

Building a Community Broadband Network - What You Need to Know Before You Begin

A look at the importance of fast and reliable Broadband for communities, and the steps needed to make that happen.





Introduction

Fast, affordable broadband is essential to the long-term success of communities and their citizens, giving them the ability to participate and thrive in the global economy. Yet some parts of the United States continue to lag in establishing access to high-speed Internet in all areas of the country.

Expanding access to all parts of America has become a critical public policy goal. Support for broadband in rural America continues to grow, as evidenced by public meeting notices or a quick scan of the Internet and social media. Broadband is now considered critical infrastructure, the equivalent of electricity or water, and according to the FCC, public and private sector initiatives to expand broadband coverage are growing. But closing the gap has been slow in places, and broadband as currently defined by the FCC (25 Mbps x 3 Mbps) is not being deployed to all Americans in a reasonable and timely fashion. In fact, in some rural areas the only options are dial-up, with its 1995-era speeds, or a connection via geostationary satellite, which has inherent latency issues. In these areas the infrastructure to support broadband just is not there, usually because it's not cost effective for larger incumbent providers like the telephone or cable company to serve them.

To remedy this gap in coverage, an increasing number of municipalities, electric cooperatives, and independent telephone and cable companies are investing in building or expanding their network to fill the gaps created by large national cable and telephone companies that have focused their investments primarily in areas with assured returns.

There is no one size fits all solution to connect a community. There are several potential solutions, and different models have successfully brought broadband to underserved communities. Often the most popular solution is not the best technology for a particular area, so a community should look at all of the different options that are available.



Broadband Deployment Models

Private Sector Broadband

Private sector providers must make broadband investments in communities where there is a quick return on investment to keep the stock value high. There is minimal financial incentive for private sector companies to upgrade or extend their infrastructure in rural communities where there are a small number of potential subscribers spread out over long distances.

Municipal Networks

Municipal networks are built as a municipal effort and are owned by local governments. These local governing bodies get involved in building internet service when the private sector declines to deliver service to the area or when the customer cost of service is much higher than in other locations. Local governments try to fill the gap by using resources such as right of ways, prebuilt infrastructure, and other government property already in the community. Examples include Chattanooga, Tennessee; Wilson, North Carolina; and Sandy, Oregon.

Municipal networks can be modest, serving a few businesses or networks that are available at every address across a community. Some are run by a single municipality or by several municipalities on a regional level. Most of these operate like traditional private-sector networks with the difference being that the revenue that is available for government broadband projects includes bonds and grants. These funds usually have the luxury of having more time to pay them off as compared to the private sector.

Municipal delivery models face several obstacles though. Private sector providers consider public sector competition to be unfair. While changes are being made, many states have legislation that prohibits or limits public sector delivery of broadband services. Problems with high startup costs and low population density, especially if delivery is limited to a small population within municipal boundaries, also makes it difficult to justify the cost of facilities and to see the return on investment necessary to maintain and upgrade the network and facilities.



Public-Private Partnerships

When communities and private companies partner to provide greater efficiency and better access to capital, they share the risks but also the rewards of network investment. Dividing the responsibility and roles between communities and a private sector operator offers an alternative to an entirely government-owned network. The city of Westminster, Maryland has a very successful public-private partnership with the private provider Ting.

Open Access Networks

Open access networks allow multiple ISPs to offer broadband service over the same fiber infrastructure. This will enable subscribers to have multiple options, which can drive down costs and drive up the quality of service. The owner of the network, which could be the city, a utility, or even a private company, builds and owns the infrastructure, and independent Internet

service providers operate using that same physical network but in a competitive market environment. This increases the pool of competitors because each service provider no longer needs to invest in building their own network across the community, allowing them to recover their costs and make a profit with fewer subscribers.

Institutional Only Networks

Institutional networks connect only government buildings such as the town hall, city office buildings, schools, public safety, and libraries. These networks do not serve homes or private businesses. Montgomery County, Maryland has an institutional network that has brought tremendous cost savings and higher-quality telecommunications to its public facilities. Facilities, such as public libraries and schools, are among the first places people go to access the Internet when they cannot at home. Institutional networks can also serve as the valuable backbone to support an eventual wider build-out of broadband services to the community.



Electric Co-Ops

Rural electric cooperatives brought electricity to communities and later telephone service. Many of these same co-ops are now expanding to deliver high-quality internet access to their rural regions. Like some municipalities, they have access to utility poles and other rights of way that make it easier for them to deploy broadband service to their members.

Working with Incumbent Providers

Many communities can and have partnered with success with the local incumbent providers, whether large national providers or small, local ISPs. Smaller incumbents, like telephone cooperatives, tend to be especially receptive to partnerships with local communities.

So, What's Holding Us Back?

Some communities have implemented changes at the local government level. The broadband networks built by municipalities present an opportunity to connect communities to broadband, but many states have legislation that bans municipal networks from being built.

Conservative analysis shows that Americans who do not have access to broadband often live in states where municipal networks are barred or outright banned by state legislation.

But these restrictions seem to be changing rapidly in the aftermath of the COVID 19 virus crisis of 2020. For example, on June 25, 2020, the U.S. House of Representatives introduced the Accessible, Affordable Internet for All Act. This new Act calls for the federal government to invest \$100 billion to ensure all Americans have access to affordable, high-quality Internet access. This new legislation would also remove state restrictions on community-owned broadband networks.

Unfortunately, there is no simple 'one size fits all' solution for tackling the project as every community and its needs are unique. Finding the optimal way to bring high-speed broadband to a community is the goal, whether it's a municipality, electric co-op, or cable company.



So Where do You Start?

Identifying Goals

Project leaders need to first think about what problems they're hoping to solve with broadband access. The best strategy for investing in broadband is to approach it with end goals in mind, so leadership should start by asking, "What pain points can be eliminated if high-speed internet was available?"

Does your Community Have These Issues?

- It's necessary to work from the local library or drive around town to find WiFi
- There are limited broadband choices and affordability issues.
- Residents can't sell their homes.
- Students can't complete homework assignments or participate in remote learning.
- Young people are leaving the community and finding jobs elsewhere.
- Grandparents can't video chat with grandchildren.
- Telehealth applications are not available.
- Communication is limited for public safety personnel.
- Local businesses are leaving or closing down, and new ones are not opening.

After your goals are established, next organize information about your community's current needs.

Measuring Demand

It's vital to have an accurate assessment of resident and business demand for broadband before a new project is begun.



Items to Consider:

- Who in your community is online?
- Who wants to be online and is not?
- Who needs better bandwidth?
- Is cost preventing residents from connecting?
- Is sufficient bandwidth available to meet the needs of residents, large and small businesses, and anchor institutions such as schools, libraries, and healthcare organizations?

After determining current and future demand, building an inventory of assets already in place may present new possibilities for a network build.

Asset Mapping

Collecting information on public and private infrastructure assets scattered across the community can reveal fiber, conduit, towers, and more. Keep in mind that most large, private broadband providers will not happily give up their infrastructure secrets, so starting the planning with community-owned assets will yield better results.

Does the community already have available conduit in place? Is there rooftop and tower access available? Also to be considered are rights of way across bridges or railroads that will be necessary for the network build. Where are assets located and what are the options for sharing, leasing, or using those assets to support broadband builds or expansion? Asset mapping has often shown that some fiber optic cable is already in the ground and not being used to its full potential. Tools like ESRI GIS and VETRO FiberMap can help with the mapping and planning that can set the direction of your strategy.

How do You Start?

Even after determining the real need for a broadband network, or the expansion of an existing one, it can be hard for community leaders to know how to approach a broadband network's complexity. The process requires commitment from your leadership team and the choosing of reliable and experienced partners for guidance.

If broadband is new to you or your leadership team, here are the planning steps to consider before committing any resources.

- Feasibility Study
- Financing
- Engineering and Design
- Project Planning and Construction
- Operations and Managed Services

It's important not to ignore that first step, the feasibility study when considering your network. This vital study should come before everything else, and determines if moving forward is worthwhile and your goals are attainable.



The Journey Begins

Feasibility Study

Let's begin with the feasibility study, the crucial first step for any new broadband project. The goal of a feasibility study is to provide communities with estimates of different network costs as well as recommendations for a realistic plan to build or expand.

The business case for building a broadband network in rural markets can be difficult. It's a tough business and requires expertise and knowledge. Many rural municipalities and companies like electric co-ops and telephone cooperatives might not have the needed experience to navigate the process. A feasibility study can better position an organization to proceed with the community's specific goals and circumstances in mind.

This study is most useful for communities at the beginning of the planning stages so they can better prepare for the project plan and the network build. The study will cover overall broadband strategy planning and identify potential funding sources.

A thorough study should include more than one scenario and multiple design options with possible implementation plans. Demand and the potential take rate over time should also be factored in. It should include multiple finance and funding options with cost estimates and revenue streams to implement each of the options identified in the study.

Explore the Financing Options

There is no single best way to finance your broadband network, and each community should explore the best fit for their project. Financial decisions should begin early in the process to have informed conversations with

decision makers. Many communities make a common mistake by not considering the many financing options and not involving the financial managers early in the planning.

Financial forecasting can be started in conjunction with the feasibility study and will include market penetration and service offering information. This information will impact the financial outlook, which will be built into that study.



Financing Options Checklist

- Always bring the community's Finance Director or CFO into the project from the onset.
- Explore all available financing options early in the project's life
- Gauge your community's appetite for public investment
- Determine if any community institutions are already receiving grants or loans from federal broadband programs
- Determine your community's eligibility for existing federal and state programs

Federal Government Funding

Federal programs like the FCC's Connect America Fund (CAF) and the USDA's Broadband ReConnect Program have provided funding support, grants and low-cost loans as incentives to deploy broadband in underserved areas.

The Rural Digital Opportunity Fund (RDOF) is the FCC's next program now that the second phase of CAF funding has been completed. Through a reverse auction process, the FCC will direct up to \$20.4 billion over ten years to finance up to gigabit speed broadband networks in unserved rural areas, connecting millions of American homes and businesses to digital opportunity.

Public Municipal Bond Offering

A local government or utility will issue bonds to investors that will be repaid over several years with revenues from the network. Certificates of Participation work along similar principles. These bonds are sold to investors, including local residents. One example is Fort Collins, Colorado.

Private Municipal Bond Offering

A local government or utility can issue revenue bonds or other debt structures. These are sold privately, often to high net worth individuals or institutions. These bonds are not available for purchase by local investors. Ammon, Idaho is an example.

Direct Loan/Private Loan (Debt Financing)

This type of loan is when a bank provides a short-term loan to get the network started. These funds could cover initial construction costs, and then the community could find another financing solution if needed to continue. Reedsburg, Wisconsin is an example.

Internal Loans

One department within the local government will loan another government department the funds for building a broadband network. Many states will regulate a minimum interest rate and requirements for such a loan.

Private Equity Financing

A third party investor can provide the capital for the initial startup and owns the network for a certain period of time before giving the community a buy-back option.

Avoided Costs

A local government redirects existing funds used to lease connections from an existing provider to build and operate its own network, often resulting in faster connections at lower prices. If payback is longer than one year, bonds may be issued and repaid with the budget that had been used to lease lines. This approach is most common with smaller networks built incrementally. Examples include Santa Monica, California.



Engineering and Design

Because construction costs represent the most expensive item in most broadband deployment, as opposed to the fiber, cable or conduit itself, taking time to plan out the route in detail ensures that when contractors go to bid on the construction they have a clear picture of what they will be building. If an appropriate amount of detail is in the plan, the construction crews' job will be a lot easier because it will flow much smoother. Consequently, the price of the construction will be less for deploying that network.

Without the necessary details, the construction company will eventually run up against obstacles. When that happens, the contractor will be returning for change orders; 'change order this', 'change order that', or 'this wasn't in the plan'. On the same token, the more you put out there as far as good quality data, the more the contractor knows exactly what his responsibility is, and consequently, there will be fewer surprises and fewer field changes in the project.

For wired deployments the plan should show how the infrastructure is going to be deployed. Aerial deployment is less expensive, especially if you own the utility poles. But, it is far less reliable and less desirable for the community. While buried infrastructure is more expensive to lay, and more costly to repair if it is ever damaged, it is at least ten times more reliable than an aerial deployment, especially in areas prone to bad weather.



Project Planning

The information collected from the feasibility study and financial analysis is used to outline a more detailed project plan. This step in the planning process includes subject-matter experts that work closely with the community's leadership team to guide the development of the plan and identify the best solution based on its requirements. This process will lead to mapping out of your specific way forward.

Identify Potential Solutions – As mentioned earlier, community leaders faced with the inability to obtain broadband service through the incumbent phone or cable company are looking to other models to bring service to the community, including local government or public-private partnerships. Understanding the structures and financial models for these delivery methods will provide insight into options for rural community projects that increases the availability of affordable broadband service.

Select Optimum Design – Identify the best technology solution and which options are the most financially viable. Your demographics and any service providers already in the area will be taken into consideration of the financial success. In a perfect scenario, everyone would be served by a fiber network delivering minimum speeds of 1 gigabit/sec. However, when only a small percentage (2%) of the world's population is anywhere near fiber access, some communities need other options to compete in the digital economy such as pure fiber to each premise, pure fixed wireless, private LTE or a mix of technologies.

Develop Detailed Project Management Plan - Developing a more detailed step by step project management plan will outline everything necessary to establish the new network and how it will be accomplished. Developing a project management plan ensures that the selected solution will be implemented in a timely and cost-effective manner.



Construction

Once the network is designed and engineered, you are ready for the construction phase. Often this will be done by a contractor, who will proceed based the plans developed in the previous steps. Make sure you are working with a company that has the right experience, and a reputation for completing projects on time.

Before construction begins there are a few things to consider regarding rights of way.

Dig Once - Installing high-speed infrastructure is incredibly expensive, with the average cost of deploying fiber-optic cable at about \$27,000 per mile. Yet, a Federal Highway Administration report detailed that 90 percent of this cost is tied up in actually digging up roadways, not the physical fiber lines. The “Dig Once” policy is a common-sense method of reducing the cost of communications infrastructure by placing conduit in the ground any time the road is dug up for a public works project. Proactive placement of conduit can save anywhere from \$30,000 to \$100,000 per mile compared to the costs of digging up streets again. Despite slow adoption, several states do have existing dig once policies in place. Any community should consider this policy even if they have not yet decided to deploy a broadband network.

One Touch Make Ready (OTMR) or Climb Once

One Touch Make Ready (OTMR) is similar in concept to Dig Once in that it streamlines the deployment of new infrastructure. Typically, in order for a new provider to attach wires to a pole, each owner of the currently attached wires must be asked to assess and move their wires — a process called “make ready.” Incumbent providers don’t have any incentive to move quickly, and the process is time and fund intensive for new providers, who then must bear the cost of all make ready work.

OTMR replaces this practice with one that is much more streamlined. OTMR allows pole-owner approved contractors to conduct all new make ready work. Benefits of this practice include faster and safer work, and decreased cost.

In July 2018, the Federal Communications Commission adopted a Report and Order to establish a new OTMR framework for pole attachments, writing that “OTMR should accelerate broadband deployment and reduce costs by allowing the party with the strongest incentive to prepare the pole to efficiently perform the work itself.”

Fortunately, most local governments have authority over the public rights of way, including the utility poles. Communities can use this power to create policies that would make them the best partners possible for deployment of fast, affordable, and reliable broadband access in their communities.

Operations and Managed Services

Finally, when your network is connected, don't be afraid to partner with companies that can provide managed broadband services. There are many moving parts with operating a broadband network, and you shouldn't hesitate to explore partnerships with companies who already have expertise in the ongoing management areas.

Operating a network requires different skill sets than what community leaders may possess. The use of outside expertise for critical management services such as OSS integration, network operations, subscriber customer service, and marketing should be considered. Partnering allows the project leaders to focus on building the broadband network while leaning on partners' expertise and capabilities to deliver key services. In so doing, communities can avoid costly network expenses, lessen network management headaches, and get to market more quickly with a competitive offering.



Final Thoughts

Today it's clear that broadband networks are essential infrastructure. Decisions about who controls or owns the network and what population areas can access it will affect the entire community. Who will make these decisions, and what makes a network a success or a failure?

There is no quick and easy formula - but there are successful community networks across various measures, from take-rates to job creation to subscriber satisfaction. One of the reasons these community networks are so impressive is that they are built where there was a great need for broadband. Another reason is that some of these networks offer the fastest speeds available in the U.S. at affordable prices.

The Game Plan is Simple. Here Are Four Steps you Need to Take Today:



1. Understand the Assets

Project leaders should invest in gathering information to develop a complete plan. In some communities, power and utility companies have deployed fiber networks and should join this effort to use any and all the assets for the fastest, broadest benefit.

2. Understand the Capacity

After inventorying assets, communities must know the current service level of any existing network. This is the time to make the most of the assets already in place. Also, identify capacity issues. Are there neighborhoods that are known for regularly having broadband problems?

3. Understand the Demographics

Ultimately, communities must understand their underserved neighborhoods. Network managers should ask:

- Where are there higher populations of adults working from home?
- Where are households with teenagers and tweens?
- Where are there clusters of elderly that could make use of telemedicine?
- Where are new or planned apartment complexes?
- How many apartments and how many people live in each apartment?

4. Understand the Options

This means being able to model and compare the different technologies such as fixed wireless technologies, private LTE, fiber to the premises, fiber upgrades, or a mixed architecture of different technologies. Communities should consider the services they can offer at what cost per household, what combinations of technologies will have the fastest speeds to the most homes, and the advantages and disadvantages of those technology choices.

Not every community will build a perfect network or should immediately invest in fiber-to-the-home. What is right for one community may not be right for another. Ultimately, the community itself must decide what is essential and how to proceed.

Contact us to answer your questions around broadband network projects, including assistance with your feasibility study, overall broadband strategy planning, and identifying potential funding sources for a community network.



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