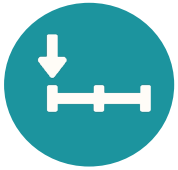


Offering Broadband to Your Utility Customers - What You Need to Know Before You Begin

Steps for building a broadband network for your electric community





Introduction

Fast, affordable broadband is essential to the long-term success of your electric cooperative and your subscribers. Some would even argue it's as important as offering electricity, gas and water. 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 reliable broadband service to all parts of America has been a critical public policy goal for several years now. Billions in federal dollars have already been made available through efforts like the Rural Utilities Service (RUS) ReConnect program, the Connect America Fund (CAF), the Rural Development Opportunity Fund (RDOF), and the American Rescue Plan Act (ARPA). More recently, the passage of the Infrastructure Investment and Jobs Act (IIJA) will be providing \$65 billion dollars to deploy broadband in unserved and underserved areas, as well as to increase broadband affordability and adoption. 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 to serve them.

To remedy this gap in coverage, an increasing number of utilities 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.

Rural electric co-ops are the fastest growing segment of broadband providers because they are in a good position to utilize middle mile fiber assets for last mile expansions to deliver retail broadband. In fact, nearly a quarter of the National Rural Electric Cooperative Association's (NRECA) 900 members have or are in the process of rolling out broadband to their subscribers.



Deployment Options for Utilities

Do it Yourself

You can build it all, including the last-mile to the subscriber. You would manage it, and provide the retail broadband service to your customers. Many utilities and co-ops are already doing this, and most do it under a separate operating company they set up. The separate company, usually with an internet type name, keeps the utility business and the broadband business separate. Having access to utility poles and other rights of way

makes it easier for Co-Ops to deploy broadband service to their members while keeping broadband rates affordable. There is more of a focus on the long-term goal of serving the community and co-op members, who are also part owners, and less pressure for short-term gains.

Working with Incumbent Providers

Because rural broadband requires tremendous capital and has a long ROI, utilities are in the best position to share costs with the private incumbents. 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.

Windstream, a communications company and incumbent in 18 states, recently partnered with several EMCs in Georgia for expanding broadband services. This partnership will have Windstream attaching fiber to utility poles owned by the EMCs. The EMCs and Windstream will then coordinate their engineering and construction activities to build out the network. Most of the capacity of the expanded network will deliver broadband to homes and businesses across the EMCs' footprint. The remaining capacity will be allocated to the EMCs to serve to communicate with the EMCs' power system equipment.

Another possibility of working with an incumbent is the excess ISP capacity model. With this model, the electric utility expands its own fiber optic network to improve its own electric and information services, then leases the excess fiber capacity to an ISP. The ISP then adds the electronics and takes over the tasks of operating the service and supporting customers with high-speed broadband services.

Unlike efforts in the less densely populated areas, this model does not need to depend on government assistance. By leasing capacity to an experienced broadband service provider, the electric utility can expand its fiber optic infrastructure without raising rates to its customers. Similarly, the utility isn't forced to launch new services for which it might have little (if any) experience.

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.



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.

Since EMCs cover large areas and already have an existing customer relationship with the members in that area it will be easier to determine the feasibility of deploying broadband service, member interest, and potential take rates. 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 your EMC'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 most recent program, with many EMCs winning support to deploy broadband service. Through a reverse auction process, the FCC is directing 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. And, more money is coming.

The infrastructure Investment and Jobs Act (IIJA) will be distributing \$65 billion dollars for broadband, with the goal of ensuring that everyone in the U.S. has access to broadband service of at least 100 Mbps. The funds from the IIJA will be granted to the States, who will determine how those funds are to be allocated to local service providers. EMCs that want to offer broadband to their members should be talking with their State Broadband Office about being considered for IIJA funding.

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.

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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 EMC'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.

Select Optimum Design – Many EMCs already have fiber networks in place between substations and offices to help run their electric utility. This can be leveraged as a middle-mile network that can be extended and used to provide last-mile fiber service to members. If a fiber backbone is not in place, a fiber broadband project can be leveraged to provide the network connection needed for smart grid applications and monitoring. Additional fiber capacity can also be built and leased as dark fiber to other operators for applications such as front-haul and back-haul for 5G networks.

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 on 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.

Electric co-ops already have access to “rights of way” and power poles, greatly reducing a major challenge for new fiber deployments and attachments.

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 EMC 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.

2. Understand the Capacity

After inventorying assets, EMC's 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, EMC's must understand their underserved neighborhoods.

- 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. EMC's 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 EMC will build a perfect network or should immediately invest in fiber-to-the-home. What is right for one EMC may not be right for another.

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.



ZCorum provides broadband Internet and communication solutions to telcos, cable companies, utilities, and municipalities, assisting in all facets of broadband implementation, integration, engineering and consulting, network monitoring and diagnostics. ZCorum also offers wholesale, privately labeled Internet services, including data and VoIP provisioning, email, Web hosting, and 24x7 support for end-users, enabling service providers to compete effectively in their local rural and suburban markets. ZCorum is headquartered in Alpharetta, GA. For more information, please visit ZCorum.com or contact us at 1-800-909-9441.