiber Backbone

Building the infrastructure to reach every household and every business across the region is a clear goal. Providing high-speed internet service begins with the infrastructure to deliver it, and many gaps exist in our region. Fiber is a priority for fixed networks. This Vision proposes including fiber in other infrastructure projects to maximize efficiencies in construction and maintenance and to utilize available rights-of-way. Providers and local government can partner together along "smart corridors" to provide shared space for fiber and 5G infrastructure that multiple providers can use, creating a strong backbone of middle-mile service through each county. A continuous backbone is also essential to advancing the use of Connected and Autonomous Vehicles and transforming our region's mobility options. Partnering with transportation and utility departments and companies to share resources and colocate broadband, road, and electric networks where possible will make infrastructure projects more efficient to build, operate, and maintain across each sector.

STRATEGIES

1

Continue work with providers to identify topographic "dead zones" and blockades that impede signal transmission, gauge future expansion against topography, and share data to identify ideal locations for efficient and maximal reach for future cell tower placement.

2

Explore opportunities to invest in fiber infrastructure along KINBER's PennREN fiber network to improve access to broadband to rural communities along the network.

3

Partner with the Pennsylvania Turnpike Commission as they complete a fiber backbone along the Turnpike and connect branches from the fiber network into adjacent communities that maximizes the reach of existing infrastructure.

4

Partner with PennDOT and local roadway owners to install fiber, where appropriate, in road/bridge improvement projects where there is already utility work being performed to maximize efficiencies.

5

Partner with PennDOT and municipalities to identify a network of state and local routes to use for "smart corridors." Invest in both fiber infrastructure and small cell technology along these corridors that will use public rights-of-way to accommodate multiple provider networks and extend middle-mile service along major public routes throughout all 10 counties. Plan extra capacity for future providers and/or technologies to be accommodated.

6

Work with state governmental entities and authorities to support the development of a statewide infrastructure network plan for a "state fiber backbone" that maximizes efficient use of available networks, streamlines regulations to facilitate fiber expansion and reduce costs in rural areas, identifies opportunities to share resources, and assigns partnerships to address missing last-mile gaps through appropriate means.

7

Promote public-private partnerships (P3) that rely on private industry to build and maintain a backbone of fiber infrastructure and assign public entities to sponsor or own the missing or last mile(s). Continue to advance the Connectivity Roadmap's ranking system to quantify the impact of network expansion into un- or under-served areas based on households served, cost per user, and socioeconomic growth factors in order to identify projects as a priority (ranked by high to low impact), or P3 sponsorship priority (ranked by high to low impact).

8

Prioritize investments with long-lasting functionality that will offer 100/20 (100 Mbps download and 20 Mbps upload speed) for all projects.



GOAL

Support Industry Sectors i.e., Transportation and Agriculture

Residents understand the value of internet on daily activities in work, school, entertainment, and socializing but do not always realize how much smart devices and technological advancement drives other sectors as well. Regional and local leaders must understand how broadband intersects with and supports efficiencies and innovation in transportation, agriculture, and other industry sectors. Pittsburgh is a hub for developing and testing Connected and Autonomous Vehicles (CAVs), but smart technology applications in transportation are more wide-ranging than that alone: real-time traffic data can improve road utilization and safety, improve public transportation reliability by allowing accurate bus schedule tracking, allow curbside management programs that allocate road space to different uses by time of day, and more. Agricultural businesses benefit from self-operating equipment, sensors to monitor food freshness, real-time data sharing between suppliers and buyers to efficiently deliver food in needed quantities, and more. Broadband investments in the region also support cutting-edge technologies, robotics, and modern equipment that will enable our industries to be leaders in the nation and drive economic growth and prosperity.

STRATEGIES

1

Promote smart growth land use patterns in southwestern Pennsylvania counties and municipalities to ensure that infrastructure investments, from fiber and cellular to roads, transit, and land use are efficient and complementary.

2

Factor smart land use into planning efforts and require a comprehensive land use approach that includes broadband connectivity infrastructure, with fiber for all new housing and industrial development.

3

Add broadband connectivity requirements to transit-oriented development (TOD) policies and prioritization to promote efficient land use around infrastructure.

4

Invest in network expansion to and around areas with high farming and agricultural activity to allow continued technological advancement and modernization of the industry to stay competitive.

5

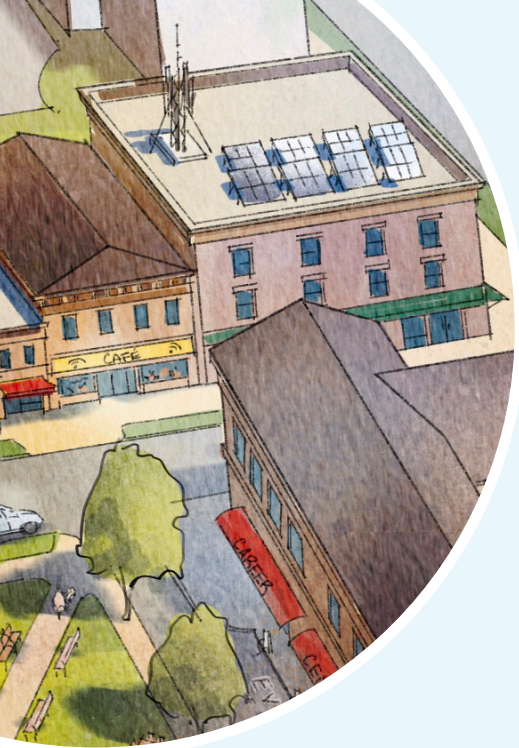
Partner with EMS, transit authorities, and PennDOT to promote and prioritize investments in smart data tracking throughout public transportation vehicles, stoplights, and other transportation equipment, which can also serve to future-proof a comprehensive network of coverage along roadways and enable increased use of CAVs.

6

Partner with EMS and transit authorities to promote and prioritize investments in Wi-Fi hubs, which serve each user, and extend the network to support smart data tracking across emergency and transportation services.

7

Invest in micromobility hubs (dedicated spaces that include sustainable mobility solutions, such as e-bikes, e-cargo bikes, and e-scooters onsite), with Wi-Fi in small town and residential neighborhoods as a means for providing improved connectivity alongside transportation options.



GOAL

Prioritize Digital Equity for all Existing and Potential Users

At the core of inclusion and literacy goals, there is a desired outcome of digital equity. Broadband access directly impacts economic mobility: resources available online connect users to greater job markets, permit flexibility to work from home, support the freedom to make individual choices about personal health and safety, and open up a variety of training and educational opportunities. Increasing dependence on technology and online systems drives the growth of a new workforce sector to manage, monitor, and maintain everything from websites and devices to the innovative software and data tracking tools they may employ. Southwestern Pennsylvania must connect marginalized communities to these opportunities and ensure that workforce education and development is created and implemented equitably. Every resident who wants a better future for themselves should be able to benefit from the digital economy.

STRATEGIES

1 When assessing household internet usage and need, continue to incorporate questions in public surveys on number of users and their anticipated internet needs (i.e., school, work, gaming, medical visits, streaming, etc.), to evaluate the internet speed and capacity that will best support the household's internet usage needs and respond to the diverse and changing needs of different household types.

2 Invest in programs for workforce development and training that includes digital skills that position workers to qualify for virtual jobs across the region with English as a Second Language (ESL) services included.

3 For organizations and entities that provide remote learning opportunities and/or any services that require a stable and consistent internet connection, provide a standardized, multilingual digital access survey that will provide information on a household's ability to access the internet. The access survey will at a minimum ask about internet service in the household, number, type of devices available, and monthly internet costs.

4 Partner with existing community and immigrant organizations to translate documents on existing and new broadband programs and resources in multiple languages.

5 Partner with existing community and immigrant organizations to create and/or expand digital navigation services offered in multiple languages to provide live technical support and training for internet access and use.



Digital Equity is a condition in which all individuals and communities have the information technology capacity needed for full participation in our society, democracy and economy. Digital Equity is necessary for civic and cultural participation, employment, lifelong learning, and access to essential services.

Source: National Digital Inclusion Alliance



GOAL

Provide Assistance to Achieve Affordable Rates

Costs for high-speed internet vary widely across southwestern Pennsylvania, even though there is little connection between the rates charged and the speed or reliability of service. In fact, there is a correlation between higher rates and less reliable service in rural areas. In some of the least densely populated parts of the region, users pay for cell service that they can only use in some parts of their town and home service with slow speeds and frequent outages. Across the region, users struggle to afford all the costs associated with accessing the internet, from service plans and devices to installation fees and unexpected data fees. If southwestern Pennsylvania truly wants to ensure that all residents have access to the tools, benefits, and opportunities available online, we need to also invest in making this access affordable to all.

STRATEGIES

1

Advocate, potentially through ongoing research, for housing authorities to reclassify internet service as part of basic services and include it within the utility allowance.

2

Explore ways and resources to structure internet service as a public utility with low and affordable costs.

3

Partner with senior facilities to provide technical assistance and grant support to enhance connectivity at the facilities.

4

Support a grant system and seek partners with capacity to manage potentially nonprofit entities, and to provide financial sponsorship to reduce up-front fees related to establishment of service (i.e., the initial installation and device fees of first hook-ups in households), at or below 130% of the poverty line, or that have a demonstrated need.

5

Partner with community organizations and social services to promote existing programs such as the FCC Affordable Connectivity Program.

6

Advocate for providers to reduce costs for customers, prioritizing areas with average monthly costs over \$80/month, through such means as business incentives, customer rebate programs, and public-private cost sharing.

7

Support initiatives and/or policies that would provide housing authorities with free Wi-Fi in and around their properties, focusing first on properties with high populations and high rates of poverty.

8

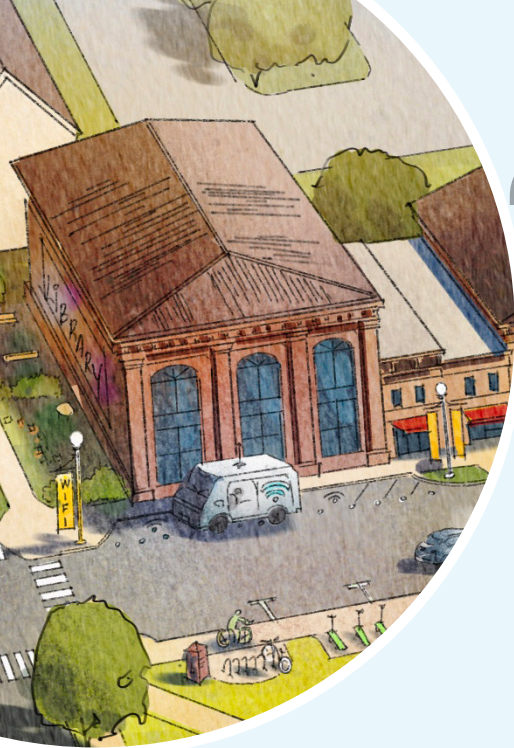
Establish a watchdog group or hotline to manage customer complaints and advocate for clients with repeated service outages or insufficient service that fails to meet the threshold paid for.

9

Seek reliable funding to support a regionally available cellular plan with affordable cost for households at or below 130% of the poverty line.

10

Seek reliable funding to support affordable prices for fixed internet service, which may be an assistance program to cover partial costs in areas where average cost exceeds \$80/month, to be determined by county.



GOAL

Foster Digital Inclusion and Access

The prioritization of digital inclusion acknowledges the unequal dispersion of resources across the region and commits to seeking balance through future investments. Southwestern Pennsylvania must take steps to connect broadband service, programs, and literacy initiatives equitably and inclusively so that no one is left behind. The needs differ in each county and in different demographic groups. Middle mile and last-mile infrastructure projects have left out many rural areas where low household density does not generate enough profit for private companies to expand. Programs and subsidies that are advertised online or accessed online automatically exclude those without reliable access, while geographic or demographic qualifiers exclude others. Digital inclusion is easy to value, but difficult to implement and maintain because it requires ongoing effort to assess the reach of every provider, service, and program. Future investments should be prioritized based on how well they address gaps and inequalities in access to internet service and related programs, include plans for how they will measure success, and provide sustainable funding to continue inclusive access in the long term.

STRATEGIES

1 Identify opportunities to close middle-mile and last-mile connectivity gaps across the region. Create a strategic plan aligned with funding resources and an implementation timeline to address last-mile connectivity gaps. As part of the strategic plan, evaluate the ability of local and/or regional governments to play an active role in making the last-mile connection.

2 Ensure that evaluations of broadband access and planning account for users who may exclusively access the internet on their mobile devices and the unique needs they may have. Establish a performance framework for evaluating the impacts of proposed broadband policies and programs on mobile device users and those who access the internet via their mobile devices.

3 Work alongside higher education providers to evaluate annual budgetary needs to support digital inclusion and digital access for all students and staff.

4 Evaluate opportunities for establishing a "Wi-Fi on Wheels" program similar to what is provided by the Pittsburgh Housing Authority and identify the resources, staffing, and funding needed to create a program that could serve the entirety and/or a subset of the 10-county region. Sponsor a vehicle outfitted with Wi-Fi and laptops that travels to various locations to provide connectivity and devices.

5 Partner with English Language Learning (ELL) programs across the region to support device distribution to students to allow them to connect to their classes online and remotely.



Digital Inclusion refers to the activities necessary to ensure that all individuals and communities, including the most disadvantaged, have access to and use of information and communications technology:

1. affordable, robust broadband internet service;
2. internet-enabled devices that meet the needs of the user;
3. access to digital literacy training;
4. quality technical support; and
5. applications and online content designed to enable and encourage self-sufficiency, participation, and collaboration.

Digital Inclusion requires intentional strategies and investments to reduce and eliminate historical, institutional, and structural barriers to access and use technology.

Source: National Digital Inclusion Alliance



GOAL

Expand Programs for Digital Literacy and Education

Digital literacy is an expansive topic that covers the many ways that users fail to benefit from available internet resources due to lack of skills and knowledge. For some people, navigating provider websites and understanding the terms within service plans is itself a challenge; as a result, they pay extra costs or fees they do not understand. Others do not have enough web familiarity to know how to check out books, pay bills, or research services online. Understanding how to secure personal accounts and information is a huge barrier that keeps some users afraid of using the internet and costs others when their data is stolen. Jobs more and more often require basic web skills to do the work and sometimes even to apply, so digital skills are an entry point to the workforce. The Vision for a connected southwestern Pennsylvania recognizes that having internet access is not enough – we must also invest in educating residents on how to use it through robust digital literacy programs and offerings.

STRATEGIES

1

Prepare an awareness campaign about available programs and technical solutions such as home mesh networks to boost signals. Target the campaign towards seniors and residents of older buildings (built before 1970), and provide educational resources and links to help them maximize connectivity through currently available methods.

2

Prepare an awareness campaign around internet security and provide educational resources to assist people in securing their privacy online.

3

Partner with state agencies and aid organizations to identify common services (such as job applications, vehicle registration, unemployment application), that favor internet access and provide application assistance through digital navigator programs offered in-person or by phone.

4

Support the creation of a digital navigator library system, in partnership with libraries, senior centers, and/or other entities, to offer technical support, resources available to be checked out, and computer training for free.

5

Partner with senior centers and senior organizations to create senior connectivity hubs that provide internet access and accessible devices, for ownership or as loans, in locations frequented by large senior populations.

6

Partner with local organizations to provide and promote computer skills for all ages, including courses offered through schools, libraries, community centers, and senior organizations as well as online resources.

7

Seek reliable funding to support affordable prices for fixed internet service, which may be an assistance program to cover partial costs in areas where average cost exceeds \$80/month, to be determined by county.



Digital Literacy is the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills.

Source: National Digital Inclusion Alliance



GOAL

Facilitate and Lead Regional Partnerships

The expansion of broadband infrastructure and services involves many entities who must coordinate and work together to build out the network completely and efficiently. Pairing broadband projects with existing infrastructure requires strong partnerships between different owners, systems, and service providers. If broadband is to be treated as a public utility and government assists in ensuring service, there are further partnerships to build between public and private entities. It is not currently profitable for private companies to expand broadband in areas with few households or challenging and expensive site conditions. The Vision of comprehensive coverage across the region will require strong and clear partnerships that bring multiple sectors together to collaborate and share resources.

STRATEGIES

1

Set private industry standards for providing services fairly and sustainably, for example, requiring ongoing maintenance plans, transparent pricing, accurate data sharing, and sustainable funding sources, and apply these standards as a qualifier for allocating public funds and selecting partnerships with providers.

2

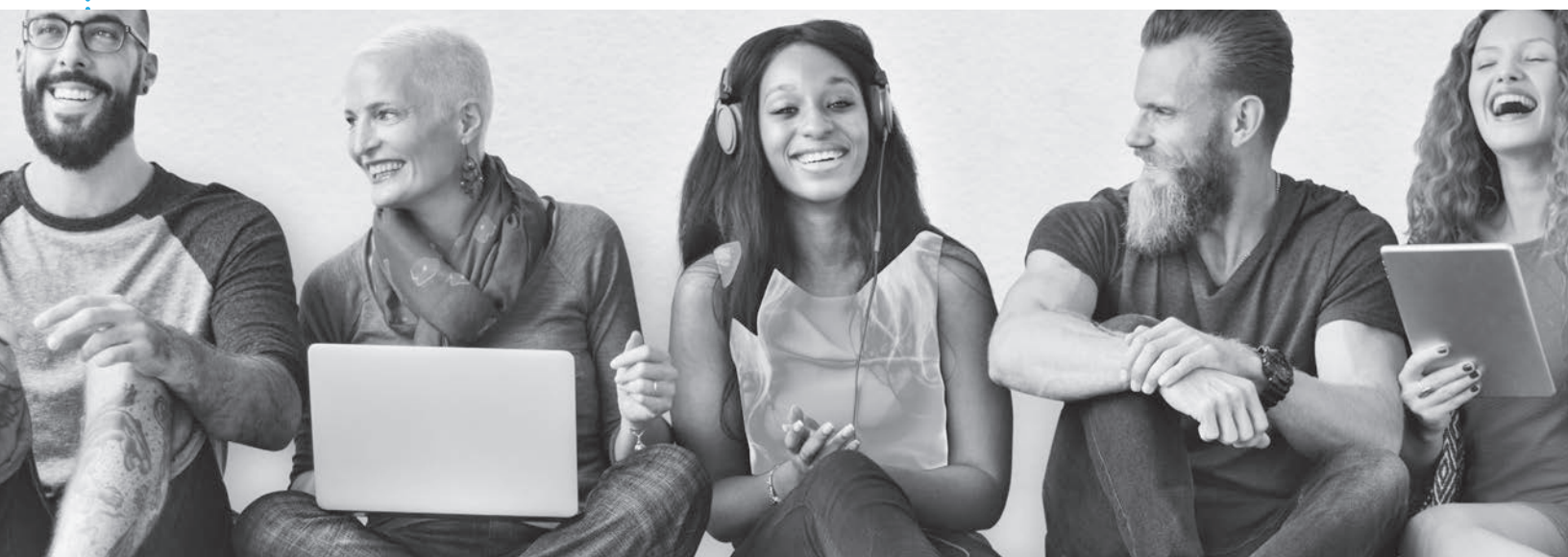
Explore ways to generate competition, such as incentives for providers to expand in areas with single-provider service.

3

Anticipate market constraints and supply chain barriers by planning in advance and ensuring that project timelines include the flexibility to accommodate a year of acquisition time without adversely impacting funding, construction, or other project constraints.

4

Facilitate collaboration between fiber, cable, wireless internet service providers (WISPs), and middle-mile backbone providers by hosting a provider working group via regular, quarterly collaboration sessions and a shared contact list that enables communication and mutual familiarity amongst providers.





GOAL

Advance Cross-Jurisdictional Policies and Legislative Change

The internet does not stop at county or state boundaries, yet these boundaries do define governmental funding and regulatory arms. By working alone, counties and municipalities within counties often struggle to have the necessary staffing, resources, and skill sets to implement the projects they wish to see or even navigate all the steps to identify what those projects should be. This Connectivity Roadmap is a first step towards equipping the counties with the tools to proceed, but more steps should follow to facilitate projects and programs across jurisdictional borders. Whether it is modernizing smarter land use policies that enable broadband infrastructure and new technology, streamlining multi-municipal projects, or developing clear policies for ISPs to follow in ensuring a fair market, our region needs to continuously understand the limitations embedded in our own policies and strategically work to pursue legislative changes that enable the land use, infrastructure, and fair access outcomes desired in the Regional Vision.

STRATEGIES

1

Collaborate with providers and counties to create a resource sharing portal that provides data and mapping, implementation guides and templates, and facilitates shared labor and investment across county lines, including guides for streamlined applications, zoning ordinance examples, best practices, and more.

2

Host a provider roundtable annually to assess regulatory burden, acknowledge the fast pace of technological change, identify excessive barriers that keep providers out of the market, and advocate for legislative changes to remedy the issues.

3

Advance the Small Wireless Facilities Deployment Act (PA Act 50 of 2021) by preparing a zoning tool kit focused on allowing 5G in communities, which includes materials to educate local officials on common barriers and needs as well as templates for preparing and passing modernized ordinances.

4

Explore and determine the best format or mechanism (Council of Governments, nonprofit, etc.), to give a voice to municipal collaboration, whether created within SPC or externally, that enables municipalities to engage in shared negotiations with providers.

5

Develop a regional broadband working group across the southwestern Pennsylvania counties to coordinate and advance access, affordability, and awareness across the region.

6

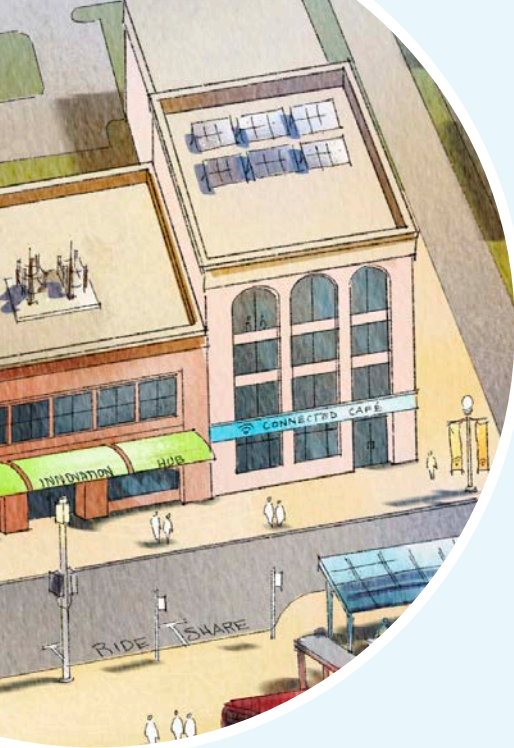
Collaborate with Regional Planning Organizations in West Virginia and Ohio to advance interstate policies to facilitate shared resources and labor for municipalities on borders and throughout Pennsylvania.

7

Work with legislators to create fair access regulations to apply to ISPs, paired with incentives and funding support, to mandate that ISPs provide reasonable and fair access in rural areas and provide clear means for ISPs to achieve this goal.

8

Promote legislator awareness of regulatory burdens, timetable and cost standards, and deployment processes in order to educate officials on the steps involved and provide the tools and knowledge for them to simplify and streamline their processes.



GOAL

Integrate Broadband Expansion into Economic Development Policies and Strategies

The previous goals make it clear that broadband access and expansions will have ripple effects throughout the workforce and throughout all sectors of the economy. In the near term, broadband-related construction creates jobs. New types of infrastructure will give rise to a new set of jobs to maintain them, and digital systems that grow and thrive in a region with reliable high-speed connectivity will give rise to new jobs in software, data management, operations, and more. As an example, the use of self-driving tractors in agriculture supports new jobs to design the tractors, manage and track the routes within a farm, and service the tractors when maintenance is needed. Investment in infrastructure is always expensive, but the economic impact can be transformational and lead to sustainable new sources of revenue and job creation. Southwestern Pennsylvania should anticipate and quantify the economic value of broadband investments to maximize each project's potential to spur growth in the region and to accurately portray to residents and to leaders the true value of broadband investments. Incentivizing strategic efforts to digitally connect the whole region will position the counties to excel in the new and emerging economy.

STRATEGIES

1

Include broadband access and availability in the evaluation of local and regional economic development strategies and evaluation tools. Assess if certain areas have been more impacted than others in the region. Consider key factors such as cost of living, internet availability and cost, and diversity of workforce.

2

Conduct a regional study on remote work with a lens on potential economic development impacts.

3

Assess broadband expansion opportunities in the newly adopted federal infrastructure bill (IIJA) in each of the 10 counties and the City of Pittsburgh. Create a funding matrix that delineates who can apply for funds and how, what the funds can be used for, and how success is measured.

4

Perform a regional cost-benefit analysis of impacts on expanding connectivity and making middle-mile and last-mile connections and publish results to support the economic value of broadband.

5

Work with economic development organizations and local governments to create several tiers of tax incentives, with varied quantities and time limitations, to make available to businesses, developers, and utility companies that expand broadband in rural areas that meet qualifying standards based upon industry standards and project impact.

6

Assist counties and municipalities in offsetting costs involved with ongoing maintenance to encourage private investment in places that present high financial risk, by providing direct subsidies, guidance on financial mechanisms available, and technical assistance for grant applications to seek external funding assistance.

7

Support small businesses in expanding their potential through technology. Conduct a survey to gauge use and understanding of online ordering and payments and prepare a strategy guide for small businesses to maximize their use of internet services.

Advancing the Roadmap Together

Out of the many strategies formulated under the 12 Regional Goals, there is substantial work to be done in collaboration with a wide range of partners. In pursuing and implementing these strategies, SPC may play the role of lead, partner, or advocate. It is expected that the work to be done far surpasses the capacity of SPC alone. As reflected by the collaborative process that created the Vision within this Roadmap, the goals are intended to guide SPC, the counties and city, service providers, nonprofits, and funding partners.

Lead

Broadband access needs and experiences cross boundaries. Ensuring consistent, reliable service means addressing gaps and needs from a shared public viewpoint rather than expecting providers to individually meet the needs. Leaders can help advance regional goals and strategies by acting as a manager:

- Be the connecting force to gather partners and lead their collaboration
- Direct funding sources, and provide funding application support
- Own and manage shared data and research
- Coordinate with, or potentially act as, a regional entity that leads in the planning and programming of regional broadband initiatives in coordination with the 10 counties

Partner

Our region has substantial resources already available or underway through a host of dedicated partners. Goals and strategies that involve program implementation or project construction will often be most suitably led by a partner, be it a service provider, institution, or other. Partners can act as a coordinator and instigator:

- Provide direct funding and resources
- Provide staffing to pursue and gain indirect funding and resources
- Gather and share data and data analysis to support projects
- Provide seed funding or initial staff efforts to begin multi-partner projects
- Support the Commonwealth with lessons learned from the region to promote efficient implementation of statewide projects and programs
- Support counties with the development of grant applications, including letters of support and in-kind labor commitments

Advocate

Some goals and strategies may be moved forward primarily by organizations whose missions encompass the efforts needed. In these cases, helping them access the resources and platforms they need is highly valuable. Advocates can apply their efforts at a regional, state, and federal level to draw attention and resources to projects within the region:

- Support legislative changes as needed
- Provide available resources, data, and research in support of projects
- Connect users to available resources, data, and research in support of digital literacy
- Connect potential partners and funding sources to empower them to equip themselves
- Serve as a central hub for educational materials
- Promote existing and future projects, programs, and services



Closing the Gaps: What We've Heard

Gauging the Reality of our Broadband Access

To ensure high-speed internet reaches the end users, understanding how people use and access the internet is crucial. The project team engaged residents and stakeholders from across all 10 counties and City of Pittsburgh to document their experiences with internet connectivity and the impact poor connectivity has in their communities.

Several public engagement tactics were deployed to inform the plan development including a regional public survey, a series of five virtual workshops, 17 in-person community conversations, and more than 25 phone interviews with industry leaders, ISPs and county planning directors. Individual experiences and recommendations provided invaluable quantitative and qualitative data to help in the development of the Connectivity Roadmap.



3,445+
Survey
Respondents



5
Workshops



17
Community
Conversations



25+
Interviews



THE SURVEY AIMED TO ASSESS:



PUBLIC ACCESS to required technology, equipment, and broadband service

PUBLIC ATTITUDES about broadband

BARRIERS TO ACCESS including technology, affordability, and desire to adopt

OPPORTUNITIES for future broadband access needs

PUBLIC SURVEY

To identify connectivity gaps and barriers and to understand current internet use trends and experience, a public survey was conducted to inform the needs analysis for equal access across the 10-county region. The sample of adult residents surveyed focused on communities and populations that are unserved or underserved by existing broadband infrastructure.

From November 2 through December 8, 2021, a total of 3,445 responses were collected through the online survey, an in-bound phone survey, and outbound survey calls. The survey was promoted by direct mail postcards to a sampling of identified unserved or underserved populations, press releases and media interviews, and a social media campaign organized by SPC, CMU, and Allies for Children. A social media tool kit was also distributed to a wide variety of organizations including those that serve vulnerable populations and older Pennsylvanians in the region.



The **HIGHEST** survey response rate was achieved following local news coverage. Several articles were published in the *Pittsburgh Post-Gazette*, *Indiana Gazette*, *Greene County Messenger*, and *Observer-Reporter*.



VIRTUAL WORKSHOPS

Leaders and institutions in each county are already investing in broadband connectivity and seeking solutions to close gaps. A series of five virtual workshops were held in late-October and early-November 2021 as a mechanism for residents and stakeholders to share local knowledge and experiences at the regional level and to brainstorm together.

Stakeholders were selected to represent a balanced cross-section of participation from across the region, with a diverse range of professions and expertise, and representation of community end users. This included representatives from:



Nearly 400 stakeholders were invited to participate in the virtual workshops to share their knowledge, help guide the region’s vision for broadband, build consensus amongst them, and enable them to become champions of the Vision and Roadmap for and within their communities. Each workshop followed a three-part series of discussion questions and gathered input about connectivity challenges and needs reflective of how people across our region use or struggle with high-speed internet in work, socializing, accessing services and programs, and more. In total, 88 stakeholders attended the workshops live, and all invitees received access to an online portal for collaboration and review of ideas gathered.

COMMUNITY CONVERSATIONS

From November to December 2021, 17 community conversations were conducted in the 10 counties to listen and hear from residents directly and enable conversation in-person and in a comfortable local setting. These events were open to the public and held at frequently used and accessible public locations such as libraries and community centers.

Residents were invited to engage in discussions on their own terms, share their experiences, and identify dead zones in their county where fixed broadband service does not exist or where mobile connectivity drops off. These conversations were extremely beneficial in understanding what residents want from their internet service. Many people spoke about the unreliability of currently available service and shared the many ways in which dropped calls or the inability to connect at different locations throughout their day impacts their daily activities.



A total of **123 INDIVIDUALS** attended the in-person conversations to share their broadband experiences.

Residents who attended these conversations also provided detailed insight into geographic challenges in their location and specific needs of people across many demographics, backgrounds, and lifestyles. The conversations explored what affordability and access mean to different people including small business owners, seniors on a fixed income, those who use internet to attend counseling, and those who rely on it to contact their families abroad.

READ THE COMMUNITY CONVERSATIONS REPORT:

See Appendix D or find it online at alliesforchildren.org

INTERVIEWS

One-on-one interviews were also conducted with eight ISPs, planning and economic directors of all 10 counties, and the City of Pittsburgh. Additional interviews were conducted with other statewide and regional agencies to best understand lessons learned related to developing broadband projects and programs. These interviews collected information about the regional and local industry perspectives on the current and future state of broadband in the region. The conversations covered county and industry broadband initiatives and projects, case studies and new approaches, shared resources, and ways to build or strengthen partnerships. They also provided updated data about existing service types and infrastructure.

Market Research Findings

While every county in the 10-county region participated, there was greater survey participation and therefore representation of residents in more populated geographies in the region. Demographic targets were set based on U.S. Census data to ensure results were truly representative of the residential populations in the region and their respective needs. In acknowledgement of the greater gaps in coverage and barriers that are present in counties outside of Allegheny County and rural areas in particular, promotional outreach, including phone calls and postcards, focused on zip codes with low Connectivity Index scores.

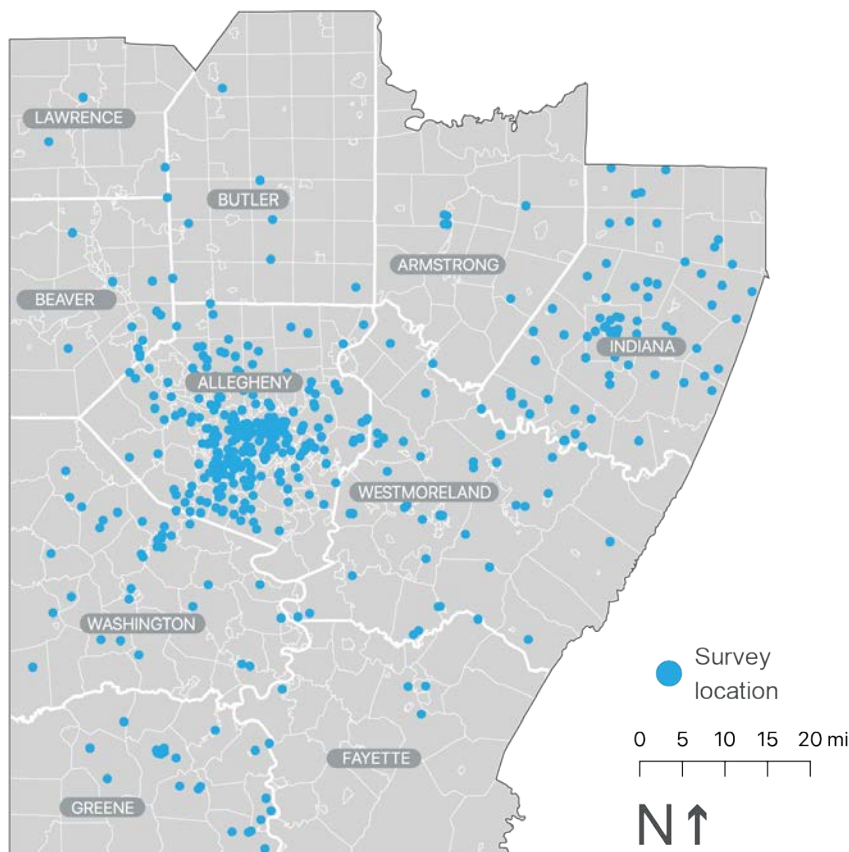


Figure 8: SWPA Connectivity 2021 Survey Participation by Zip Code



Key Insights Identified

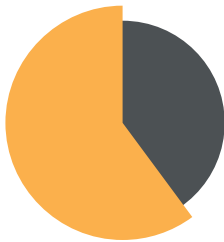


While many residents did state they have home internet access of some kind...

12% OF THE POPULATION rely on their cellular data plan for their main home internet, and **2% HAVE NO HOME INTERNET ACCESS AT ALL.**

Of the 2% without access, most of the impacted residents live in rural areas where there is no home internet infrastructure or service available. A negative relationship was also found between the cost of internet service and the overall satisfaction for customers. However, all income brackets agreed that their household would benefit from better internet service.

In addition to general information about access and satisfaction, the survey also found that residents are interested in faster, more reliable internet primarily to improve online entertainment and streaming but also to support working from home capabilities and social connectivity.



Of the 3,445 respondents, **63% OF THE RESIDENTS** in the 10-county region feel that their household would **BENEFIT FROM BETTER HOME INTERNET SERVICE** which suggests they would likely support the SWPA Connected program and future projects.

Engagement & Adoption

Of the 3,445 respondents, 63% of residents feel that their household would benefit from better home internet service and therefore would likely support the Roadmap and future projects. Of this contingent, 74% live in rural and suburban communities, 71% believe government should do more to assist in providing better internet, and 33% have children in their household. In addition, this contingent already pays higher rates. Despite that, they are also willing to pay more for faster, more reliable internet service, which underscores the value of improved service.

There is also a need for broadband education. A sizable proportion of residents (27%) neither agreed nor disagreed that they would benefit from better internet service, implying there may be a lack of understanding of true capabilities of faster, more reliable internet, and the opportunities the internet can provide all users in any stage of life. Lower levels of support for better internet service from residents 65 years and older may also be related to a lack of digital literacy and knowledge of technology.

It is recommended to target on-the-fence residents or those that do not perceive internet access as a benefit with educational messaging focused on digital literacy, broadband benefits, and improvements to service cost and contract terms.



Listening to Residents' Stories

Discussions during the workshops, conversations, and interviews validated the survey results in many ways and provided more insights into reasons for some of the survey results and issues faced by those without internet. A pattern of key challenges emerged: the physical barriers of connectivity infrastructure, awareness and understanding of broadband internet services, accessibility for all, affordability and reliability, and coordination of private and public stakeholders to equitably deliver internet connectivity to these communities.



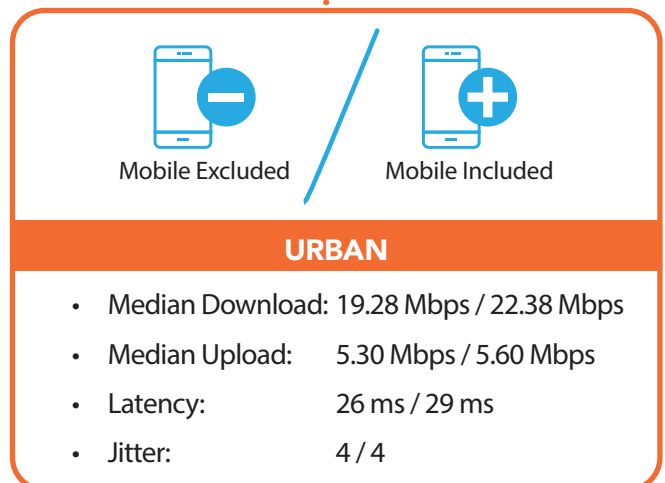
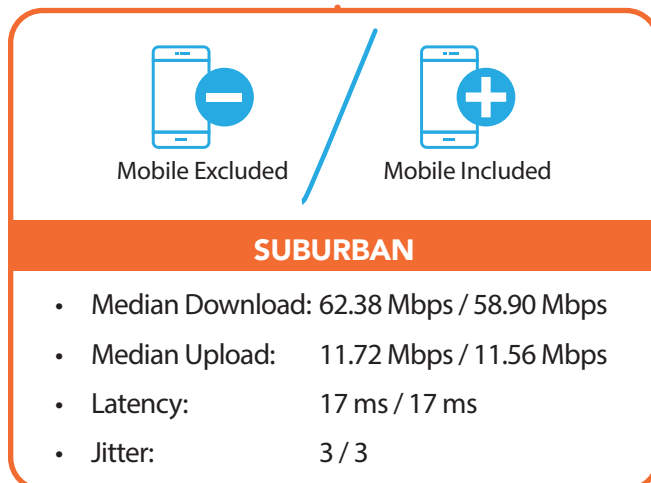
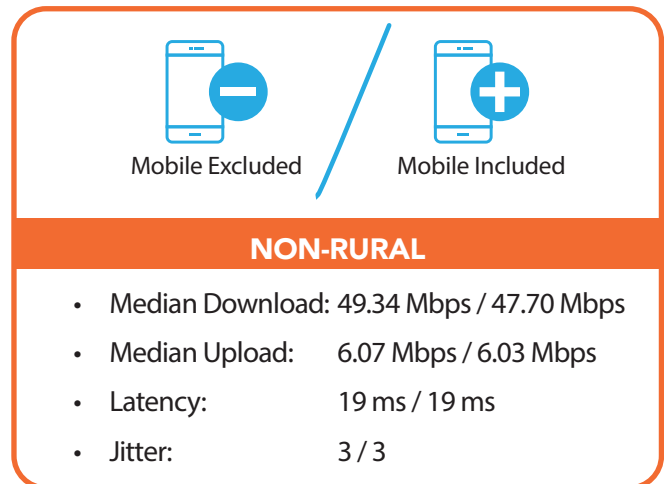
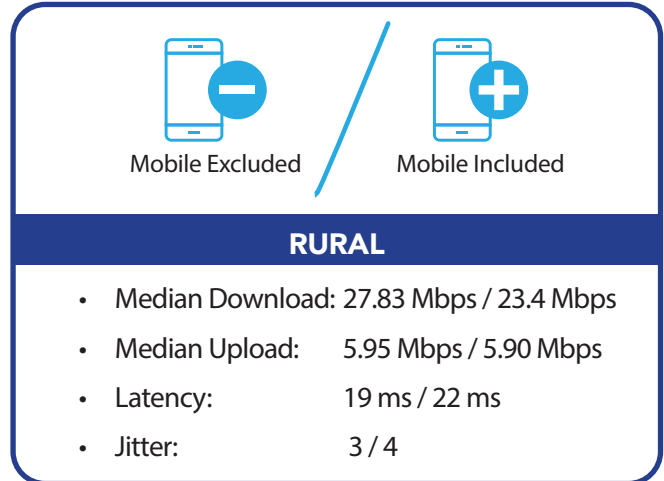
Reported Speed

Speed tests were collected during the market research survey utilizing Speedtest by Ookla. The speed test has the ability to capture the user's ISP, download speed, upload speed, latency, and jitter. See below for a more detailed description of the median download and upload speed with mobile included and with mobile excluded, along with the latency and jitter for each survey speed previously described.

Interpreting the Results

When reviewing speed test results, we must consider that users may have access to faster internet service but may be subscribing to a slower speed tier. There is a clear distinction regarding fixed and mobile speeds for urban, suburban, and rural locations based on the market research survey results.

1. The survey results show urban areas having the slowest download and upload speeds. This is mostly due to residents who have enrolled in low-cost internet programs, those who cannot afford faster service, and the lack of affordability programs, which are consistent with urban areas in the region.
2. Rural speed results in the region were only slightly improved as compared to urban areas. Rural residents lack access to broadband infrastructure, with little provider choice and service options as opposed to urban and suburban residents.
3. Suburban residents fared the best, having the fastest speeds available. Infrastructure, accessibility, and affordability factors are not typically an issue for suburban respondents.



Understanding the Users: Key Populations for Prioritization



SUMMARY FINDINGS

Rural residents would benefit from improved access and a better understanding of internet terms, service fees, and affordability programs.

RURAL RESIDENTS

Many rural residents suffer from poor access and service and are dissatisfied, with little provider choice and high prices.

Rural residents also face a significant barrier with a lack of ISP options as only 17% felt they had a good selection of service options. However, options are not the only barrier for rural residents. This group also pays higher prices, with 37% paying \$80 or more monthly compared to their urban and suburban counterparts in the region. As a result of these two factors, rural residents rely on cellular data for their home internet access more than any other demographic group.

Many of the rural respondents in the region live in Connectivity Opportunity Areas, with 50% located in areas identified for Broadband Access and 75% in areas identified for Adoption and Equity improvements. Based on the responses, Armstrong, Greene, and Indiana Counties have the highest need, with Fayette and Lawrence Counties as the next highest.

ONLY 49%

of rural residents are **satisfied with their connection reliability and speed** compared to moderate majorities in urban and suburban areas.



SUMMARY FINDINGS

Households with children would welcome increased service capability that would allow them to move about their day without scheduling internet use to alleviate slow speeds.

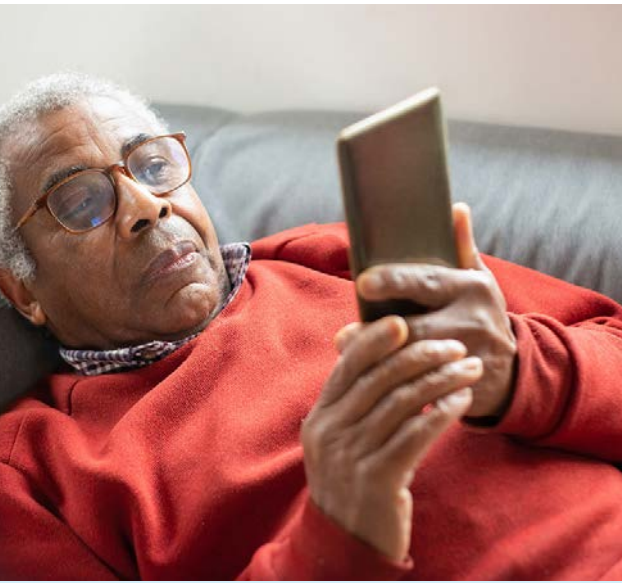
HOUSEHOLDS WITH CHILDREN

Seventy-one percent of households with children under the age of 18 need increased service capabilities due to larger households and additional internet usage, more online hours, and a wide array of online activities and needs. Of the survey respondents, only 8% of households are without children, while 57% have four or more individuals living in the household (including adults and children). Due to the global pandemic, these households specifically stated that better internet service would improve remote learning and homework for their children, while also expanding their ability to work from home.

The issue is that many of these households do not have better internet options.



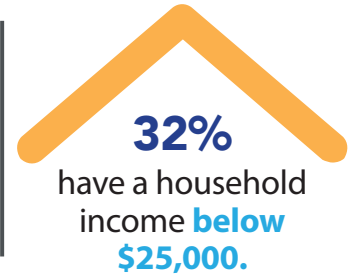
49% are willing to **pay more for BETTER SERVICE** if it were available.



BLACK RESIDENTS

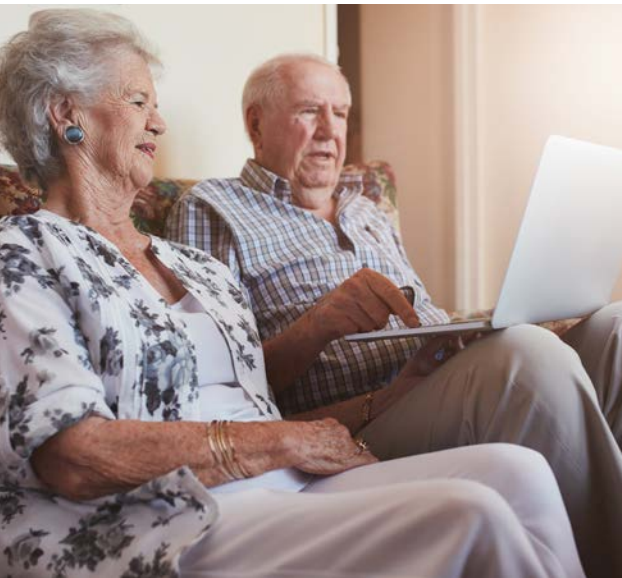
Despite having higher ISP satisfaction in general, Black residential respondents rely more on cellular phone plans to access the internet at home and 70% would benefit from better internet service. Black households also have multiple users online for five hours or more a day and better internet would also be instrumental in the improvement of online education access, homework, and the ability to work from home.

The most significant barrier to better service identified for Black residential respondents in the survey is the cost of service.



SUMMARY FINDINGS

Many Black residents would welcome improved internet service but with a focus on affordability for the cost of service.



SENIORS

Residential respondents 65 years and older were least likely to say they would benefit from improved home internet representing only 52% compared to 63% and above for all other age groups. This is despite their satisfaction with their internet service being on par or lower than other age groups. In addition, residents of this age group are significantly more likely to have issues understanding internet technology, with 43% stating so, again higher than all other age groups.



54% USE A DESKTOP

versus a laptop or mobile device to access the internet, **significantly higher** than any other age group.

SUMMARY FINDINGS

Older residents would benefit from increased digital literacy education about the opportunities technology and internet access provides for their personal use.



HISPANIC-LATINO/A/X RESIDENTS

While 73% of Hispanic and Latino/a/x respondents have home internet via modem/router, 58% utilize cell phone plans for internet on their home devices and 91% do not have a connected device other than their smart phone. These residents also rely heavily on internet access for social connectivity with their family and friends, especially those living abroad. Sixty-nine percent of Hispanic and Latino/a/x households responding would benefit from improved internet service.

62%  of respondents would **pay more for FASTER, MORE RELIABLE SERVICE.**

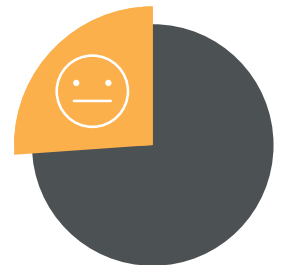
SUMMARY FINDINGS

Information about internet service expansion and affordability programs to meet needs and provide in-home access would be beneficial.



ON-THE-FENCE ABOUT BROADBAND BENEFIT RESIDENT

Of these respondents, 75% do not have children in the household, 45% are 55 years of age and older, and 46% live in suburban communities. Based on these demographics, it can be assumed that either this contingent has reliable internet access, their access needs are met, or there is a digital literacy gap preventing them from getting the full potential out of internet usage. Outside of these assumptions, this contingent may also be unaware of what access barriers their community is facing and how internet access is beneficial for the community at large.



27% of residential respondents **did not feel strongly in support of or against the need for better internet service.**

SUMMARY FINDINGS

The main messaging for residents on the fence would be to explain the community benefits of having internet access and the affordability programs available.

PUBLIC AWARENESS THEMES

Through the research, conversations, and workshops conducted to understand the current state of broadband in the region and the sentiment of residents and business owners in the communities, key themes presented themselves as opportunities for engagement and education.



Benefits of Broadband

Targeted educational campaigns about the benefits of broadband and the opportunities that internet access provides to individuals in all stages of life. It is important to engage audiences that are on the fence or do not see an immediate need or benefit to their personal livelihood. Including information about the importance of community and economic growth and stability for regions with shrinking workforces or declining populations due to relocations to areas with more connectivity options is also important.

Digital Equity for All

Rural communities, low-income households, minorities, and vulnerable populations are frequently left behind when it comes to accessing and benefitting from local investment and resources. Internet access is no different; unequal distribution of service and costs perpetuate the digital divide. Ensuring that these populations are priorities, and that their needs and voices are heard is essential to success.



Digital Literacy & Internet Safety

Digital literacy is necessary for our society, from school to the workforce to telehealth. As technology continues to evolve, more and more of our connections and demands require internet access and the knowledge of how to navigate digital resources safely and successfully. Educating the public on how to utilize the internet securely will help with adoption in areas where access is available. As part of the digital literacy effort, common terms should be defined as these were identified as pain points that caused confusion for many residents.

Contract Language & Fees - Consumer Guidance

Providing helpful information to assist consumers in understanding ISP services, contract language, and fees can help them make more informed decisions on what their home internet needs are. Transparency in pricing is also highly important and needed to reduce many of these barriers. In addition to general consumer guidance, sharing information about funding assistance programs and the FCC's Affordable Connectivity Program (previously known as the Emergency Broadband Benefit Program), can further assist adoption for families that are low-income or have financial constraints.



CONNECTIVITY FOR ALL - CARNEGIE MELLON UNIVERSITY'S SCHOOL OF DESIGN CONCEPTS

As a partner in the project, CMU's School of Design under the leadership of Professor Kristin Hughes conducted a Junior Communication Design class focused on developing outreach campaigns around the concept of "Count Us by Connecting Us." The class explored targeted marketing guided by the data gathered within SPC's connectivity dashboard including the Broadband Access Index and Adoption and Equity Index. Throughout the fall semester, concepts for 19 multimedia campaigns were prepared that covered a variety of key messages from highlighting digital equity to the importance of internet access to education and opportunity.

The students' work developed slogans and imagery aimed at educating the population about the need for broadband. Each took a different approach, with some focused on general awareness, and others aimed at more specific messaging around children's education, rural needs, and more. They identified avenues to partner with other organizations and private companies, including postal services and convenience stores, to spread awareness and deliver messages to different communities. Each student turned their slogan and theme into a video, and a set of marketing materials including signs, tote bags, billboards, postcards, and phone booth artwork to name a few.

"ZIP Code Connectivity," a concept created by Sarah Xi, was selected to help promote the public survey via social media. The video used zip codes and buffering symbols, paired with intentional delays, to indicate areas with poor connectivity. It speaks to the frustration, shared throughout all the other public engagement outreach conducted as part of this Roadmap process, that an individual's zip code determines whether they have internet access.

These campaign ideas illustrate a range of opportunities and approaches to communicate the sense of urgency in bringing broadband access to all and promoting a call to action. Further efforts to educate and inform the public can build upon the valuable work created by the CMU students.



"**Help Plant the Future**" focused on the benefits and values of extending high-speed internet into rural areas. It depicted internet access as new growth in agricultural areas. This campaign powerfully highlighted the impact rural areas have on our cities through the crops they cultivate and illustrates the value of connecting our rural areas and helping them thrive and grow. This campaign also identified the potential to partner with a national service to build upon their message of reaching everyone, no matter where they live.

Concept by Neely Young Lee



"**DONE WAITING**" emphasized the time lost in waiting for information to load when speed is slow or the connection is unstable. This campaign stretched the word "wait" to visually prompt the reader to think about the delay, with dominant percussive audio in the video. It speaks to the value we place on our time and prompts the viewer to think about how poor connectivity costs people in terms of real time, which translates to real earnings and opportunities.

Concept by Maggie Ma

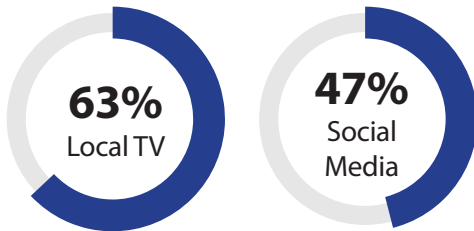
Much thanks to Prof. Kristin Hughes and to all the students for their great work. The other concepts developed include:

- Caitlyn Baensch - Don't Lock Kids Out
- Bon Bhakdibhumi - Help All Kids Dream Bigger
- Hayoon Choi - Would You Still Be You Without Connectivity?
- Elena Crites - Light Up Their World
- Jasmin Kim - Just a Click of a Button
- Dorothy Li - What If There Was Internet 2,000 Years Ago
- Grace Li - Internet To You
- Chelsea Liu - What is Broadband?
- Jenny Liu - If You Could Give Internet Access to Anyone
- Francis Park - Too Far To Be Together
- Shruti Prasanth - The Internet is a Digital Jungle
- Proud Taranat - Color Through Connectivity
- Elysha Tsai - Future Leaders of America
- Catherine Wang - Cast Some Magic
- Sarah Xi - ZIP Code Connectivity

How to Reach Targeted Resident Populations

Residents get their news and information from a variety of sources. Local TV and social media will have the broadest reach overall for education and project messaging. Below are the best media sources ranked in order of preference by targeted resident groups.

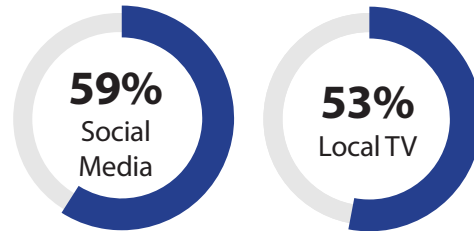
RURAL RESIDENTS



Their preferred sources for news online are:

Local News Websites	76%
Google Search	58%
Local Government Website	24%
Blogs	11%
Other	9%

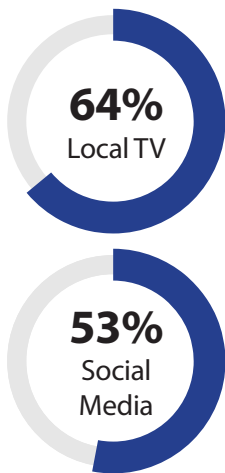
HOUSEHOLDS WITH CHILDREN



Their preferred sources for news online are:

Local News Websites	77%
Google Search	64%
Local Government Website	31%
Blogs	26%
Other	6%

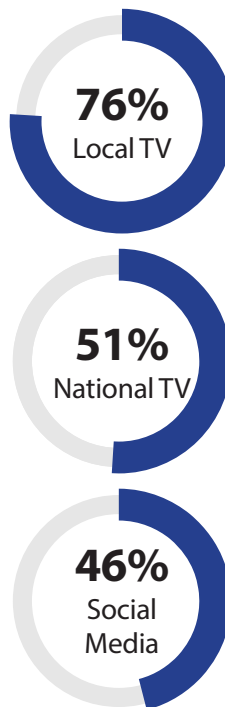
BLACK RESIDENTS



Their preferred sources for news online are:

Local News Websites	80%
Google Search	64%
Local Government Website	25%
Blogs	16%
Other	12%

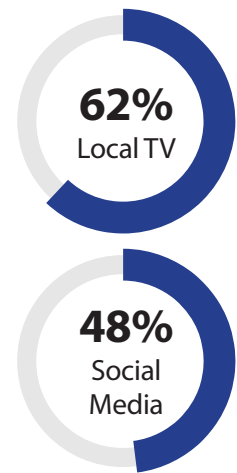
RESIDENTS 65 AND OLDER



Their preferred sources for news online are:

Local News Websites	74%
Google Search	60%
Local Government Website	21%
Blogs	15%
Other	8%

ON-THE-FENCE





Programs and Projects

Priorities for Implementation

Rapid changes to broadband technology and policy create an evolving landscape of opportunities and partners for achieving all of the goals for a connected future. The Regional Vision includes many far-reaching goals for thorough and equitable connectivity across the region. Meeting the 100/20 Mbps threshold will require extensive investment over time. This investment will be shared between the public and private sectors. As ISPs continue to improve and expand their own networks, and other companies and nonprofits offer products or services in support of broadband access and digital equity, future public investment should be careful to build upon, not duplicate, those efforts. Projects and programs will need to be continuously measured against private sector opportunities so as to maximize broadband investment where it is most needed. They will also need to be measured against performance rubrics that gauge their impact on the population and identify how well they fill gaps in the network. Some projects will focus on establishing a regional communication backbone to increase the overall broadband capabilities of the region, while others will focus on addressing the lack of connectivity and improving service capacity to underserved areas.

Rather than identify a comprehensive set of future projects that may quickly become obsolete in this changing landscape, the Connectivity Roadmap provides several tools to guide the selection of projects as priorities shift. The Project Identification Decision Tree and Measures of Effectiveness rubric provide a clear framework to continuously reassess priorities and direct upcoming funding toward the most relevant needs.

The **Project Identification Decision Tree** guides decision-making through the steps needed to meet a given need, according to the existing conditions and type of need. It helps identify the processes to follow, data to gather, and partners to work with. It applies to a wide range of decisions, including addressing connectivity to the unserved and matching individuals with subsidies to make their broadband bills more affordable.

The **Measures of Effectiveness** rubric rates and weights projects according to an extensive set of metrics that includes technical and equitable qualifications. This is an interactive modeling tool that allows SPC to select and prioritize broadband investment and project locations.

Finally, fourteen **Projects** have been prepared as models for how the Decision Tree and Measures of Effectiveness can be used. Sample projects have been analyzed and assembled for each county to illustrate priority infrastructure improvements that meet the particular needs of the county, by starting first with areas that are unserved and can pursue funding immediately.

Project Identification Decision Tree

The purpose of the Project Identification Decision Tree ("Decision Tree", shown in full in Figure 10) is to logically determine the type of project needed and to ensure it is properly framed, proposed, identified, and implemented. There are four primary decision points for identifying projects. The first two determine if there are broadband infrastructure needs or gaps based on areas classified as unserved and underserved. Next, the Decision Tree focuses on projects for equity and affordability as well as digital literacy constituent needs. Additional decision points branch off the primary four as described below and illustrated in Figure 9.

- In an unserved area, the first branch is a decision point to identify if the area is served by an electric cooperative (co-op). From there, if there is a co-op and they are willing to provide broadband services, then the recommended next step is to request an expansion cost from the co-op to compare against other technology alternatives. If a co-op is not set up to serve the area with broadband services, service providers and fiber optic facility owners in proximity should be evaluated for cost and feasibility to expand their network to the unserved area.
- When infrastructure exists but is not affordable, another branch of the Decision Tree assesses the available funding pools for subsidizing the monthly cost of broadband and mobile hotspots. This vetting process may be performed by a nonprofit or volunteer organization to help match individuals with the most suitable subsidy program.
- When individuals have access to services and have overcome the affordability factors, the Decision Tree leads to a third branch to assess user needs. Individuals may need help setting up or using a home network, or education on using online services. Digital literacy programs and home network assistance programs may be established through volunteer or nonprofit organizations. Community workshops and demonstrations coupled with scheduled one-on-one sessions are recommended to help educate and train constituents so that the broadband services and associated devices can be utilized as intended.

FROM GOALS TO IDENTIFYING PROJECTS FOR IMPLEMENTATION

Three Regional Goals have substantial relevance for infrastructure projects:

- Invest in Expanded Infrastructure and Establish a Fiber Backbone
- Expand Broadband in the Public Domain
- Establish Network Redundancy

However, all project types may be evaluated using this Decision Tree to determine steps forward.

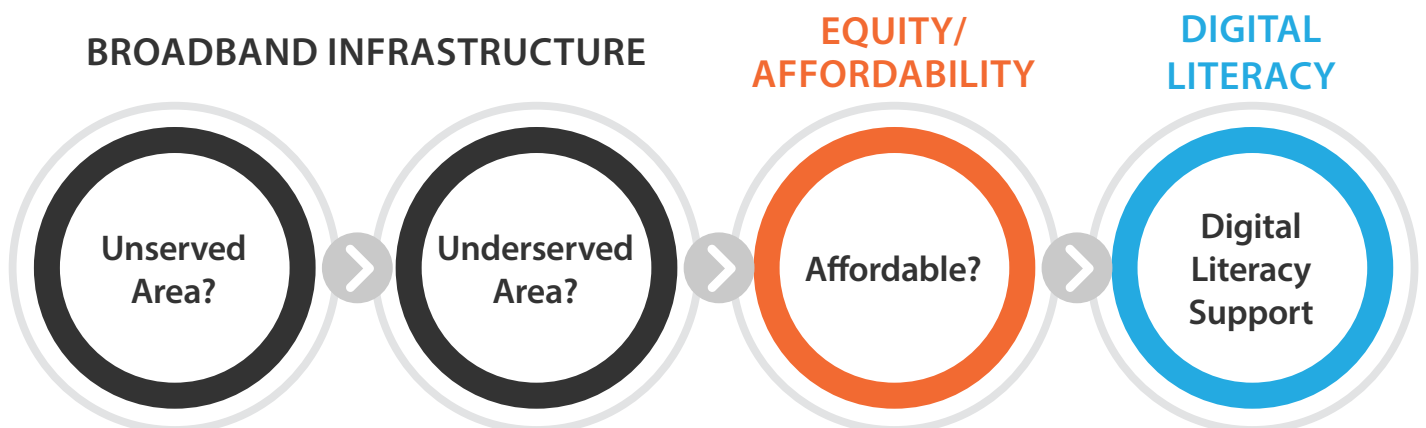


Figure 9: Project Identification Decision Tree Branches

PROJECT IDENTIFICATION DECISION TREE

Broadband Infrastructure

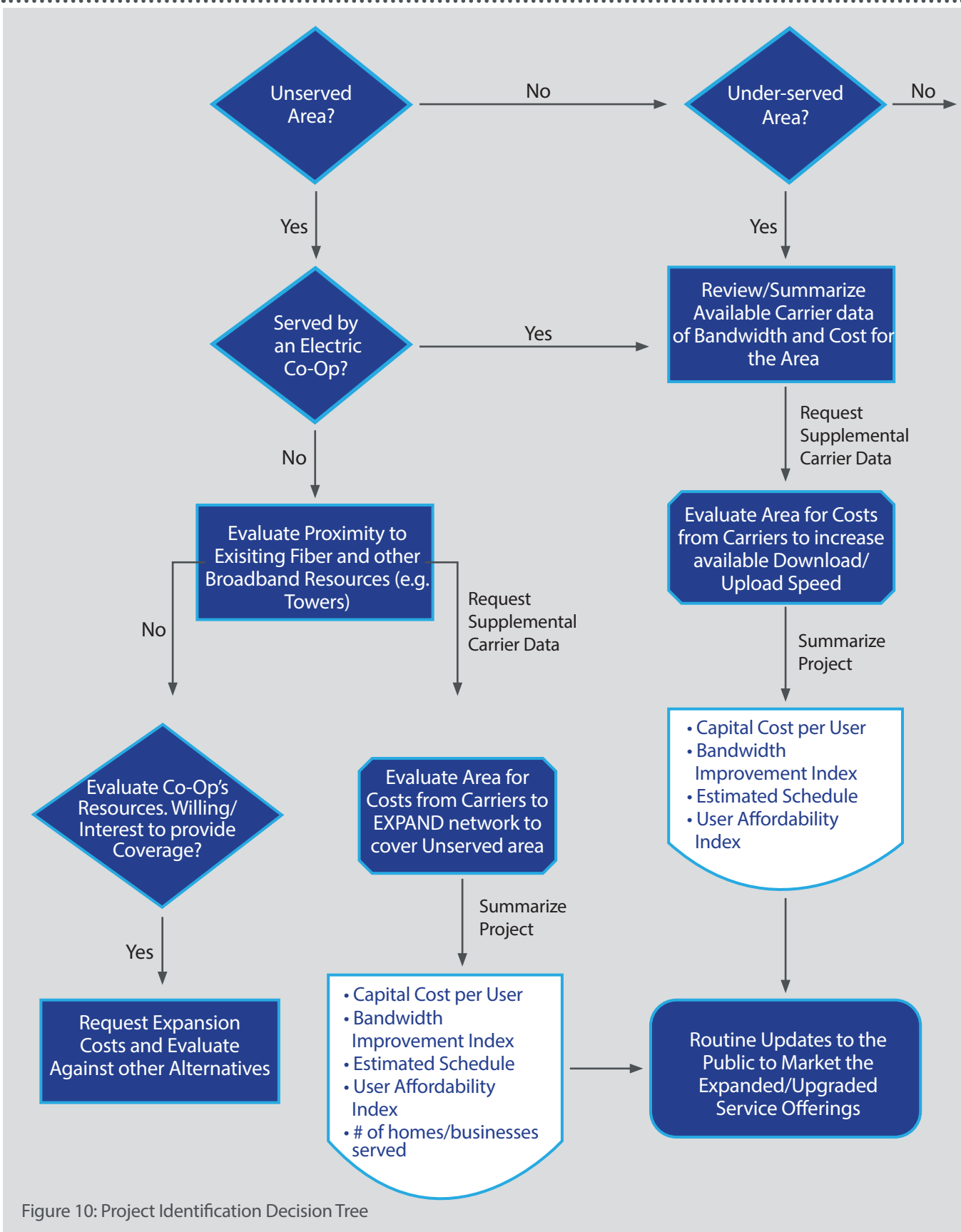
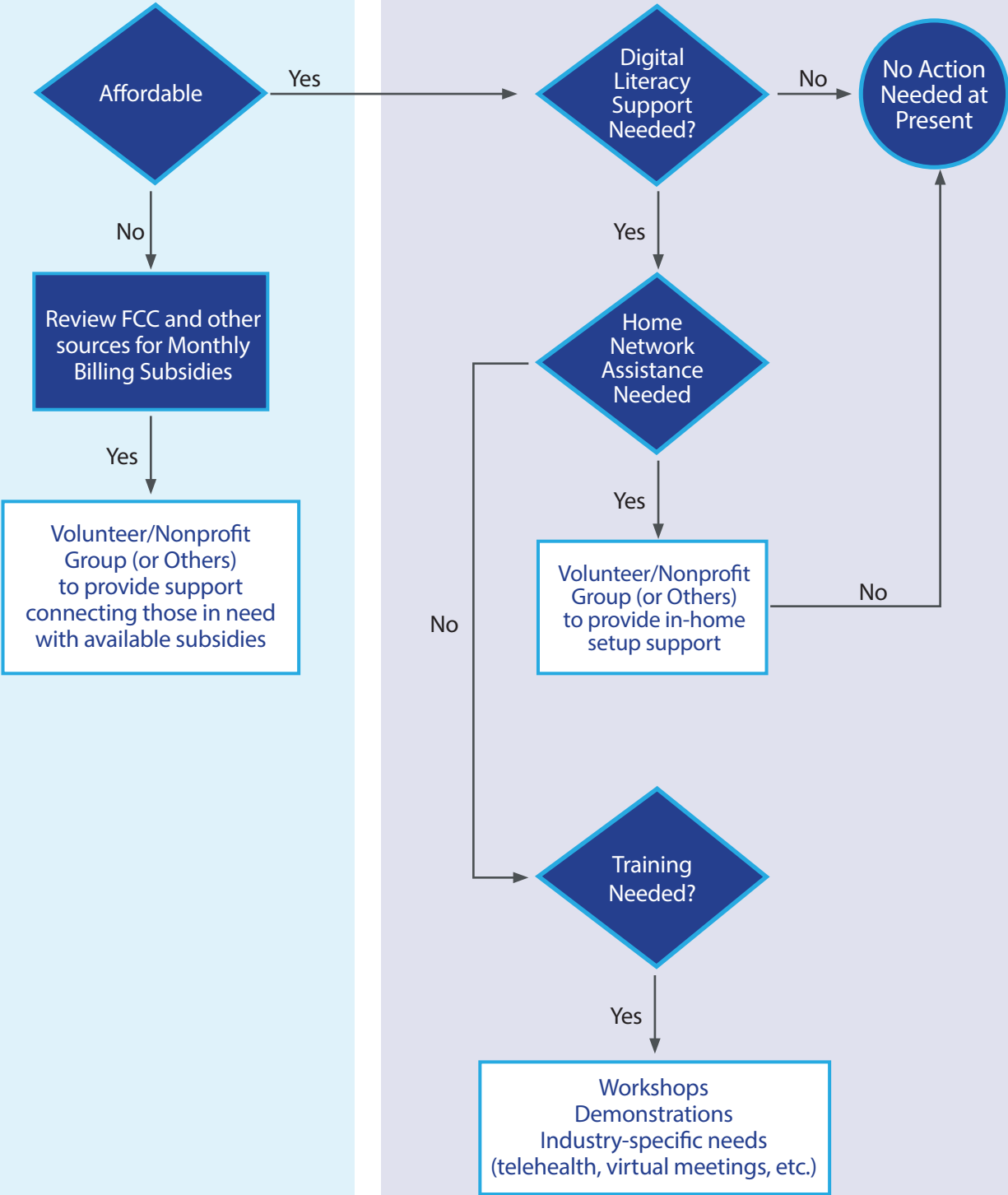


Figure 10: Project Identification Decision Tree

PROJECT IDENTIFICATION DECISION TREE (continued)

Equity / Affordability

Digital Literacy



Measures of Effectiveness for Project Identification

The Measures of Effectiveness rubric applies weighted metrics to known conditions to help prioritize the projects and programs identified using the Decision Tree. As different funding opportunities become available, the weights can be adjusted to assess priorities that align with the specific requirements of those funds. This flexibility will assist SPC and partners in understanding which projects will best advance broadband access, adoption, and use within the region.

The scoring matrix in the table on the right demonstrates some of these metrics and their default weights. "A" metrics demonstrate highest need and receive the highest score in their category. "D" metrics demonstrate the lowest need and receive the lowest score in their category. For example, in the category of broadband access, projects that impact 100 census blocks are weighted more heavily than projects that impact fewer than 10 census blocks. Some categories contain multiple criteria. For example, in the category of telehealth, areas without a healthcare facility and with higher populations of older residents would most benefit from the availability of telehealth services, and so these options receive the highest scores in this category. Combining the scores from all the categories helps identify projects that will best address the overall need — the higher the score, the more needs addressed.

The metrics are based on datasets gathered from the FCC, SPC, and the public survey conducted through the preparation of this Roadmap. The Measures of Effectiveness enable projects to be identified and assessed according to the following subsets:

- Broadband access related to speed
- Proximity to healthcare facilities
- Educational institutions located within census blocks
- Percentage of population 65 or older
- Projects within Federal Opportunity Zones
- Impacted households, businesses, and Community Anchor Institutions
- Survey results indicating attending school from home impacted by internet speeds
- Projects that improve network redundancy/reliability
- Projects that offer access to future-proof technologies
- Projects that prioritize unserved and underserved communities
- Transportation system measures provided by SPC

Equity and Digital Inclusion (Connectivity Opp Areas)
Criteria: A - >100 census block improvement B - >50-100 census block improvement C - >10-50 census block improvement D - <=10 census block improvement
Broadband Access (Connectivity Opp Areas)
Criteria: A - >100 census block improvement B - >50-100 census block improvement C - >10-50 census block improvement D - <=10 census block improvement
Affordability of Services
Criteria: A - <= \$50/Month B - > \$50-75/Month C - >\$75/Month D - Project will offset internet service provider bills for low-income households
Workforce Development and Training Opportunities
Criteria: A - Project will supply job training opportunities for the unemployed B - Project will promote digital literacy skills for people looking to apply for online jobs C - Project will supply courses for new skills training or online certifications D - Project will supply broadband apprenticeship program for additional telecomm workers
Digital Literacy Levels
Criteria: A - Project will supply computer (hardware and software) to residents B - Project will supply teaching on digital information (content usage, access) C - Project will supply media teaching (text, sound, image, video, social) D - Project will establish digital literacy class locations within the area of improvement
Reliability of Services
Criteria: A - Download Speed B - Upload Speed C - Security D - Satisfaction/Cost Results from Survey?
Job Creation
Criteria: A - >500 jobs B - >100-500 jobs C - >50-100 jobs D - <=50 jobs
Advancement in Telehealth
Criteria: A - Advancement in Telemedicine (remote clinical services) B - Reduction in Healthcare Costs C - Improve Patient Outreach and Health Outcomes D - Improve Patient Health-Related Education and Training
Advancement in Remote Learning
Criteria: A - Accessible and expandable (use of devices to learn from anywhere) B - Multiple educational resources online C - AI/Virtual Reality teaching methods D - Unlimited enrollment in online courses

Figure 11: Measures of Effectiveness Example
Additional metrics are also included, but the full chart is too extensive to reproduce at a legible scale.

Prioritizing Projects for Funding

Once priority broadband infrastructure projects are identified using the Measures of Effectiveness rubric, the next step is to establish project plans for implementation, often in collaboration with cooperatives or private sector ISPs.

As public funds are limited, it is important to review additional criteria before allocating or dispersing available funds to the ISPs for project implementation. Below is a chart with the key criteria to evaluate before making funding decisions. Other funding sources, such as planned Capital Improvement Projects and RDOF Phase 1 funds, should also be considered before dispersing funds to proposed projects.

COST PER USER

Assess the number of homes or businesses served, and the associated capital cost per user.

BANDWIDTH INDEX

How well does the proposed infrastructure provide end users with bandwidth that meets the federal and SPC guidance for broadband speeds and does it provide opportunities to scale even faster in the future?

USER AFFORDABILITY INDEX

For these services to have the most benefit, they need to be affordable to the constituents being served. Monthly payment subsidies are available through other funding sources apart from infrastructure funding, but only to offset a small portion (e.g. \$30) of a bill. Evaluating a project for its ability to provide services that meet the broadband needs and that are also affordable should be compared with the amount of any requested infrastructure subsidy.

INFRASTRUCTURE SUBSIDY

There are factors that influence why existing service providers have not already provided broadband services to unserved areas or provided higher speeds to underserved areas. In some cases, it may be cost prohibitive to install the middle-mile service. The amount of public funding to subsidize these impediments to providing services need to be measured against the other criteria that demonstrate benefits to the end users.

SCHEDULE

Timeliness of deployment is also important to provide connectivity to constituents in a reasonable timeframe. Schedules of different service providers may also play a factor in determining which one to advance to deployment.

NETWORK REDUNDANCY/RELIABILITY

This factor assesses the ability of a project to improve network resiliency in the event of a single point (or path) of failure to the area served.

Leveraging this balanced approach will allow for consistent and fair evaluation of subsidies for private sector expansion along with public sector deployments.

Prioritization Evaluation Tools

When programmatic needs far exceed the available funds to address them, evaluation tools are needed to help sift through those needs and rank and compare them for priorities as well as dependencies. If a critical section of a high-speed backbone is missing to enable access to a local internet service provider, then it would be optimal to build that backbone extension before building fiber-to-the-homes or businesses. For this reason, it is recommended to use a two-tier approach with the evaluation of projects:



The first tier will leverage the raw data from the FCC and the survey information to formulate an initial filter on specific census blocks to target for project identification and development before the scoring matrix is applied.



The second tier will apply after projects have been developed and scored. This processed data can be further compared in the prioritization tool against other projects in each county or across the region, and filtered based on grants that target certain criteria.

In the first tier, project areas can be filtered by reviewing the Broadband Access Index and census block access speeds from the FCC data. Collectively these Indices can be filtered to look for certain areas that target an objective, particularly those tied to available funding sources and then use the list to promote development of projects.

For project developments, the Measures of Effectiveness provide the basis for scoring and comparisons. Additionally, when evaluating private sector projects, an affordability index and speed improvement index can be applied to evaluate the benefit versus the subsidized cost from the public sector. By evaluating these Indices when collaborating with the private sector, public decision-makers can assess the value of public dollars being used for the betterment of the region's broadband goals.

As an example, this Connectivity Roadmap used a first tier filter and identified one or more areas that are unserved per county.

Some of these locations are adjacent to areas that are currently well-served by an existing regulated and approved service provider. SPC partners and/or the local municipal representatives could engage in preliminary project scoping conversations with carriers to identify impediments to expanding their coverage to the unserved areas, and to consider what level of public-sector subsidy might be needed to achieve a financially viable project. The service providers can then develop a cost proposal identifying the broadband improvements they would offer to the unserved area, the monthly pricing plan (whether the same or different from public tariffed rates), a schedule for completion, and how much (if any), public sector investment they would be seeking to assist with achieving the service goals. When multiple providers have submitted proposals, the region or municipality affected can evaluate the relative benefit/cost of various projects and prioritize how to use each year's pool of available funding.

A RESOURCE FOR MUNICIPAL USE

The census block and FCC summary data can be used by the localities and the region to filter and identify areas where projects are desirable/top priorities.

The Measures of Effectiveness can be used to evaluate preliminary projects as a basis for reviewing existing broadband resources and to rank projects before engaging with private sector service providers (where appropriate). With proposals in hand from service providers, the region can use the Measures of Effectiveness for both unserved and underserved project scores to rank and distribute grant funding to cost-effectively achieve the region's goals.

Identified Projects

To demonstrate this process, a first tier evaluation using the Decision Tree and Measures of Effectiveness was applied to areas in each county that are unserved or have very low Broadband Access Index scores. As a result, 14 initial projects were identified. Thirteen of these projects are primarily county-specific, with some involving overlapping benefits due to proximity to two or more counties. The last project involves a wider reaching network backbone improvement project to establish a primary trunk and to improve network resiliency in the region. Focusing first on unserved areas often has the additional benefit of improving the underserved areas that are immediately adjacent. Please note that these projects are equitably focused on areas of most need. Due to factors outside the control of SPC, such as the implementation of broadband projects by private ISPs and existing issues with mapping data related to overstatement of coverage and periodical currency of updates, projects were not identified for every census block in the region. Datasets should continually be evaluated in conjunction with public engagement surveys to determine locations for new infrastructure projects.

The projects are organized by county and identified by the primary township census blocks they are addressing. The project sheets that follow show the Broadband Access Index, the census block access speeds, and the proposed project area with adjacent census blocks for each of the 14 projects. A description of the connectivity intent and objectives is also provided along with the project score according to the Measures of Effectiveness rubric.

The sample projects that have been identified are:

	Name	County
1	Frankfort Springs-I-376 (A)	Allegheny
2	Perry Twp 1	Armstrong
3	Perry Twp 2	Armstrong
4	Frankfort Springs-I-376 (B)	Beaver
5	Worth Twp - West Liberty	Butler
6	Masontown-Uniontown	Fayette
7	Masontown-New Geneva	Fayette
8	Gray Twp-Richhill Twp-West Finley Twp	Greene
9	Indiana - Bolivar	Indiana
10	New Castle-Pulaski-New Wilmington	Lawrence
11	West Pittsburg-East Moravia	Lawrence
12	Gray Twp-East Finley Twp	Washington
13	Fairfield Twp	Westmoreland
14	Regional Ring	various

Thirteen of the projects recommend routes to install more fixed broadband networks to expand the existing network into unserved areas. The fourteenth project recommends extending the wireless network.

The projects are further detailed in Appendix B. Each project sheet includes an estimated cost to connect subscribers based on land use and density. The estimates do not include operating and maintenance costs, which should be taken into consideration before moving forward with a proposed project if they will be managed by a public entity.

PROJECT:
Frankfort Springs - I-376 (A)

PROJECT DESCRIPTION:

Install fixed broadband from the Beaver County line to I-376 via US 30 and State Route 576. Build fiber spurs off of main corridors to adjacent roads and properties to serve adjacent homes and communities. Connect to resources available providing well served access in the east to enhance options of served and unserved communities within Allegheny and Beaver Counties.

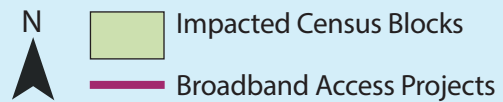
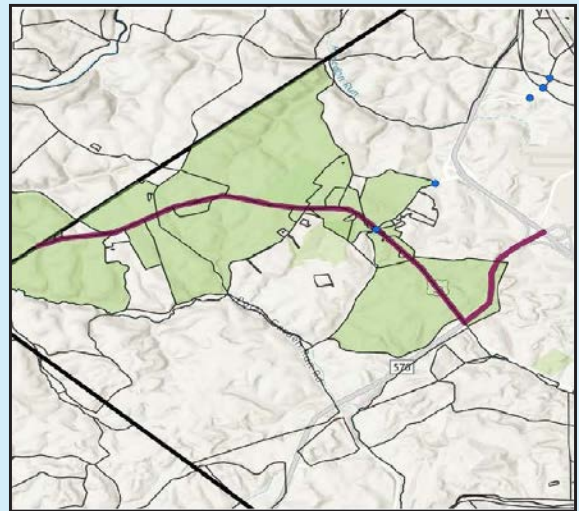
PROJECT ENHANCEMENTS:

Connect with Project Segment B (Beaver County) to expand improvement.

Leverage existing fiber along US 30 near east end of the project.

COUNTY: ALLEGHENY

AVERAGE PROJECT SCORE: **163**



PROJECT:
Perry Twp 1

PROJECT DESCRIPTION:

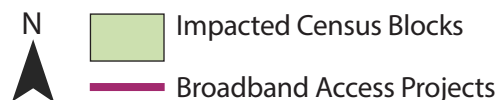
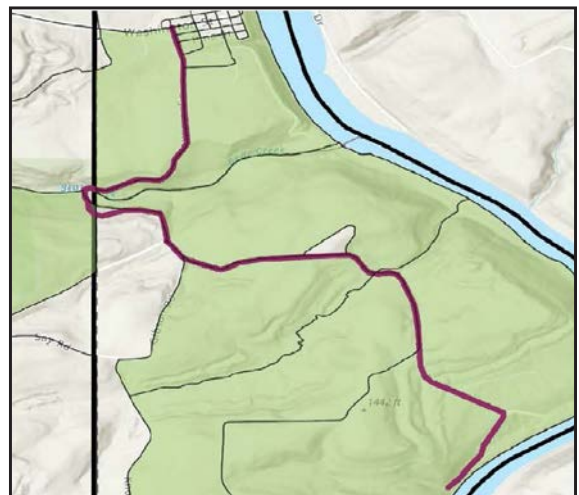
Install fixed broadband along Jackson Ave/Knox Rd/Peach Rd from central Parker to the Allegheny River. Build fiber spurs off of main corridors to adjacent roads and properties to serve adjacent homes and communities. Connect to resources available providing served speeds in Parker to currently unserved communities.

PROJECT ENHANCEMENT:

Continue installation to the south/west to additional unserved communities (refer to Armstrong County Project #2).

COUNTY: ARMSTRONG

AVERAGE PROJECT SCORE: **158**



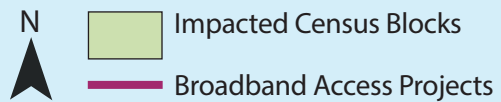
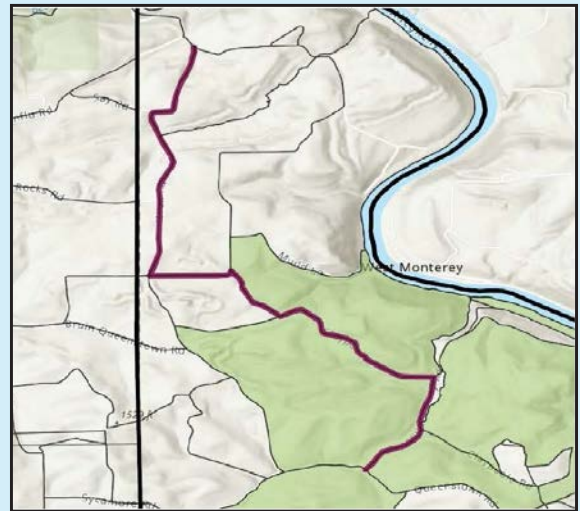
PROJECT:
Perry Twp 2

PROJECT DESCRIPTION:

Continue fixed broadband along Knox Rd/Gibson Rd and Route 4002 to the Perry Township Municipal Building to provide internet access to currently unserved communities and redundant service to the Township building. Build fiber spurs off of main corridors to adjacent roads and properties to serve adjacent homes and communities.

COUNTY: ARMSTRONG

AVERAGE PROJECT SCORE: **190**



PROJECT:
Frankfort Springs - I-376 (B)

PROJECT DESCRIPTION:

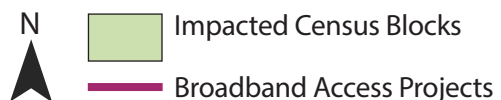
Install fixed broadband along Purdy Rd/County Line/ Clinton-Frankfort Rd from the west county border, through Frankfort Springs, to the east county border. Build fiber spurs off of main corridors to adjacent roads and properties to serve adjacent homes and communities. Provide internet access to currently unserved communities.

PROJECT ENHANCEMENT:

Connect to resources available in Allegheny County via Project Segment A in the east to connect to well served speeds and enhance options of unserved and served communities.

COUNTY: BEAVER

AVERAGE PROJECT SCORE: **170**



PROJECT:
Worth - West Liberty

PROJECT DESCRIPTION:

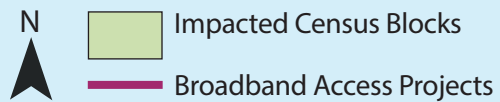
Install fixed broadband along Cornelius Rd from I-776 to Mt Union Rd, then along Mt Union Rd/Roher Rd to West Liberty. Build fiber spurs off of main corridors to adjacent roads and properties to serve adjacent homes and communities. Connect to resources available providing served speeds in West Liberty to currently unserved communities.

PROJECT ENHANCEMENT:

Connect to well served resources in the north to improve speeds for entire community.

COUNTY: BUTLER

AVERAGE PROJECT SCORE: 160



PROJECT:
Masontown - Uniontown

PROJECT DESCRIPTION:

Install fixed broadband along State Route 21 through Masontown and to Uniontown. Build fiber spurs off of main corridors to adjacent roads and properties to serve adjacent homes and communities. Connect to resources available providing well served speeds in Carmichaels in the west to enhance options of served and unserved communities.

PROJECT ENHANCEMENTS:

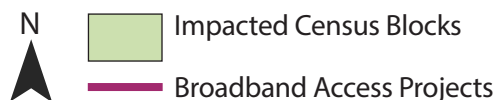
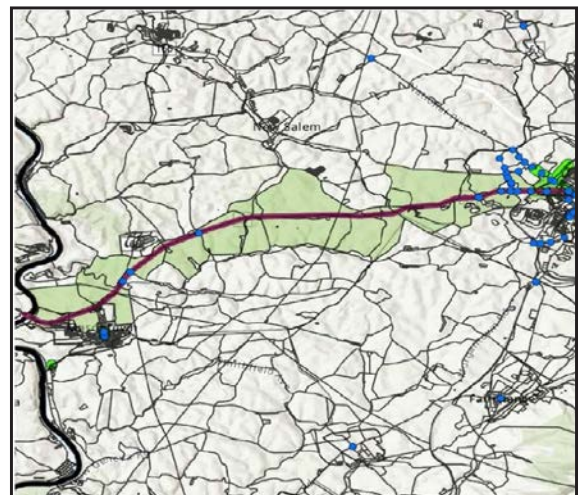
Leverage existing fiber near Uniontown.

Coordinate construction with planned CIP Project near east end of project for cost-reduction opportunities through concurrent construction and potential funds-sharing.

Continue installation to the south to New Geneva (refer to Fayette County Project #2).

COUNTY: FAYETTE

AVERAGE PROJECT SCORE: 222



PROJECT:
Masontown - New Geneva

PROJECT DESCRIPTION:

Continue fixed broadband south to New Geneva through Masontown and along State Route 166. Build fiber spurs off of main corridors to adjacent roads and properties to serve adjacent homes and communities. Enhance options of served and unserved communities.

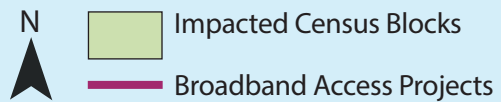
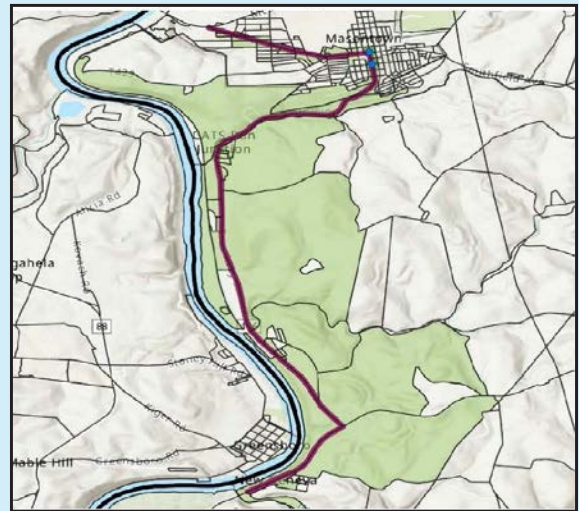
PROJECT ENHANCEMENTS:

Improve existing backbone capacity into West Pittsburg to increase connection speeds for entire region.

Leverage existing fiber along Route 166.

COUNTY: FAYETTE

AVERAGE PROJECT SCORE: **198**



PROJECT:
Gray Twp-Richhill Twp-West Finley Twp

PROJECT DESCRIPTION:

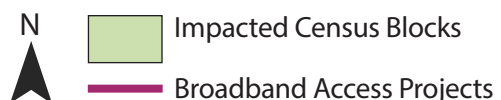
Install fixed broadband along the following routes from Graysville to the West Virginia State Line:

- Ackley Creek Rd
- Sawmille Rd
- Nebo Ridge Rd
- Day Rd

Build fiber spurs off of main corridors to adjacent roads and properties to serve adjacent homes and communities. Connect to resources available providing well served speeds in Graysville to provide internet access to primarily unserved communities.

COUNTY: GREENE

AVERAGE PROJECT SCORE: **178**



PROJECT: Indiana - Bolivar

COUNTY: INDIANA

AVERAGE PROJECT SCORE: **180**

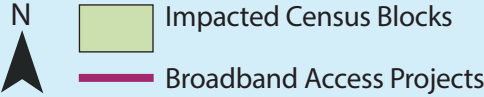
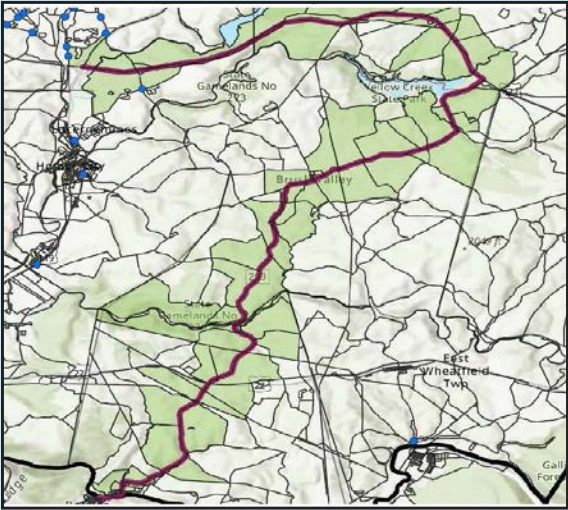
PROJECT DESCRIPTION:

Install fixed broadband along US 422 from US 119 near Indiana east to State Route 259, then south along State Route 259 to Bolivar. Build fiber spurs off of main corridors to adjacent roads and properties to serve adjacent homes and communities. Connect to resources available providing well served speeds near Indiana to enhance options of served and unserved communities.

PROJECT ENHANCEMENTS:

Improve backbone capacity into West Pittsburg to increase connection speeds for entire region.

Leverage existing fiber along US 422.



PROJECT:

New Castle - Pulaski - New Wilmington

PROJECT DESCRIPTION:

Propose installing fixed broadband along I-376 from Exit 9 near New Castle to Exit 5 near Pulaski, and along State Route 208 from Pulaski to New Wilmington. Build fiber spurs off of main corridors to adjacent roads and properties to serve adjacent homes and communities. Connect to resources available providing served speeds in the south, west, and east to provide internet access to mostly unserved communities.

PROJECT ENHANCEMENTS:

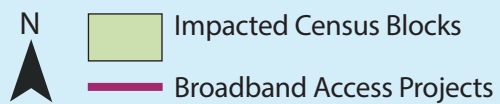
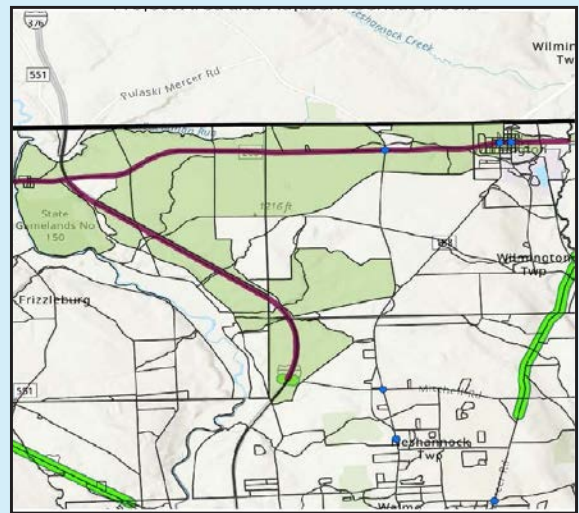
Leverage existing DQE fiber along State Route 208.

Potential need to improve backbone capacity into West Pittsburg to increase connection speeds for entire region.

Coordinate construction with the planned capital improvement project near the south end for cost-reduction opportunities through concurrent construction and potential funds-sharing.

COUNTY: LAWRENCE

AVERAGE PROJECT SCORE: **206**



PROJECT:

West Pittsburg - East Moravia

PROJECT DESCRIPTION:

Install fixed broadband along the following corridors:

- Union Valley Rd
- Galileo Rd
- Beaver Rd
- River Rd

Build fiber spurs off of main corridors to adjacent roads and properties to serve adjacent homes and communities. Connect to resources providing served speeds in central West Pittsburg via 3rd St to enhance options of unserved and underserved communities.

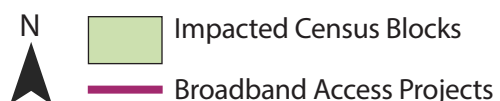
PROJECT ENHANCEMENTS:

Improve backbone capacity into West Pittsburg to increase connection speeds for entire region.

Leverage existing fiber.

COUNTY: LAWRENCE

AVERAGE PROJECT SCORE: **217**



PROJECT:
Gray Twp - East Finley Twp

COUNTY: WASHINGTON

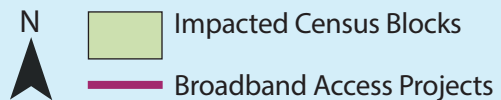
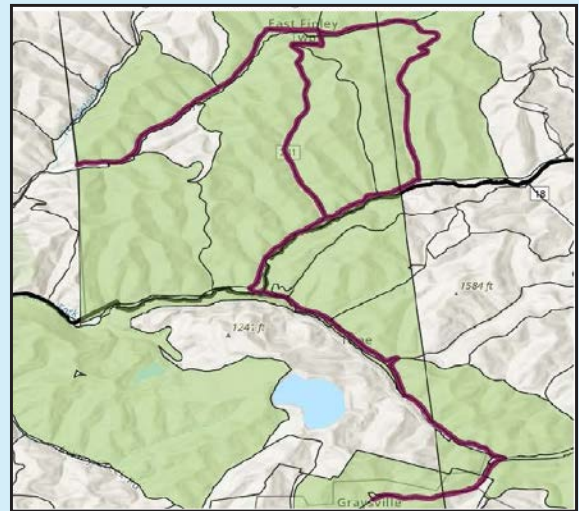
AVERAGE PROJECT SCORE: 200

PROJECT DESCRIPTION:

Install fixed broadband along the following routes from Graysville to the north/west through East Finley Township:

- Stringtown Rd
- State Route 3026 (Crouse Rd/Martin Rd/Valley Chapel Rd)
- Enon Church Rd/E Finley Dr
- High Point Rd
- State Route 3035

Additionally, install fixed broadband along E Finley Dr as a redundant communication path between Enon Church Rd to central E Finley and extend access to additional communities. Build fiber spurs off of main corridors to adjacent roads and properties to serve adjacent homes and communities. Connect to resources available providing well served speeds in Graysville to provide internet access to primarily unserved communities.



PROJECT:
Fairfield Twp

COUNTY: WESTMORELAND

AVERAGE PROJECT SCORE: 238

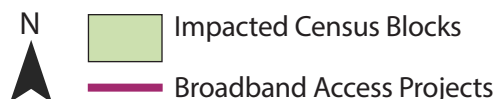
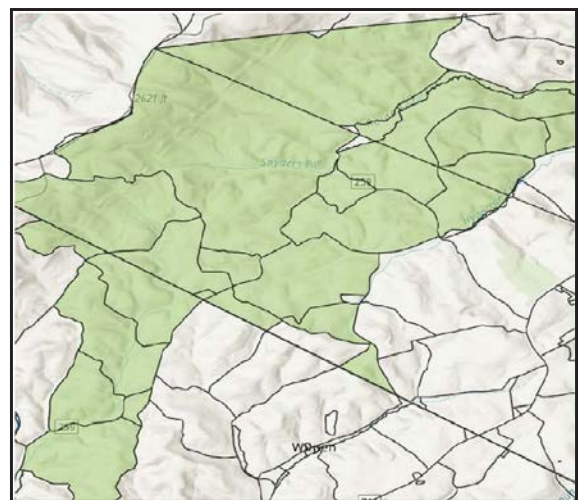
PROJECT DESCRIPTION:

Install wireless communication towers in the vicinity of Fairfield Township to provide internet access to the valley that is currently unserved. Connect to existing wireless resources to the west and east.

PROJECT ENHANCEMENTS:

Install access points at homes for direct-connection to new communication.

Coordinate construction with adjacent bridge repair/replacement projects for cost-reduction opportunities through concurrent construction and potential fund sharing.



PROJECT:
Regional Ring

COUNTY: VARIOUS

AVERAGE PROJECT SCORE: 219

PROJECT DESCRIPTION:

Install fixed broadband along primary corridors across the region to establish a regional communication backbone.

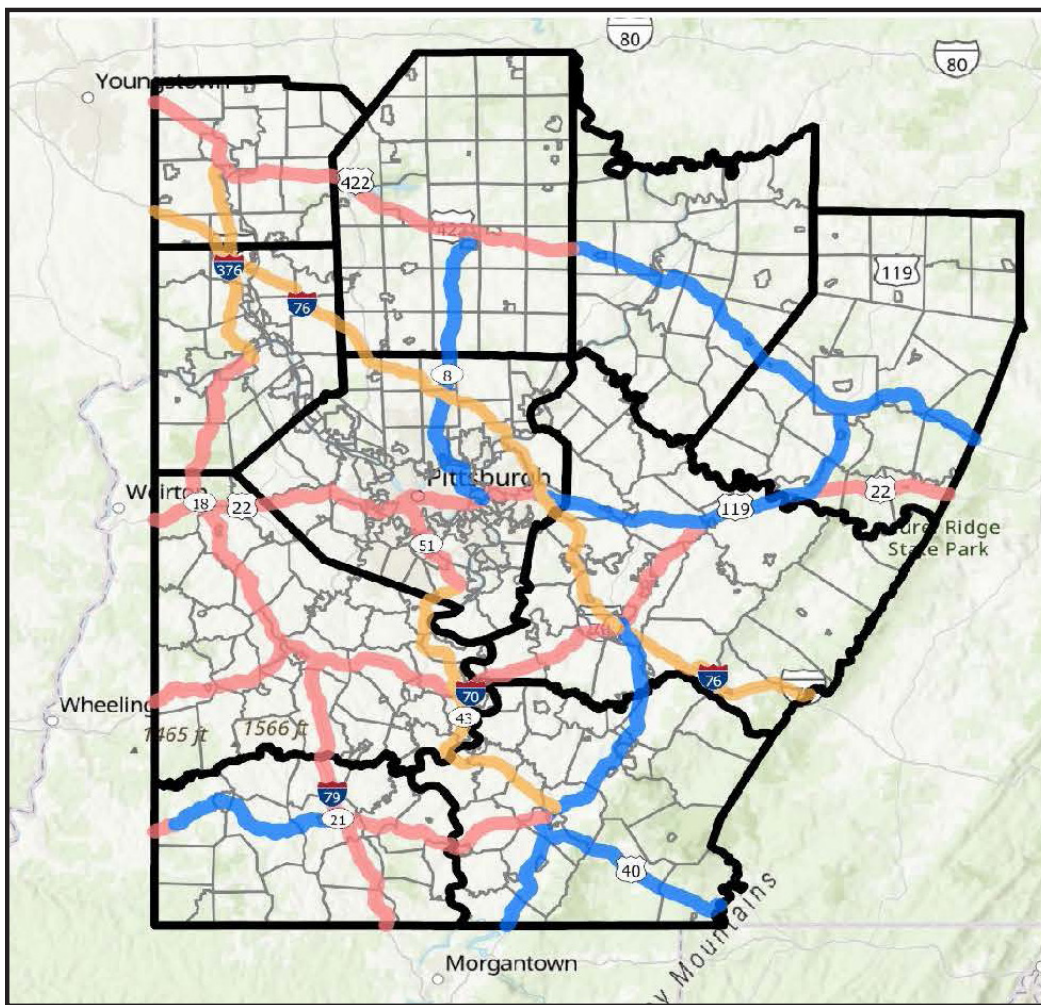
PROJECT ENHANCEMENTS:

Establish local communication hubs near urban areas to allow for network connections and cybersecurity controls.

ALTERNATIVE ROUTE OPTIONS TO LEVERAGE EXISTING FIBER:

Replace I-79 with US 19

Replace I-70 from State Line to Washington with US 40



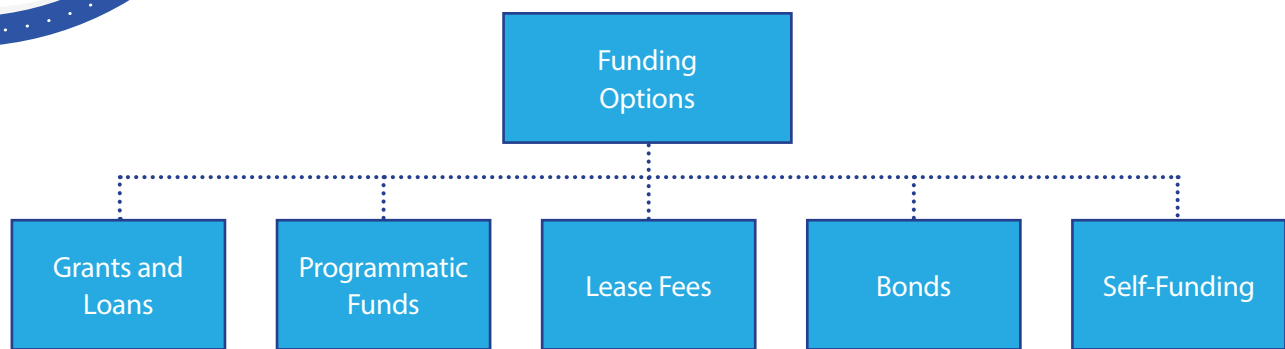
- N
- Existing Fiber: No
- Existing Fiber: Yes
- Existing Fiber: Planned



Funding

Funding and Financing Options

When it comes to funding and financing broadband projects, there are different types of structures available. These structures often work together as it may take multiple structures to finance the end project. Additionally, certain types of funding or structures may only be available to certain governance structures. Broadly, these can be categorized into grants and loans, general funds, lease fees, bonds, and self-funding.



Grants and Loans

Grants and loans are funding sources that involve an application. Grants and loans may be available at the national level, state level, or local level and are typically available for a specific project or group of projects. In many cases, there is a hierarchy of grants where a state may apply for a national grant and then develop sub-grants to award money to lower entities, whether that is a lower level of government or a private entity such as a nonprofit, service provider, utility co-op, or other type of organization.

Grant programs are either competitive or formulaic. Competitive grants are typically awarded based on a set of criteria such as whether the benefitting population is unserved or underserved, whether the project will generate revenue, and whether matching funds are available. Formulaic grants are awarded based upon dividing the available funding to all applicants based upon a formula such as the percent unserved in the state divided by the percent unserved in the country.

There are over 100 existing grant programs that may be applicable to broadband projects in the United States and the SPC region. The National Telecommunications and Information Administration's website lists over 95 federal programs that have funding available for broadband uses. Additionally, Pennsylvania has many funding opportunities available through the Department of Community and Economic Development (DCED) and Commonwealth Financing Authority (CFA).

Grant and loan programs currently available for funding broadband projects are documented in Appendix C in a funding resource matrix developed for the SPC region.

Programmatic Funds

This category of funds refers to money that can be directly allocated. For example, Pennsylvania may apply for a national grant to implement a broadband program. The state may then allocate money directly to counties or directly to organizations that carry out pieces of the digital equity plan. Alternatively, each county in Pennsylvania may be allocated an amount of funding from the federal government that they can put towards prescribed uses. An example of this is a county receiving programmatic funds under the Coronavirus Aid, Relief, & Economic Security Act (CARES Act) and giving these funds to an organization to build out last-mile fiber in their communities.

Bonds

This may refer to revenue bonds or general obligation bonds. Revenue bonds would be repaid through revenue from the network and do not obligate the local government or taxpayers if financial targets are not met. These types of bonds may be difficult to obtain because there is no financial history to endorse success so the project would need a well-designed financial model. General obligation bonds could lead to increased taxes for repayment but may be easier to obtain for broadband projects.

Self-Funding

This category typically refers to equipment or construction projects that are paid for by residents or businesses that benefit directly from the project or service. For example, residents would pay for last-mile installations.

Lease Fees

This category typically refers to government-owned fiber that is leased to ISPs. Fiber buildout may be accomplished through another funding mechanism, such as a loan, and money is paid back by the ISPs leasing the use of public fiber lines.

Available Funding

When funding is made available by the federal government for broadband projects, funds are typically allocated to specific departments which then make funds available through grant programs. Even when an amount of funding is designated for all state governments, this funding still typically requires an application from the state to be awarded. For example, this means that when it is said that specific funds are still available for Pennsylvania, the state must still apply to access those allocated funds. Additionally, when an amount of funding is made available to states, it is frequently allocated in set amounts over a certain number of years so the state may need to apply for its allocation each time new funds are made available.

CARES ACT

In March 2020, Congress passed the CARES Act, a \$2.2 trillion economic stimulus bill in response to the economic fallout of the COVID-19 pandemic. Within the Act, the Coronavirus Relief Fund (CRF) was created, designating \$150 billion for payments to state, local, and tribal governments to navigate the impact of the COVID-19 outbreak with broadband as an eligible use. In addition, the CARES Act provided an additional \$100 million for grants under USDA's ReConnect program to provide loans, grants, and loan/grant combinations to facilitate broadband deployment in rural areas.

AMERICAN RESCUE PLAN ACT (ARPA)

The American Rescue Plan Act (ARPA) was an economic stimulus bill that became law in March 2021. One part of the Act established the Coronavirus State and Local Fiscal Recovery Funds (SLFRF), a program which provided funds to governments across the country to help fight the Coronavirus pandemic. Under the SLFRF Program, funds can be used for broadband. It is important to note that while funds can be used for broadband, there are many other uses that government bodies may choose to apply these funds toward.



The SLFRF program allocated set funding amounts directly to state, city, county, and local governments. Each government entity that was allocated funds will need to apply through a Department of Treasury submission portal to use the funds. The Pennsylvania state government received \$7.3 billion in funding and then counties, cities, and local governments received separate funds. The figure below shows the SLFRF funds allocated to the state and to the SPC region.

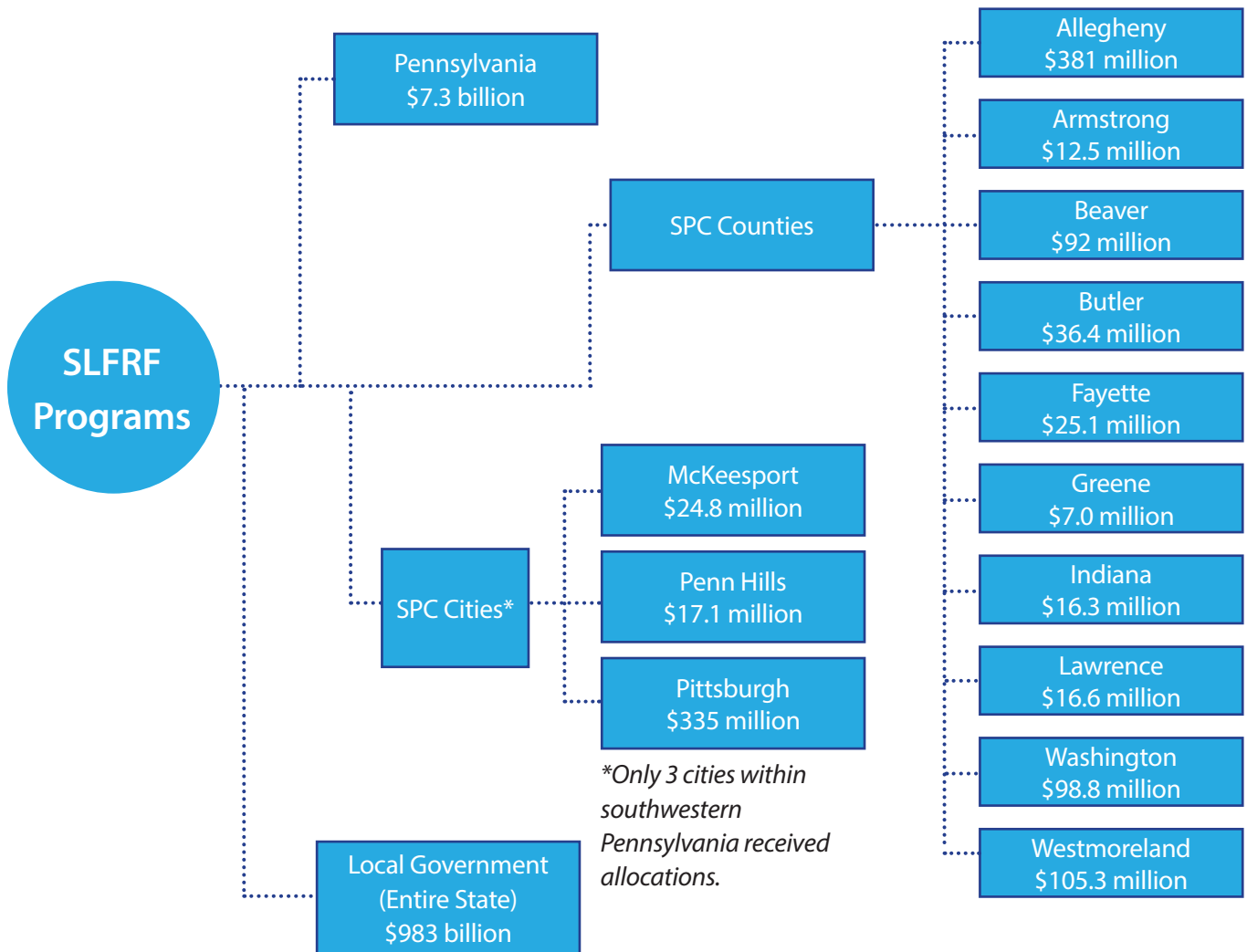


Figure 12: SLFRF Funding Allocation

While at least 50% of the SLFRF funding has been distributed and potentially spent under the Interim Final Rule, remaining unused funds will be made available in spring 2022 and may be used for broadband.

On January 6, 2022, the Treasury released The Final Rule which further governs eligible uses of SLFRF funds that have not yet been spent.

The Final Rule takes effect on April 1, 2022, and has the following suggestions and requirements to identify broadband projects eligible for SLFRF funds:

- Preference to projects that service areas with identifiable broadband needs
- Preference to projects that provide 100 Mbps download and 100 Mbps upload speeds. If cost or geography are barriers though, then 100/20 is allowable
- Preference to last-mile connections
- Encourage broadband networks owned by or affiliated with local governments, nonprofits, and co-operatives
- Low-income subsidy programs (required)

INFRASTRUCTURE INVESTMENT AND JOBS ACT (IIJA)

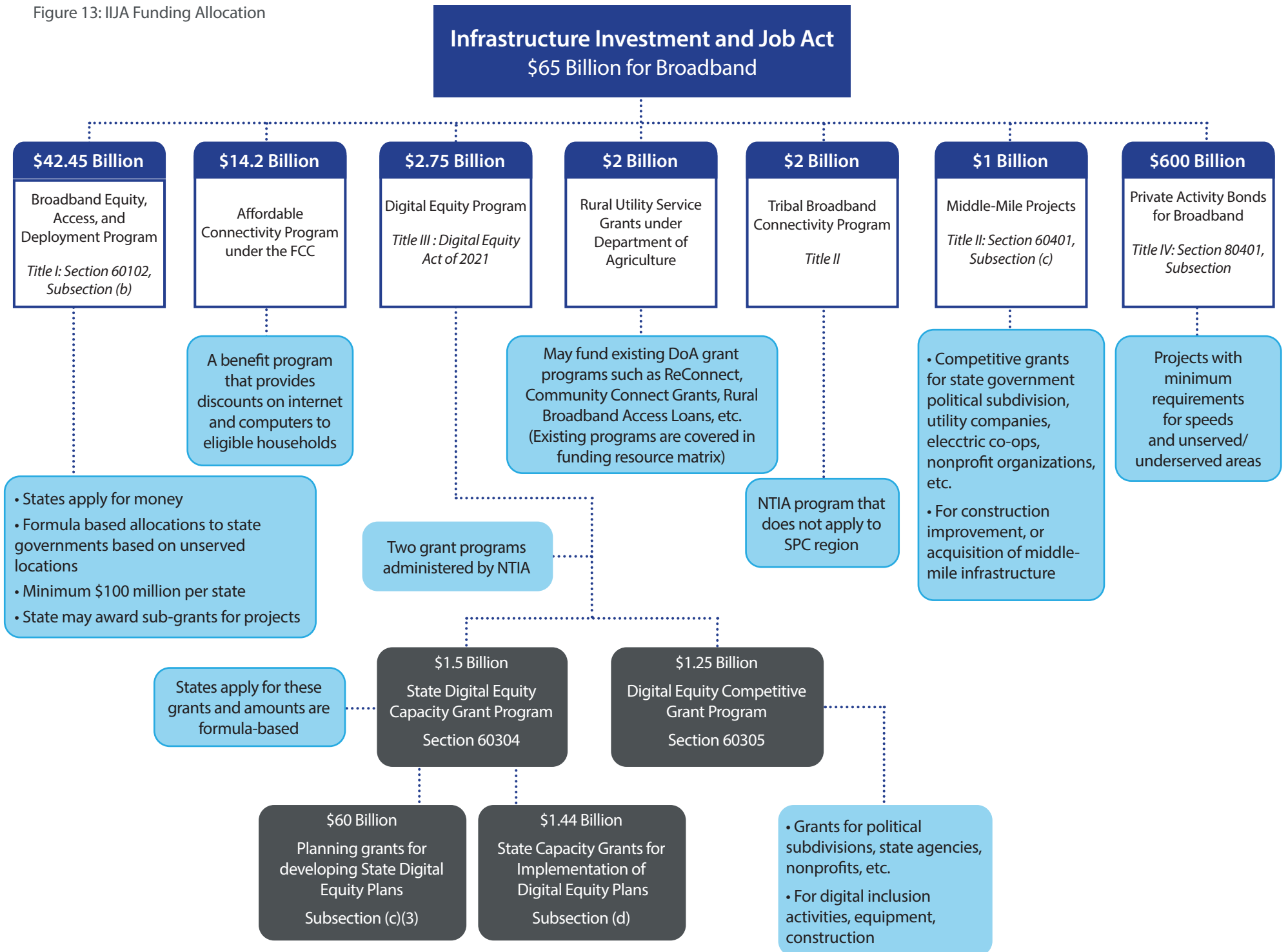
The recently passed Infrastructure Investment and Jobs Act includes \$65 billion for broadband. This \$65 billion is divided into seven buckets which are then further divided into grants available to governments, private entities, and nonprofits. The IIJA specifies the creation of some new grant programs with a portion of the funds. The remaining funds may be used to provide additional funding for existing grant programs or to create other new grant programs not specified in the Act. For example, the U.S. Department of Agriculture will receive \$2 billion that may be used to fund existing grant programs, such as ReConnect, or may fund new grant programs that the department creates.

The following flowchart gives an overview of the funding available from the IIJA. Of the seven buckets, Pennsylvania is expected to receive a minimum of \$100 million and also be able to apply for formulaic grants under the \$42.45 billion allocated to the Broadband, Equity, Access, and Deployment (BEAD) program and the \$2.75 billion allocated to the Digital Equity Program. To help manage this new broadband funding, in December 2021, the Pennsylvania General Assembly passed legislation that established the Pennsylvania Broadband Development Authority (PBDA) to serve as a single point of contact for the development and deployment of broadband service.

Additionally, the Pennsylvania state government, other political subdivisions (county or local governments), and non-governmental organizations will be able to apply for grants under the U.S. Department of Agriculture, which is receiving \$2 billion, or a future grant program with the \$1 billion available for middle-mile projects. The \$14.2 billion for the Affordable Connectivity Program can also benefit households within the SPC region if they are aware of the available benefits. Service providers can apply for private bonds that are funded by the \$600 million in the Act.



Figure 13: IJA Funding Allocation





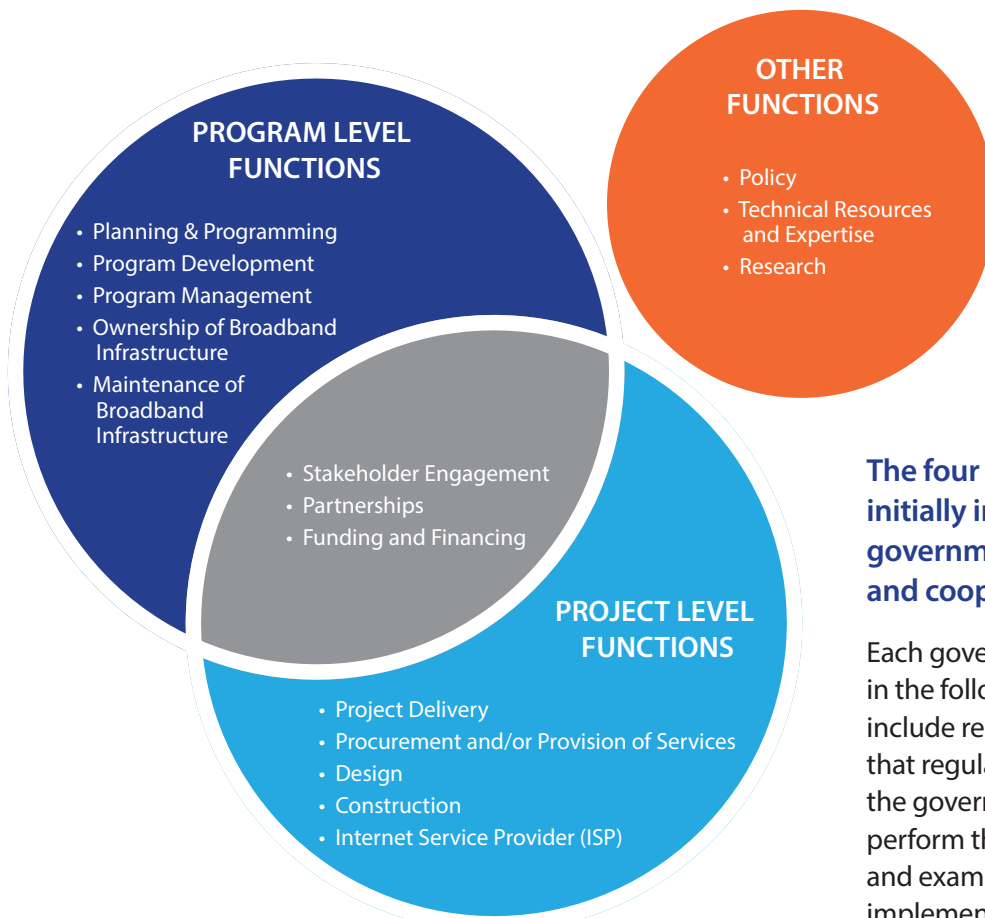
Governance Types

Regional Governance

A diverse set of skills and functions are required to plan, implement, operate, and continuously improve broadband service and use in the region, which surpasses the capacity of individual local governments. To fill this gap, the region needs a clear regional leader to guide and manage shared resources and partnerships. This Connectivity Roadmap reviews four potential operating structures for this regional broadband governing body, and explores how it may operate to best support the efforts and partnerships involved.

Each governance type facilitates certain functions and precludes others. Before selecting which type will best support our region's broadband efforts, the desired functions for the governing body will need to be identified. Below is a diagram illustrating an example of potential functions for the governing body. The SPC and the counties will need to work together to determine the preferred functions before selecting one of the following governance structures.

FUNCTIONS OF A GOVERNING BODY



The four possible structures initially investigated are: government, authority, nonprofit, and cooperative.

Each governance structure is described in the following pages. The descriptions include relevant Pennsylvania laws that regulate each structure type, the governance structure's ability to perform the suggested functions, and examples of these structures as implemented around the country and in Pennsylvania.

Figure 14: Possible Functions of a Governing Body

Government

A governmental entity is one that is defined by law as a public and political body. Because no single governmental body exists that would cover the whole SPC region, this approach would involve some level of intergovernmental cooperation from existing bodies. Pennsylvania Title 53, Chapter 23, Subchapter A, which governs intergovernmental cooperation, allows local governments (county, second- or third-class city, borough, town, or township) to enter into joint agreements to cooperate on exercising governmental functions, powers, or responsibilities.

Government bodies, including joint bodies such as COGs, are well-situated for many broadband functions: policymaking and planning; promoting partnerships (including P3s); securing and dispersing funding; procuring or providing technical resources, expertise, and construction services; and managing and delivering projects or a program of projects.

While many government entities around the country have built municipal-owned broadband networks, few are serving as the ISP. Historically, municipal ventures into providing internet service have received pushback from major telecommunications companies. As a result, many states, including Pennsylvania, have laws that prohibit the government from providing internet services. Act 183 of 2004 amended PA Title 66 to prohibit any political subdivision, or any entity established by a political subdivision from providing, for compensation, broadband services within the service territory of a local telecommunications company without first giving any existing telecommunications companies in the service area the right-of-first-refusal to provide services.

Due to these laws, Public-Private Partnerships are becoming common around the United States to accomplish broadband expansion projects. DRIVE, a council of governments in central Pennsylvania, is an example of a government body taking the lead on building out and owning broadband infrastructure and partnering with local ISPs to provide broadband services.

Governmental bodies, both individual and joint, in other states have successfully deployed broadband service. Huntsville, Alabama, has had success building physical infrastructure using investments, leasing the infrastructure to ISPs, such as Google Fiber, and then using the revenue from the leasing agreements to pay back investors. In Utah, 11 cities formed a consortium, the Utah Telecommunication Open Infrastructure Agency (UTOPIA) which has built, deployed, and operates fiber to every business and household within their communities.

Common Public-Private Partnerships (P3)

Public Financing of Private Infrastructure

- Public partner acquires and provides funding for deployment
- Private partner builds, owns, and operates network
- Private partner agrees to service requirements (locations served, speeds, etc.)
- Allows for fast commitment of programmatic funding
- Often a competitive process to choose private partner

Public Financing of Public Infrastructure operated by Private Sector

- Public partner funds, constructs, and owns the infrastructure
- Private partner leases infrastructure and provides services (ISP)
- Ownership of infrastructure could be transferred after the term of the financing
- DRIVE is an example of this type of P3

UTOPIA provides the infrastructure and allows local ISPs use their network to deliver services. Chattanooga, Tennessee, owns, maintains, operates, and serves as the ISP for the municipality and has been recognized as having some of the best broadband access in the country.

GOVERNMENT USE CASE: DRIVE

- Council of governments formed by ordinance under PA Constitution Article 9, Section 5 and Title 53, Chapter 23, Subchapter A
- Board consists of two community representatives and one county commissioner from each of the five member counties
- Piloted a wireless network in one county in 2019 using a private loan and expanded to all counties using direct funds that the member counties received through the CARES Act
- Open Access Community Network is currently leased by two ISPs
- Currently builds, operates, and maintains network with future plans to find an independent entity to handle O&M due to lack of internal capacity
- Has given “right-of-first-refusal” to ISPs before building out service area

Authority

Under PA Title 53, Chapter 56, municipal authorities can be established for numerous public services, including transportation, parks, sewers, steam plants, incinerator plans, waterworks, electric power, hospitals, and industrial development. Because broadband is not listed as a purpose of an authority under this act, formation of a broadband authority is not explicitly permitted and the existence of one in Pennsylvania was not found. Pennsylvania law allows for municipal authorities to jointly organize to extend service areas across municipalities. The law grants the following powers to authorities: acquire, purchase, hold, lease, and use property; finance projects by accepting grants from federal agencies, the commonwealth, and corporations; use eminent domain; and more. Like government, authorities are public bodies that are typically established by law under a county or local government or by a partnership agreement between more than one local government.

Under PA Title 53, Chapter 56, Section 7, Subsection b, because municipal authorities are established to benefit the people of the Commonwealth, they are restricted by law from constructing, financing, improving, maintaining, or extending operations of any project or projects that duplicate or compete with existing enterprises serving substantially the same powers. Thus, a municipal authority likely cannot pursue any projects that may be perceived as competing with an existing ISP.

There are a few successful examples of using an authority to govern broadband development around the country. Virginia passed the Virginia Wireless Services Authorities Act in 2003 which allowed for municipal governments to form public authorities for the purposes of broadband. Two examples of larger authorities in Virginia are the Roanoke Valley Broadband Authority, which covers two cities and two counties, and the Southside Network Authority, which covers five cities. The boards of these organizations consist of local government council members, commissioners, and other public officials.

Nonprofit

A nonprofit organization is a corporate entity established to serve the public good. Nonprofits may have paid employees, volunteers, or both, and may generate revenue from fundraising, donations, fees for services, events, and grants. Nonprofit organizations are eligible to apply for nearly half of the federal programs that offer broadband funding, and with the exception of policymaking, are positioned to serve many of the same functions as a government entity. A nonprofit organization could also serve as a resource for local governments in establishing broadband programs and developing partnerships. However, a nonprofit may not have the capacity to oversee and manage physical projects.

In Pennsylvania, Metropolitan Planning Organizations (MPOs), Rural Planning Organizations (RPOs), and Local Development Districts (LDDs) are generally set up as nonprofit organizations. Even when established as nonprofits, these entities are also considered quasi-governmental because their boards are often made up of county commissioners and other local representatives. There is little legal precedence for whether government entity broadband laws apply to nonprofit organizations governed by a board of mostly elected officials.

Two examples of PA nonprofits governing regional broadband programs and projects are

Alleghenies Broadband, Inc. and North Central Regional Planning and Development Corporation.

NONPROFIT USE CASE:

Alleghenies Broadband, Inc (ABI)

- 501(c)(3) nonprofit organization formed in 2019 by the Southern Alleghenies Planning and Development Commission (SAP&DC), an RPO and LDD
- Formed as a separate entity from SAP&DC to have a separate organization whose sole purpose is addressing broadband issues in the region
- Currently operates under a staff-services agreement: four SAP&DC employees devote their time to ABI
- Primarily focused on serving as a conduit for funding to existing ISPs
- Pursues public funding and engages county governments to prioritize broadband investment
- Does not serve as an ISP or complete construction projects

NONPROFIT USE CASE:

North Central Regional Planning and Development Commission

- 501(c)(3) nonprofit organization working in broadband for almost 25 years; also an LDD and RPO for six counties
- Builds, owns, operates, maintains, and provides internet to approximately 450 customers
- Entire operation is run by two full-time staff and one part-time staff paid through revenues from internet service
- Maintenance and expansion are also funded primarily through revenues
- Has a partnership with Zito Media who constructs, owns, and maintains the fiber backbone to the wireless network

Electric Cooperative

A cooperative (co-op) is not an organizational structure, but rather describes the governing structure of an organization. For example, nonprofit organizations or private businesses may be co-ops. Rural electric co-ops were established by law in Pennsylvania in 1990 to provide electric service to unserved areas. Given the powers provided in Pennsylvania law, electric co-ops are existing entities that are well situated to provide regional broadband services.

Across the US, more than 200 electric co-ops are developing or planning to deploy broadband service to their members. Electric co-ops are ideal for establishing broadband networks:

- Electric co-ops are nonprofit organizations with low return-on-investment requirements compared to for-profit ISPs. This allows co-ops to charge less than ISPs for high-speed internet service.
- The infrastructure needed for broadband, including rights-of-way and poles, is the same that co-ops use to deliver electricity to their members.
- Electric co-op owned fiber-optic infrastructure improves electrical grid reliability and efficiency, giving members greater control over their bills, helping pinpoint power outages, and speeding restoration of service.
- Electric co-ops are winning large grants for broadband. In 2020, the FCC granted approximately \$1.6 billion to electric co-ops in 31 states under the RDOF for the establishment of broadband services.

COOPERATIVE USE CASE:

Tri-County Rural Electric Cooperative

- Co-op owns the infrastructure (poles and fiber)
- An independently staffed subsidiary, Tri-County Connections, is the ISP and serves over 1,800 customers
- Tri-County Connections leases over 1,000 miles of fiber from the co-op

Pennsylvania has two laws governing cooperative corporations:

PA Title 15, Chapter 71, also known as the Cooperative Corporation Law of 1988,

allows co-ops to be established. This law does not specify whether local governments can form a cooperative, but it is likely that the Municipal Authorities Act governs the ability of municipalities to jointly organize.

PA Title 15, Chapter 73, also known as the Electric Cooperative Law of 1990,

permits the formation of electric co-ops and gives them the power to use Pennsylvania right-of-way for electric lines.

PA Title 68, Chapter 82, passed in October 2020, gives electric co-ops the right to construct, operate, and maintain broadband facilities through existing easements owned, held, or used by the co-op. The co-op cannot supply broadband services but can partner with an ISP to provide internet service.

In October of 2020, Chapter 82 was added to PA Title 68 to outline broadband regulations for electric co-ops to construct, operate, and maintain broadband facilities through existing easements owned, held, or used by the electric co-op. The co-op cannot supply broadband services, but can partner with an ISP to provide internet service. One electric co-op in Pennsylvania, the Tri-County Rural Electric Cooperative, founded Tri-Co Connections, LLC to bring fiber to the homes of their members and serve as the ISP.

Governance Conclusion

Limiting Path: Both municipal authorities and electric cooperatives face challenges as a regional governance structure. There is no precedent in Pennsylvania for a municipal authority being formed to support broadband and its not explicitly allowable under the Municipal Authorities Act. Electric co-ops can and should play a role, as partners, in the expansion of broadband service into rural areas of the region in which they cover. However, their coverage is limited to only a few of the counties in the region.

Direct Path: The government and nonprofit structures are most supportive of the connectivity goals in this Roadmap. Goals such as expansion into the public domain, supporting digital literacy and equity programs, facilitating and leading partnerships, supporting other industry sectors, and advancing policies and legislation, are at the core of government and nonprofit structures. In addition, any regional broadband goals need to be supported by funding. Both government and nonprofit organizations have access to a majority of the primary public funding streams as documented in the Roadmap.

Regional Path: An approach that pairs SPC, either as the LDD or MPO, in collaboration with the 10 counties follows the Direct Path. This structure could be set up quickly and positioned to apply for funding immediately, either through SPC or the counties individually with SPC's support, as suits each case's need. The following are benefits for proceeding with an SPC and counties partnership approach:

- SPC is an established nonprofit with a board inclusive of all county governments of the region
- Where the counties need it, SPC has resources to support the region and deliver on the program goals with experience securing and managing public and private funds for multiple regional programs, including broadband

The Regional Path structure should consist of a predominantly county government board and may be either a nonprofit with planning organization staffing or a council of governments.

ALTERNATIVE 1: Leveraging Existing Nonprofit, SPC *(preferred)*

There is precedent in the Commonwealth for an LDD/RPO taking on this role. The North Central Regional Planning Commission is leading buildout of broadband in unserved or underserved areas of their region. Southern Alleghenies has formed and staffed a nonprofit focused on broadband, with the counties continuing as board members.

ALTERNATIVE 2: Create Regional Broadband Nonprofit

ALTERNATIVE 3: Form Regional Council of Governments

DRIVE has formed as a regional Council of Government, with the county governments represented on its board and broadband being one of several economic development assets that DRIVE brings to its member counties. DRIVE partners with the RPO in the region, SEDA-COG, and serves as an example of how a regional organization can pool appropriated funds from multiple county governments to implement projects, while still ensuring each county's funds benefit that county.








Next Steps and Priority Actions

Actions are not listed in order of importance.





REGIONAL EFFORTS

- 1 Advance the SPC nonprofit and county governance structure to best support regional needs.
- 2 Develop a regional marketing campaign to promote the benefits of broadband and highlight existing broadband affordability programs.
- 3 Select a regional pilot infrastructure project and identify partners to develop a grant application for broadband deployment.
- 4 Prepare guidance in partnership with Carnegie Mellon University and Allies for Children for partners to utilize the Connectivity Opportunity Areas and available shared resources in seeking grant funding and developing best practices. Guidance should include the identification of potential partners, likely incentives, and actions they can support related to the identified goals and strategies.
- 5 Continue collaboration with the 10 counties and the City of Pittsburgh to ensure the Connectivity Roadmap is utilized and updated while technology, beneficial programs, and additional funding mechanisms evolve.
- 6 Share the Connectivity Roadmap with the PA Broadband Development Authority and relevant state agencies to support the shaping of state-level broadband processes.
- 7 Collect further broadband location data to ensure unserved locations in the region are properly identified in preparation for the FCC's challenge process. This will position the Commonwealth and region to secure additional funding via the IJJA's Broadband Equity, Access, and Deployment Program.

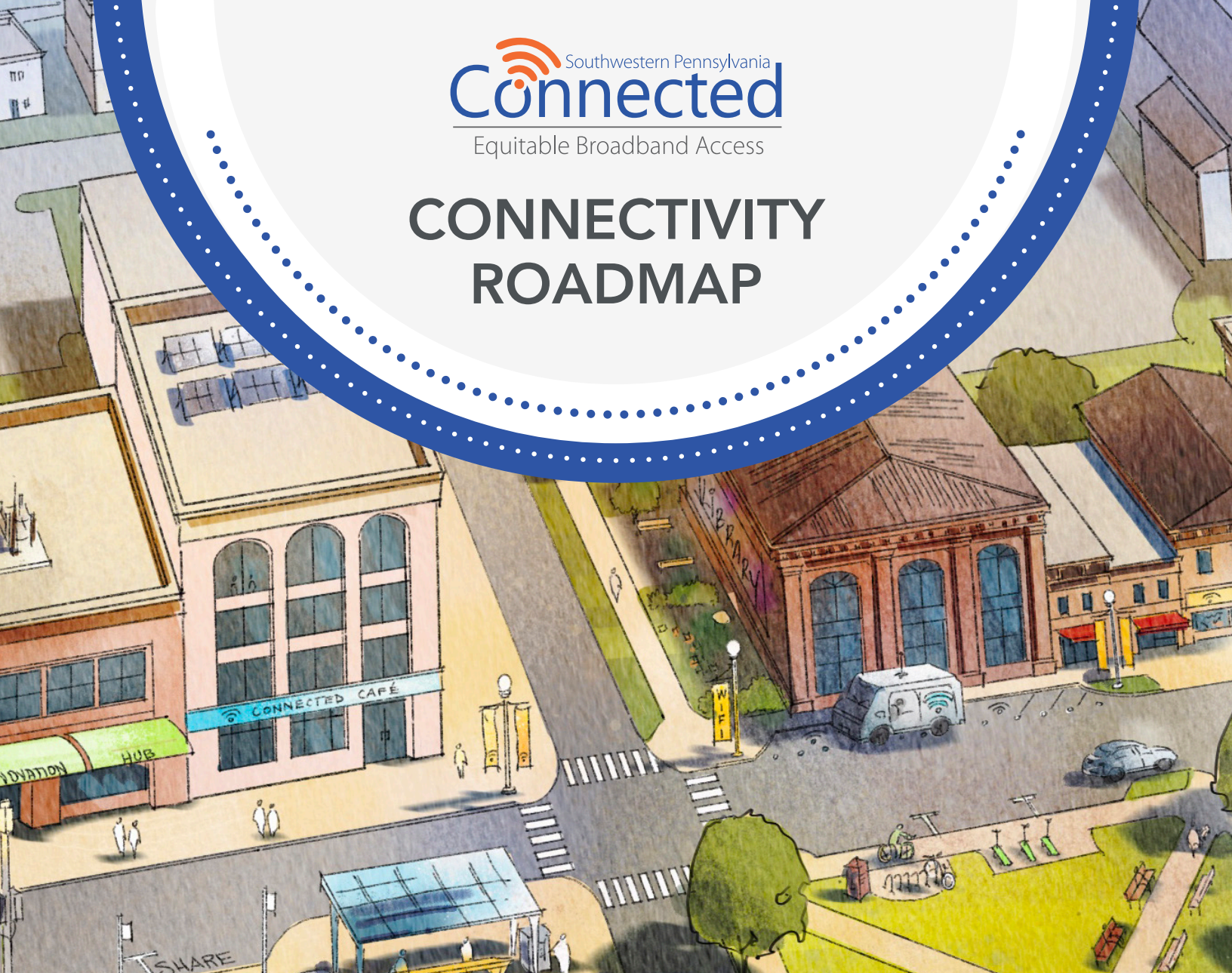
COUNTY AND MUNICIPAL LEADERS

-  Participate in the governance structure that is selected in accordance with this Roadmap to ensure that counties jointly benefit from regional investments and efficiently share resources across boundaries.
-  Advocate to local state representatives to ensure that local needs are understood and addressed, including accurate data representation and policy changes from zoning and land use to expanded regulations over service and cost inequality.
-  Develop streamlined permit processes for installation and operation of broadband infrastructure.
-  Utilize the Broadband Connectivity Indices available at www.spcregion.org/connected to conduct a self-assessment of current conditions within the county or municipality and support locally-led grant applications and planning efforts.
-  Select a pilot infrastructure project and identify partners to develop a grant application for broadband deployment.

PRIVATE SECTOR AND NONPROFIT PARTNERS

-  Identify edge of network unserved areas that are within reach of existing broadband facilities and meet with the ISPs to address constraints. Prioritize near-term expansion opportunities around existing facilities.
-  Identify the goals and strategies that align with your organization's mission and connect with SPC and/or county leadership to seek or become a partner in implementation.
-  Set organization-level goals that commit to your role in implementing connectivity for all. Some examples may be: commit to speed and service thresholds (providers), commit to funding allocations for affordable subsidies (nonprofits), and create digital literacy programs (institutions).
-  Use the Connectivity Roadmap's Engagement Tool kit available at www.spcregion.org/connected to promote improved broadband and spread awareness about existing resources as well as the goals and strategies for connectivity.

CONNECTIVITY ROADMAP



LEARN MORE

Visit www.spcregion.org/connected

to read the Connectivity Roadmap Report and
learn how to apply this plan to your area.

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