



Vertical Asset Management, Public-Private Partnerships, and Funding Benchmarks for Broadband Deployment

Executive Summary

Private corporations nationwide are not incentivized to deploy broadband services to areas which are not guaranteed to provide a significant financial return. Rural areas have low population densities, may require longer middle mile fiber networks, and may be surrounded by difficult terrain, which all increase the costs for broadband deployment. Economically disadvantaged communities in more urban areas may not provide enough financial incentive for providers to deploy broadband. Public-private partnerships (PPPs) such as those that have been established in states across the U.S. may help to overcome these barriers by leveraging financial resources, enhancing revenue potential, and sharing expertise. Additionally, fixed wireless networks may overcome some of these barriers by removing the requirement to physically deploy a fiber network.

Highlights

- The BroadbandUSA program provides several suggestions for state and local governments to increase the success of public-private partnerships including: 1) reducing right of way requirements, streamlining zoning and permitting processes; 2) reducing or eliminating fees or rents in exchange for services or use of broadband network infrastructure; and 3) compensating partner participation by allowing use of unused fiber.
- While the FCC uses 25 Mbps download and 3 Mbps upload speeds for their broadband benchmark, some federal grants, including the USDA ReConnect Grant and Loan Program and the Capital Projects Fund via the American Rescue Plan Act, are requiring 100 Mbps upload and download speeds to be delivered by grant awardees.
- There are tens of thousands of kilometers of unused fiber, or dark fiber, available for lease or purchase in the United States.

Limitations

- There is a limited body of research investigating the effects of specific state policies on the successful implementation of public-private partnerships, particularly those that focus on broadband and fixed wireless.
- There is limited publicly available information regarding 1) what situations lead to the choice of fixed wireless as an ideal broadband deployment technology, and 2) the extent of publicly- and privately-owned dark fiber.

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Research Background

Fixed Wireless

Fixed wireless internet is a method to achieve last mile internet deployment. A transmitter is typically fixed to a tower that transmits broadband internet to receivers within the line of sight in an area around it.¹ Fixed wireless internet can be transmitted over both licensed and unlicensed portions of the wireless spectrum.² New transmitters can provide speeds of up to 100 Mbps for households within one mile of a transmitter, and speeds of up to 50 Mbps within 5-6 miles.¹ However, many rural internet service providers have been deploying older technology that cannot provide these speeds.

The quality of internet provided by fixed wireless depends on a variety of factors.¹ The frequency of the spectrum used can determine the amount of data that can be simultaneously transferred over the network (i.e., bandwidth) and range. Distance of the receiver from the transmitter and the presence of interference such as foliage or precipitation can also affect the quality of the broadband service. The ability of transmitters to manage the bandwidth associated with multiple customers is also important.

Vertical Asset Management

Fixed wireless transmitters are most effective when placed on tall structures with line of sight to many potential customers, called *vertical assets*. These can be water towers, multilevel buildings, radio towers, and other tall government buildings.

The North Carolina Department of Information Technology's Division of Broadband and Digital Equity provides guidance and actions for state and local governments to increase the accessibility of vertical assets for potential partners, including:

- 1) *Mapping Vertical Assets*³ – Detailed mapping of vertical assets at the county or state level and potential customers can minimize roadblocks to fixed wireless deployment. An example county-wide map in North Carolina can be found [here](#), and a statewide map in Virginia can be found [here](#). North Carolina also provides a mapping guide [here](#).
- 2) *Vetting Vertical Assets*⁴ – Several properties of vertical assets can be vetted to ensure that wireless deployment will be successful. Potential assets should be vetted to ensure that it is located in a community that needs service. Fixed wireless transmitters also need to be able to manage large bandwidth from multiple customers, and so “backhaul” opportunities such as access to fiber should be identified. Additionally, the vertical asset owner should be contacted to see if they are interested in leasing their space to a wireless service provider and what costs would be incurred. North Carolina's Department of Information Technology provides a guide to vetting vertical assets [here](#).
- 3) *Structure Access*^{5,6} – Allowing wireless broadband providers access to government vertical assets can lower broadband deployment costs. North Carolina's Department of Information Technology provides an overview of rights of way [here](#), and

building/structure access [here](#).

The federal government has taken steps to make federal assets more available for rural broadband deployment. A presidential memorandum was issued to the Secretary of the Interior in 2018 to “...increase access to tower facilities and other infrastructure assets managed by the [DOI]”.⁷ In 2014 the FCC adopted several measures and exclusions to facilitate wireless infrastructure deployment.⁸

Public Private Partnerships

In certain instances, increased broadband deployment costs may decrease incentives for private companies to deploy broadband in certain areas. For instance, some rural areas may experience increased deployment costs because of lower population densities, lengthy middle mile fiber networks, and difficult terrain.⁹⁻¹¹ Broadband deployment may also lag behind in more urban economically disadvantaged areas because the financial return does not justify the investment.⁹ Private-public partnerships (PPP) between state and local governments and companies in the private sector can help to overcome these issues by leveraging combined financial resources, enhancing revenue potential, and sharing expertise.¹¹

There are several different types of PPPs depending on the relative involvement of the private and public sectors. PPPs can be private sector-led, where a commercial operator builds, owns, and operates the broadband network; public sector-led, where a public entity owns the network and a private partner builds and/or maintains the network; or some form of joint ownership model.^{1,11}

A publication by the BroadbandUSA program, housed in the National Telecommunications and Information Administration (NTIA), provided several suggestions to improve the success of PPPs.¹¹ Their suggestions include for state and local governments to: 1) reduce right of way requirements, streamline zoning and permitting processes; 2) reduce or eliminate fees or rents in exchange for services or use of broadband network infrastructure; and 3) compensating partner participation by allowing use of unused fiber.

SHO-ME technologies participated in a private industry led PPP with the state of Missouri.¹¹ In 2010, NTIA provided a \$26.6 million grant for SHO-ME technologies to deploy a 1,494 middle-mile network in south central Missouri.¹² SHO-ME technologies collaborated with Missouri to identify and target unserved and underserved areas. The project connected K-12 schools to the network, connected regional law enforcement databases, and provided low prices for last mile interconnections. This enabled broadband providers to extend broadband services at affordable rates.

Dark Fiber

A deployed fiber network may not be actively using all of its fiber capacity. Any unused fiber is known as “dark fiber” while actively used fiber is referred to as “lit”. There are tens of thousands of kilometers of unused dark fiber available for lease or purchase in the United

States.¹³ Dark fiber can be used for multiple purposes in the context of PPPs. For instance, dark fiber can be provided as compensation by state and local governments to private companies for running and managing a fiber network. States can also pass legislation that makes it easier for companies to lease their dark fiber. In 2010, Maine created a new designation for a “dark fiber provider”. This allowed Maine Fiber Company to lease dark fiber to other broadband providers to supply service to their customers.¹¹

Broadband Benchmarks for Federal and State Funding

On an annual basis, the FCC investigates whether broadband is being deployed to all Americans in a timely and reasonable manner. As part of this, they also determine what an acceptable broadband benchmark speed is (see our previous Science Note on [Internet Speeds](#)). In 2021, the FCC declared that 25 Mbps download and 3 Mbps upload speeds continue to be sufficient.¹⁴ These speeds are adequate for a single device to stream video. However, faster speeds would allow households with multiple users to simultaneously participate in high quality video conferencing for work or school, stream videos, and play games. Faster speeds would also allow users to keep up with future demand as more devices connect to the internet such as thermostats, phones, televisions, video doorbells, security cameras, and other appliances.¹⁴

Different benchmarks are used for federal and state grants that seek aid in the deployment of broadband. The USDA’s [ReConnect Loan and Grant Program](#) provides loans and grants of up to \$350 million and requires awardees to provide 100 Mbps symmetric upload and download speeds. The [Capital Projects Fund](#) through the American Rescue Plan Act provides funds for broadband infrastructure projects as long as they are also designed to deliver 100 Mbps symmetric speeds. Other federal and state grant programs target areas that have below 25/3 Mbps or require applicants to provide at least 25/3 speeds. These include the [USDA Community Connect Grants](#); the [Broadband Equity, Access, and Deployment Program](#) via the Infrastructure Investment and Jobs Act; and the Missouri Broadband Grant Program ([RsMO 620.2451](#)).

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