BROADBAND

SPECIAL INSERT

ADVERTORIAL: SPONSOR CONTENT

One of the enduring lessons of the COVID-19 pandemic is just how essential broadband access is for a community to function, particularly in unprecedented circumstances. Whether it's kids being able to access schoolwork or hospitals connecting emergency clinics to their network, the abiding demand for better internet connectivity suddenly became a critical need across the country.

Early on, as the breadth of this public health crisis was being realized, many electric co-ops with existing broadband operations stepped up to help, providing things like free WiFi hotspots, higher bandwidth for residential internet customers now working from home, and fast-turnaround on new connections for schools, government agencies, and other critical accounts.

Now, underserved regions are calling for the so-called "digital divide" to be healed once and for all.

Tens of millions of Americans, mainly in rural areas, are still without access to adequate internet service. With demand for service at an all-time high and billions of dollars in federal loan and grant money available, co-ops in nearly every underserved region are looking hard at whether they should be the ones to bring connectivity to their members.

In March 2019, we published our first special advertorial broadband insert with stories of co-ops that took the plunge on connecting their communities. In this our second special issue, you'll find even more case studies detailing the need, the challenges, and the eventual success of co-op broadband efforts.

These are stories of the vision, perseverance, and resolve of cooperative leaders. But they also put a spotlight on the critical role of a trusted vendor-partner that brings strong experience and expertise and a commitment to community that is equal to that of the co-ops.

Check out electric.coop and *RE Magazine* on cooperative.com for more co-op broadband success stories, and be sure to visit the websites of our contributing vendors to learn more about their products and services and their community-changing work with co-ops.

Scot Hoffman
Editor

COVER PHOTO: GETTY IMAGES

BROADBAND CASE STUDY SPONSORS

1 ADTRAN

ADTRAN helps electric cooperatives across the country provide leading-edge community broadband enablement through next-generation multi-gigabit services and an exceptional in-home experience that empowers their members to lead fully connected lives.

Visit us at **adtran.com**.

2 CALIX

Innovative communications service providers rely on Calix platforms to help them master and monetize the complex infrastructure between their subscribers and the cloud. Calix is the leading global provider of the cloud and software platforms, systems, and services that enable electric cooperatives to deliver the fiber-to-the-home unified access network and smart premises of tomorrow.

Visit us at **calix.com**.

3 CoBANK

CoBank is a cooperative bank serving vital industries across rural America. Supporting electric cooperatives for more than 50 years, the bank provides loans, leases and other financial services, along with Beacon, an interactive strategic planning and facilitation service, to these critical organizations as they deliver power to their communities.

Visit us at **cobank.com**.

4 CONEXON

Conexon works exclusively with electric cooperatives to build fiber-optic networks to rural homes and businesses, offering clients end-to-end broadband deployment and operations support, from project conception to build-out and long-term sustainability. Conexon has assisted over 160 cooperatives, 40+ of which are deploying fiber networks, with more than 100,000 connected fiber-to-the-home subscribers, and has secured more than $250 million in federal and state grants for clients.

Visit us at **conexon.us**.

5 FINLEY ENGINEERING

Finley Engineering is a full-service engineering consultancy with a successful history of consulting, design, engineering and project management for both the broadband and energy industries. Finley works with a variety of client types such as private companies, cooperatives, municipals, large carriers, investor-owned companies and a variety of government entities.

Visit us at **FinleyUSA.com**.

6 NISC

National Information Solutions Cooperative (NISC) is an information technology organization that develops, implements and supports software and hardware solutions for our members. We deliver advanced solutions, services and support to 840 independent telephone companies, electric cooperatives and other public power entities. NISC and its subsidiaries employ more than 1,300 professionals.

Visit us at **nisc.coop**.

7 NRTC

We are member driven and technology focused. NRTC provides broadband solutions to help electric cooperatives evaluate, build and operate broadband networks to benefit their operations and the communities they serve.

Visit us at **nrtc.coop**.

8 OSMOSE

Osmose provides inspection, life extension, and rehabilitation services designed to build resiliency into T&D infrastructure. From the structure top to below-grade, Osmose offers products and services designed to preserve, protect, repair, and restore in-service utility structures. Osmose has the tools, processes, and expertise to help relieve the strain on your resources created by the increase of broadband construction initiatives.

Visit us at **osmose.com**.

9 PIVOT GROUP

Pivot is the leading marketing and CX agency in the broadband industry. We collaborate with people who are doing meaningful work in the communities they serve and come alongside them to help their business grow and thrive.

Visit us at **askpivot.com/broadband**.

10 WALKER AND ASSOCIATES / TWN

Walker and Associates is the value-add national distributor of network products for broadband providers, including wireline, wireless, cable TV, utilities, government and enterprise network operators. TWN partners with electric cooperatives to deploy broadband services to members by providing feasibility studies, network design, engineering, construction and daily network operations and support.

Visit us at **walkerfirst.com / twncomm.com**.

United Cooperative Services

Your Touchstone Energy® Cooperative

Working in the Community, Texas Co-op Launching Hybrid Broadband Network

There was high demand from the community over a sustained period. United Cooperative Services (UCS) in Texas wanted to respond and, in fact, had responded with attempts to start up broadband services over the years. But the technology never quite lived up to expectations. The calls still came.

"This is the members' co-op," says UCS CEO Cameron Smallwood. "We've always done a good job of engaging our members, but we always seek to do more and search for ways we can achieve that."

Member requests for broadband go back nearly two decades, and UCS's search for the right approach has gone on just as long. In addition to kicking the tires on broadband over power line (BPL), UCS turned up a small wireless internet service in 2001, serving about 135 customers before ending that business in 2005 when competing DSL service arrived.

Over the years, members reacted to articles in publications like Texas Co-op Power about other co-ops finding success with fiber-to-the-home (FTTH). "Our members started asking why we were not one of those co-ops," Smallwood says.

In 2018, UCS asked NRTC to conduct a FTTH feasibility study. However, the $300 million price tag was out of reach, so they sat down with NRTC and looked at areas where fixed wireless would make more sense. Ultimately, they earmarked 10,000 of their 62,000 member locations for fixed wireless at speeds up to 100 mbps.

The hybrid FTTH and fixed-wireless network will be deployed over the next five years, and the approach enables UCS to meet member needs and make the business model work – shaving almost $100 million from the original cost estimate.

Long-term, UCS envisions converting all locations to FTTH – reinvesting margins from the broadband business to extend fiber infrastructure.

The wireline side will deliver FTTH to a large majority of those members, built on an ADTRAN 10-Gigabit Symmetrical (XGS-PON) network. NRTC, who's managing the project for UCS, is building wireless links from the fiber backbone to the remaining hard-to-reach locations using RADWIN unlicensed radios.

Most fiber providers today use Gigabit Passive Optical Network (GPON) technology. GPON delivers shared capacity of 2.5 Gbps downstream and 1.25 Gbps upstream. UCS chose ADTRAN's technology delivering shared broadband service at 10 Gbps in both directions to create a flexible and highly scalable fiber access network.

"We asked, 'Do we want to use today's technology, or do we want to invest a little more in the project to provide our members with a better overall experience than our competitors using tomorrow's technology?'" Smallwood says. "It increased the cost of the equipment by 11 percent, but it was the right long-term decision to make for the members."

Based on their past experience, UCS was still hesitant about wireless until it witnessed a demonstration of the technology at Butler RECA's hybrid network in Kansas. "The technology is significantly different today," Smallwood said. "We learned that their members are really happy with the service."

PHOTOS: UNITED COOPERATIVE SERVICES

UCS was comfortable with their technology and deployment plan. But what would the membership say, especially considering the $200 million cost of the project?

UCS had used a member advisory committee for feedback before with another initiative, and it went well. The broadband project was a perfect opportunity to try it again.

"We got a really diverse group of people representing all seven of our director districts. Some had internet service, some didn't, and some didn't care if they had service," Smallwood said. "We tried to get a cross-section of people who would be affected by the project in different ways."

The advisory committee even included an AT&T Fiber customer, who came to the meetings saying he had no problem with his service. "He got to hear what all the other people were dealing with in terms of poor or zero internet options, and said, 'Wow, I had no clue. I would have voted no on this, but now that I see the issue, I'm all for it so that those co-op members who want broadband can have it. It's the right thing to do.'"

The committee was unanimous in encouraging the UCS board of directors to take it to a member vote. UCS leveraged all of its communications platforms, including member meetings, to inform members about the potential initiative, including a thorough four-page document laying out all details as part of a June 2019 vote.

The members were clear in their desires. The vote attracted response from a third of the members with 91 percent in favor of the plan.

"Our members are more eager than ever for us to get them high-speed internet service," Smallwood says. "To be able to fulfill our members' needs like this is truly in the cooperative spirit of being there for the membership."

Do You Want High-Speed
Broadband Internet Service?

ENCLOSED IS A BALLOT THAT ALLOWS YOU TO STATE YOUR PREFERENCE ON A PROPOSITION TO HAVE YOUR COOPERATIVE OFFER HIGH-SPEED BROADBAND INTERNET SERVICE AS AN ADDED BENEFIT TO ITS MEMBERSHIP

YOUR COOPERATIVE SEEKS YOUR VOTE

YOUR INPUT IS IMPORTANT!

SUBMITTING A COMPLETED BALLOT ENTERS YOU IN A DRAWING FOR CASH PRIZES!

HIGH-SPEED BROADBAND INTERNET SERVICE PROPOSITION
United Electric Cooperative Services, Inc.

Vote your preference by marking your response with an "X."

YES I WOULD PREFER UNITED EXPAND ITS PRESENT SERVICES TO INCLUDE HIGH-SPEED BROADBAND INTERNET

NO I WOULD PREFER UNITED NOT EXPAND ITS PRESENT SERVICES TO INCLUDE HIGH-SPEED BROADBAND INTERNET

SIGN HERE! MEMBER SIGNATURE (Ballot must be signed by member to be valid)

DETACH HERE AND MAIL SIGNED BALLOT IN THE ENCLOSED POSTAGE PAID RETURN ENVELOPE

What could United high-speed broadband internet service provide to members?

★ Targeted fiber optic download speeds of 100 Mbps or greater. Preliminary study has shown a few pockets within United's service territory could be limited to lower speeds.

★ Having a voice in how your cooperative operates is one of the many benefits of your membership, and your input on this issue IS IMPORTANT in assisting your board of directors in determining which course of action to take regarding this potential opportunity for cooperative members.

United Cooperative Services

★ Fiber optic-to-home service could be provided to as many residences as possible, with a few remote areas being served by the latest high-speed wireless technology.

★ Straightforward, competitively priced service plans without sales gimmicks, offered in tandem with United's superior brand of reliability and service value.

More details may be obtained at www.united-cs.com/broadband

OzarksGo: Transforming a Rural Community with 7,000 Miles of Fiber

OzarksGo, a telecommunications subsidiary of Ozarks Electric Cooperative, was formed in April 2016 to provide fiber-to-the-home service to the cooperative's 80,000 members across northwest Arkansas and northeast Oklahoma. There were two primary drivers for OzarksGo to build a fiber network.

First, to leverage this robust communication network to support its rapidly growing electric grid, which includes 32 distribution substations spread across two states and nine counties. The fiber network will reduce high telecommunication costs to reach those locations while allowing Ozarks to extend communications deeper into the grid for monitoring and control, as well as eventually providing additional behind-the-meter benefits for members.

Second, to deliver high-speed broadband to the 45% of its membership that does not have access to broadband today, while providing a competitive option for members in more urban areas that had access to only high-priced cable or DSL service.

Fiber for the Future: A Win-Win Investment

Progressive organizations like Ozarks Electric Cooperative continually evaluate how they can best prepare today to meet their members' needs tomorrow. By investing in a communication network, OzarksGo could bring reasonably priced, high-speed broadband to members across their service area, optimize the electric side of their business and eventually lower costs for their members.

Ensuring Cybersecurity for a Smart Grid World

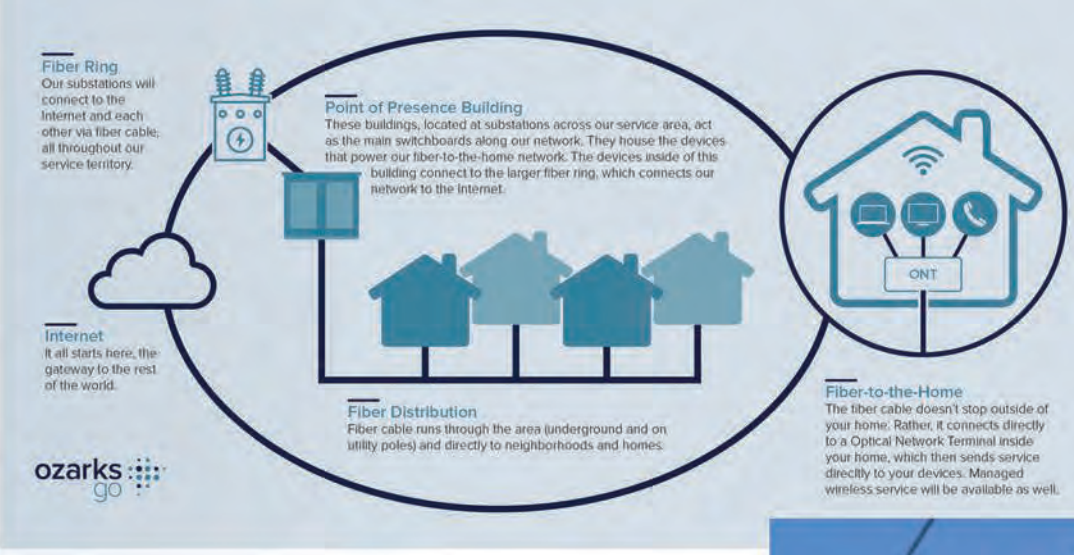
Ozarks recognizes that cybersecurity is a critical priority for electric utilities. The ability to use different wavelengths on the fiber allows Ozarks to keep smart grid traffic separate from internet traffic. Furthermore, at the substation, breaker, and switch level, Ozarks will use separate optical network terminals that will utilize separate wavelengths to assure utility traffic is segmented away from the internet traffic.

How Fiber Supports Disaster Recovery for the Local Business Community

OzarksGo built a large, hardened data center with colocation facilities available for local businesses to place their equipment, but it required a high-speed backhaul to the data center. OzarksGo is looking to leverage Calix NGPON2 technology to provide a high-speed connection back to the business customers' equipment in this data center, enabling the equipment to operate as if it was on premise at the customer's facility.

Project Status: Currently in Year Four, $180 Million Deployment

The entire project will encompass 7,000 miles of fiber construction passing more than 80,000 homes and businesses and take approximately six years to complete. OzarksGo's plan and commitment is to make broadband service available for 100% of its members. Under the leadership of General Manager Steven Bandy, OzarksGo has passed the halfway point of its build with over 16,400 subscribers currently



PHOTOS/GRAPH: OZARKS ELECTRIC COOPERATIVE

connected. Ozarks has ramped to an aggressive build pace, connecting over 7,500 new subscribers in 2019 alone. Take rates are exceeding projections. In the most competitive areas, the co-op is already achieving a take rate of more than 40%, and that number continues to climb. Building and connecting subscribers quickly coupled with a recent $23 million FCC CAF2 auction win has allowed the co-op to reach break-even in year three versus the planned break-even in year five. An additional element of the OzarksGo build is the cooperative serves an area that is undergoing rapid growth, with an average increase of 150 to 200 electric meters monthly. This requires the organization to keep up with fast-paced growth while providing service to existing members during the project.

This is a model of success.

Top: Image of a fiber-to-the-home network provided by OzarksGo. Above: OzarksGo running fiber. Below: Steven Bandy, general manager of OzarksGo

Surprise! Rural Subscribers Want Gigabit

Residential subscribers report high satisfaction for service reliability and speed, while small businesses report lower telecommunication costs and increased productivity from higher speeds.

One of the biggest surprises: Nearly 30% of OzarksGo fiber subscribers are taking the gigabit tier. "We believe it enables people to do whatever they want with their internet connection at any time in their home, no matter how many devices they have," Bandy said. "People are tired of slow internet and are jumping right up to the gigabit tier."

'Our Members Know and Trust Us'

"The one thing electric co-ops have as an asset that is often overlooked is their reputation in the community," Bandy said. "We have been in northwest Arkansas and northeast Oklahoma for over 80 years. Our members and customers know and trust us. We have a high customer satisfaction rating on the electric side of the business.

It's natural that it is expected of OzarksGo to provide that level of service our members and customers have come to expect."

OzarksGo believes the affordable pricing for 100 Mbps and gigabit service is attractive to subscribers, particularly for those in urban areas who only had access to high-cost service due to the lack of competition. The combination of affordable world-class fiber broadband coupled with great service and the cooperative's reputation makes the OzarksGo project extremely successful.

Callabyte
TECHNOLOGY LLC

Stopping the Outflow of Customers by Delivering a Flow of High-Speed Connectivity

In a time when millions of people are recognizing just how essential reliable high-speed communications capability is, Callaway Electric has been quietly building and expanding its fiber network to deliver broadband connectivity to its membership, hoping to stem the exodus of residents from the territory it serves.

Callaway Electric is a mid-sized electric distribution cooperative formed nearly 85 years ago in central Missouri. Located between St. Louis and Kansas City, the co-op supports 13,000 members, the vast majority of which – 93% – are residential. The cooperative was growing well through 2008, when the economic downturn hit and membership became stagnant and even started to decrease.

Callaway's subsequent study of the situation revealed that the problem was broad: Young people weren't returning after college, and retirees weren't returning for their final years. Moreover, current residents were suffering the lack of high-speed connectivity, including young students who would do their homework from the Callaway parking lot where they could access the co-op's wifi.

"Once we looked into why we were losing members, it became pretty clear that lack of high-speed access was the single biggest detriment to our business – students unable to do homework, people unable to operate home-based businesses, farmers unable to install and monitor security systems. It all depends on connectivity," says Tom Howard, Callaway CEO/general manager. "We decided the best thing we could do to promote and sustain our membership was to find a way to bring broadband to our service area."

Callaway initially undertook to bring fiber to every home in its territory through a newly formed subsidiary, Callabyte Technology. The co-op quickly realized two important truths that changed its strategy: Some electric members were already being served by another communications provider, so there was no immediate or business driver to build fiber to those locations, and alternately there were residents outside of Callaway's electric service territory who desperately wanted high-speed connectivity.

"We changed our strategy from bringing fiber to every single member to bringing fiber to members and new customers who needed and wanted it," says Howard. "Going outside our service territory has been a great decision. About 30% of our broadband subscribers aren't members of the distribution cooperative."

Beginning in 2016, Callabyte started hanging fiber on its distribution poles to the first subdivision it targeted, and realized an 80% take rate from those first 50 homes. The project is financed through CoBank, Callaway's longtime lender.

"CoBank is more of a partner than just a bank and one whose expertise in both electric distribution and communications adds a lot of value and has contributed to our project's success," says Howard.

The buildout has continued for the past three years, with each build reaching a new neighborhood and capitalizing on the lessons learned from the previous. Callabyte supports nearly 5,000 communications subscribers with three tiers of service, up to 1 gigabit symmetrical internet access, as well as VoIP phone and video service to round out the triple play. All service is via fiber directly to individual subscribers, not to a substation that customers then access wirelessly.

PHOTOS: CALLAWAY ELECTRIC

The business case for getting into delivering connectivity was clear, based on financial analysis as well as member requests. And while it has not yet broken even, a willingness to change strategy has led to the project surpassing the results anticipated in the original feasibility study.

"Our initial analysis was based on reaching every member and didn't consider going outside our territory," says Howard. "As a result, we're closer to break-even than we ever expected to be this soon."

These results are in spite of the hurdle of entering a highly competitive industry for the first time. Callaway quickly learned to keep its plans quiet, as competitors were all too happy to cherry-pick lucrative areas identified by Callaway's research.

"I would recommend to any electric distribution cooperative getting into broadband that you do your own research and don't announce areas that you're targeting, don't even ask customers to sign up in advance of you hanging your fiber," said Howard. "That's enough to tempt competitors in, and they're a lot more experienced in this industry and so can do it faster."

Competition cherry-picking lucrative neighborhoods and residents outside their territory were just two surprising challenges Callaway faced when it embarked on its fiber journey. The cooperative also needed to educate its customer service staff to respond to questions about an entirely new service, including the engineering planning and make-ready work to prepare the electric distribution system to handle the new fiber and identifying the need to change out poles to taller or stronger models. Callaway used contractors to do the fiber work and change out the poles.

The results of this massive undertaking have been gratifying: In addition to being close to breaking even on its investment, Callaway has enjoyed a renewal in its corporate culture, with employees invigorated by the new offering meeting their members' needs. And those members are extremely appreciative of the new services Callaway is delivering.

"Now that the business is proven its viability and is becoming well known, we have people asking us to expand into their area," says Howard. "Of course, a big reason for our success is that we're a member-driven organization, responding to member needs."

Tom Howard,
Callaway CEO/General Manager

gosemo
fiber internet | tv | phone

SEMO Electric Cooperative serves 16,000 homes, farms, and businesses in the southeast "bootheel" section of Missouri. The co-op's coverage area spans 75 miles from north to south and east to west, encompassing the counties of Bollinger, Cape Girardeau, Mississippi, New Madrid, Scott and, Stoddard. With a density of six meters per mile, SEMO Electric is typical of cooperative size in Missouri.

SEMO Electric's leadership began looking at broadband back in 2013. Unsure if the co-op culture was capable of evolving to succeed at a brand new and competitive business, CEO Sean Vanslyke and his team spent another three years exploring, learning as much as possible. Then in 2017, Conexon partner Jonathan Chambers spoke at a Missouri electric co-op meeting, offering a new perspective on the possibility of providing broadband to the community. The co-op tasked Conexon with a feasibility study, and in March 2017, the co-op's board made the decision to deploy a fiber-to-the-home (FTTH) network.

Following on the heels of the feasibility study, SEMO Electric selected Conexon to serve as its consultant and design the GoSEMO Fiber network.

Business Drivers of the Broadband Investment

SEMO Electric clearly recognized that its members needed the faster and more reliable internet access made possible by fiber, and its focus has remained on delivering the economic, education, and societal benefits of broadband. For the co-op's leadership, the decision to deploy boiled down to one simple question: "If we don't do this, who will?"

"We have no motives other than making people's lives and communities better here," Vanslyke says. "We're not trying to make a profit or send money to shareholders. If we're successful, we can lower electric rates, attract new jobs, and rejuvenate rural living here. That's good for everyone."

Project Overview and Deployment Approach

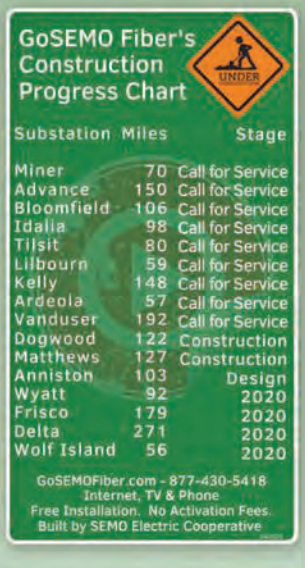
SEMO Electric made a bold early decision in its choice of substations to provision first, squaring off against two of the nation's largest broadband providers. Part of the decision was due to the higher density in those areas necessary to jumpstart the business and cash flow, but another factor was the need to sharpen the co-op's competitive skills.

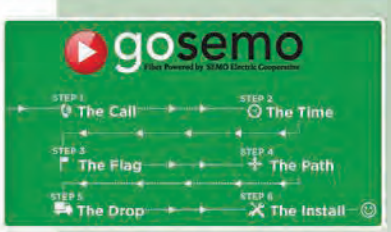
"We were very intentional because we needed to learn how to compete," says Vanslyke. "Just like with the electric side, we had to learn to focus on delivering a great product and excel in customer service."

Just two years into its project, GoSEMO Fiber has connected nearly 4,500 subscribers. It doubled customer installs from 2018 to 2019 and today averages 250 customer connects each month. The co-op's take rates, originally projected at 35%, are averaging 47%, including in areas with formidable competition. The team expects to complete the mainline construction of 2,000 miles by the end of 2020, a full 18 months ahead of original projections.

GoSEMO Fiber's original intent with a broadband build was to take care of its members. However, it was approached early on by several organized groups and municipalities outside its electric co-op footprint with the request to serve them with broadband, and is today working to serve three communities adjacent to its electric territory.

PHOTOS: SEMO ELECTRIC COOPERATIVE





Broadband Business Case

The GoSEMO Fiber FTTH project will cost an estimated $52 million. The network will consist of primarily overhead construction, following the co-op's existing electric plant, with some underground fiber. Customer ARPU (average revenue per user) is $97/month, and GoSEMO Fiber expects to be cash flow positive within years 8 to 10. GoSEMO Fiber offers Internet access with speeds ranging from 100 Mbps symmetrical up to 1 Gbps symmetrical, along with VoIP telephone and HDTV.

Broadband Business Model

With only 12 employees solely dedicated to GoSEMO Fiber, the broadband subsidiary taps into the electric co-op's team for multiple functions, IT, accounting, billing, etc., with many people performing dual roles. Like SEMO Electric, the fiber subsidiary is led by Vanslyke. Sharing resources is a practice he feels benefits the employees themselves, the overall project, and ultimately members and subscribers.

"We built our team from the inside out," Vanslyke says. "Our (electric) associates knew the system and how it was built. So, we took our people and challenged them to learn about fiber. Co-op employees want to make a difference in the community, and they know what a positive impact broadband can have on our area."

Network Architecture

GoSEMO Fiber's broadband network is 100 percent fiber-to-the-home, with a Gigabit Passive Optical Network (GPON) architecture using the Calix platform, similar to many other cooperatives. Fiber-optic cable is strung primarily overhead, or when necessary underground, following SEMO Electric's electrical footprint.

Measureable Community Impacts

Whether its enabling grandparents to videoconference with faraway grandchildren for the first time, eager online shoppers, or farmers leveraging agriculture technology, GoSEMO Fiber is achieving its goal of improving lives and fostering growth in rural Missouri.

"The network is allowing us to spur business growth at home, on farms, or other locations, and we're giving our members the ability to not just run businesses, but even compete on a global scale," Vanslyke says. "That's not possible without broadband."

Lessons Learned

Vanslyke's advice for other co-op CEOs? Get ready for some long nights.

"I would also tell CEOs that you have to engage your board and your employees before you ever think about engaging the public," he says. "If you think about it, people come to work for one reason: to take care of their families. So if they believe you're enhancing the service you provide members and (broadband) is a way to grow the cooperative, that's good and they'll support it."

NORTHSTREAM FIBER

Powered by Roseau Electric Cooperative

'Follow the Power'

Unique Partnership Answers the Call for Broadband in Rural Minnesota

Roseau Electric Cooperative is an electric distribution cooperative providing power to more than 6,400 rural customers in northwest Minnesota over an area of more than 2,500 square miles. Roseau is a member-owner of Minnkota Power Cooperative, a regional generation and transmission cooperative located in Grand Forks, North Dakota. A portion of the community in its existing electric utility service area had limited access to broadband due to slower DSL services. Because of the many limitations and challenges of providing broadband in these rural communities, Roseau made its primary goal to bring quality broadband services to the area.

Project Overview

After attending an industry meeting, Roseau Electric recognized a shortcoming in its territory's broadband services. Realizing this is a deterrent to economic development and has a negative impact on their members, the co-op wanted to take action. Roseau began polling its members and collaborated with their community to gauge service requirements. "The most asked question: Why hasn't Roseau done this already?'" said Ryan Severson, assistant general manager at Roseau.

Roseau began developing a business case with an extensive feasibility study and strategic plan with the help of a local Community Action Partnership (CAP) agency (Northwest Community Action). It relied heavily on its engineering firm, Finley Engineering, for consulting services to understand the telecom industry, funding sources, and requirements. The primary objective would be to provide high-speed broadband service to the community and ultimately build out smart grid technology.

"Our philosophy was, we did this 80 years ago with electricity," Severson said. "Since RECs possess important assets that make expansion into broadband favorable, our goal now would be to offer every member a high-speed internet connection by strength of partnership or we would 'follow the power.'"

Out of this came the opportunity for a new kind of partnership with Wikstrom Telephone (Wiktel), a company with a long and trusted history in Karlstad, Minnesota. The merger of the two resources would quickly deliver economic development opportunities across Minnesota. Roseau would be able to serve their members, not only with enhanced electric service reliability, but also with offerings that connect these rural communities to life-changing resources.

Roseau decided to brand this new venture under the name NorthStream Fiber. The co-op would use their own poles and construction crews to install fiber, saving money and time, and would own and operate the fiber down to the subscriber and the customer premises. Wiktel would provide re-branded services over the fiber, operate the optical line terminal, provide triple play services, and technical support.

Roseau received $2.08 million from the FCC's CAF II Reverse Auction program for phase one of the project. This would cover four census block groups that pass 326 customers. It is now looking at other federal government and state funding mechanisms to fund the next phase of their project that includes another 1,500 passings. It hopes to eventually serve about a third of their service area with broadband.

Business Case / NW Architecture

NorthStream implemented a traditional GPON-based Fiber-to-the-Home (FTTH) system. It used unique solutions to solve problems including the utilization of All Dielectric Self-Supporting (ADSS) fiber, which is manufactured by AFL and supported by the existing electrical system pole infrastructure. The use of ADSS allowed the cable to be placed in the restricted electrical supply zone, permitting them to quickly and efficiently deploy the network.

NorthStream's partnership combined the new fiber build with Wiktel's experience, existing network, and services. Wiktel provided traditional triple-play services on NorthStream's fiber, allowing subscribers access to world-class service at a great price. NorthStream is rapidly deploying the network, and Wiktel will gain a new revenue stream and expanded access for the residents and businesses of Roseau County. Using Wiktel's existing workforce saved money on training and operating costs, and they can build aerial fiber routes year-around without having to break for seasonal weather. It is truly a win-win-win situation.

Future phases of the project will expand on the service offerings to include distribution automation and smart grid system management for Roseau's distribution system. Advanced metering infrastructure, which is currently 70% complete, will allow for smart meters, communications networks, and data management systems with two-way communication.

Challenges and Surprises

Major investments in high-speed broadband can come with significant challenges. There are a lot of variables when launching a fiber network, so it was important to understand every detail, including the level of capital commitment and budget impact. The companies had to see that bringing broadband to this territory was a natural extension of their duty to serve the community, then understand what the member service requirements would be in order to fulfill their responsibility to the community.

RECs should not be afraid to collaborate with companies who already have expertise in certain areas. There isn't a one-size-fits-all approach, so communication is key between the two entities. The two can complement each other and both realize increased revenues and profits. And both can benefit from trusted relationships that have already been built with customers.

PHOTOS: ROSEAU ELECTRIC COOPERATIVE

Why is this Case Study Important?

Building a new fiber broadband network is an important undertaking, with significant implications for NorthStream and the rural communities it serves. The benefits are numerous, including more tools and services to better serve their members. The merger of the two resources will quickly deliver economic development opportunities across Minnesota that are life changing to their residents. While traditional broadband providers have a business model that requires a fast ROI, RECs are anchored in their communities, enabling them to take a long-term view that can be suitable for significant broadband investments. The willingness of RECs to look at these investments as long-term puts them in a unique position to close the digital divide where it is needed most, through unique partnerships like this one that "Follow the Power."

Cumberland Electric Membership Corporation

Cumberland Electric Membership Corporation (CEMC), headquartered in Clarksville, Tennessee, serves 102,000 meters and spans about 2,000 square miles throughout five counties in northwest middle Tennessee. The co-op operates from seven office locations and maintains about 8,100 miles of distribution line and 112 miles of 69-kilovolt transmission line.

CEMC has reliably served its members for more than 80 years—and on May 1, 2020, launched an exciting new venture: A not-for-profit subsidiary, Cumberland Connect, is working to provide all of the co-op's eligible members access to high-speed internet, phone, and video services.

National Information Solutions Cooperative (NISC), CEMC's technology partner, is supporting the co-op in deployment of its fiber-to-the-home network.

Broadband Business Case

CEMC's broadband project was made possible by the passage of the Tennessee Broadband Accessibility Act in 2017, which allowed the state's rural electric co-ops to enter the retail broadband market.

Based on the results of membership surveys and two simultaneous six-month feasibility studies, CEMC knew the membership had a need and desire for high-speed internet services. In one survey, 91 percent of those who responded considered high-speed internet a need rather than a luxury.

In addition, the co-op's leadership knew the installation of fiber broadband could have future smart grid applications either in members' homes, on its distribution network, or with installation of a future metering system.

Project Overview and Deployment

The six-year build-out of the $197 million project includes 5,000 miles of fiber line with construction occurring in five phases. Communicating with members throughout the multiyear project will be critical. Cumberland Connect uses crowdsourcing functionality powered by NISC's marketing and lead-generation platform, NISC LeadAgent, and SmartHub, a web and mobile app, to monitor engagement levels and deliver targeted messaging to individuals who may fall into the latter portions of the project.

The co-op educated members on the service via virtual town hall meetings and several other communication channels. Among those channels was customized mailings using NISC's Automated Mailroom Services (AMS), which prints and mails custom statements, notices, letters, and postcards to a co-op's customers.

Broadband Business Model

Cumberland Connect is a wholly owned not-for-profit subsidiary of CEMC. In addition to high-speed fiber broadband, phone, and video services, Cumberland Connect offers its members managed Wi-Fi services and a Calix GigaSpire WiFi 6 router at no additional charge.

With an enhanced focus on customer service, CEMC utilized NISC's iVUE Connect solution for its broadband project. The solution makes it easier for co-op staff to assist customers by quickly finding information in a secure, web-based, user-friendly environment. iVUE Connect is a unified solution that provides telecommunication services like triple play and auto-provisioning while also supporting the needs of the contemporary utility.

PHOTOS: CEMC

The co-op worked in NISC's iVUE customer care & billing software to complete service orders on the electric side for more than 10 years, but customer service representatives learned new, more efficient workflows utilizing iVUE Connect's broadband functionality.

From a financial perspective, Cumberland Connect is looking for the project to be cashflow positive by the fourth or fifth year of operation.

Challenges

The project's launch was extremely timely, arriving when many people were working from home and children were completing schoolwork online due to the COVID-19 pandemic. The physical distancing efforts also pushed training to be performed virtually and prompted a slight project delay during initial pre-launch installations.

The pandemic also disrupted a critical training window for the co-op's employees, when they were learning to execute broadband service orders via iVUE Connect. Much of the training was moved to virtual, as the co-op closed its lobbies and staggered shifts for contact center and lobby personnel.

Key Takeaways and Lessons Learned

Among the key takeaways from the project was the difficulty of providing video services.

Inversely, with so many content owners coming out with individual apps and services, there may be opportunity. So many choices among separate streaming apps can overwhelm customers, and there may be a growing desire among consumers to simply turn on the television to consume content.

It was also critical for CEMC to have a network of fellow co-ops and organizations to consult that had already undertaken a broadband project, fulfilling the cooperative principle of Cooperation Among Cooperatives.

‘It Pays To Work Together’: Indiana Partnership Was a Journey Worth Taking

When he talks about forming a broadband partnership with a rural telephone company, James Tanneberger describes a long journey with several twists in the road. There were missteps, but in the end, South Central Indiana Rural Electric Membership Corp. (SCI REMC) and Smithville Communications announced a plan to introduce fiber to the home (FTTH) in a hard-to-reach portion of the state.

"It's gone from friendly and supportive and 'How can we help you,' to, 'Oh, no, you're getting into the business, and now you're going to be a competitor of ours. . . .We're afraid of you and what you're going to do to us,'" says Tanneberger, president and CEO of SCI REMC, the state's largest electric cooperative. "We're finally at a place where we both realize it pays to work together."

SCI REMC serves 34,000 meters over seven counties and 1,000 square miles between Indianapolis and Bloomington, Indiana. By the end of 2020, it also expects to reach about 5,000 FTTH subscribers. Construction on SCI Fiber to all of SCI REMC's service area began in 2018 and will continue into 2023 under the current plan.

"We already have all the construction crews up and running in the area," Tanneberger says. NRTC's Broadband Solutions team designed and is managing the project.

But there was a hole in the plan. The feasibility studies could not find an economical way to provide FTTH to about 3,400 residents in and around the towns of Ellettsville, Lake Monroe, and Gosport. That area overlapped with Smithville's telephone service area, which offered DSL but also was unable to provide those homes cost-effective fiber service.

The makings of a natural partnership seemed to be forming. But the course of that partnership wasn't smooth.

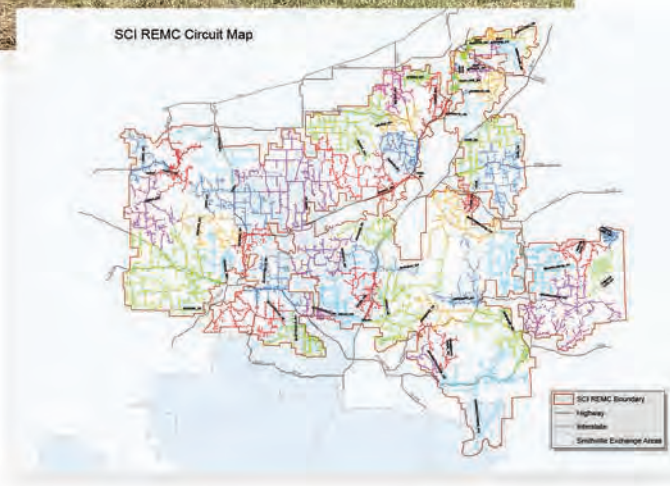
Smithville was offering advice early on in SCI REMC's investigations into fiber. "In their mind, they were ready for us, and were talking about partnership. Unfortunately, that didn't line up with our idea of what our obligation was to our members," Tanneberger says.

SCI REMC leadership reported during the co-op's August 2017 annual meeting that it had been unable to work out any broadband partnerships with neighboring telcos. Smithville, an SCI REMC commercial customer, had a representative at the meeting. "He stood up and said, 'Wait a minute. We've been trying to work out a partnership with you, and we're still here to talk,'" Tanneberger said. "It made for a very uneasy scene at the annual meeting."

Tanneberger became SCI REMC CEO a few months after that meeting. He sought to continue the Smithville dialogue, but misunderstandings formed and grew.

An unintentional competition in recruitment for technical employees arose between the two companies. Even more seriously, Smithville came to believe SCI REMC's real desire was to build its entire system on its own and compete with them. SCI REMC did not realize that when it announced plans to build fiber into certain areas, that it would affect Smithville's eligibility for federal funding and eliminate needed revenues.

PHOTO: SCI REMC



"Here we were entering into a new world where we did not understand all of the sensitivities," he said. "We didn't know whose toes we were stepping on and how it was going to affect them," he says.

Tanneberger decided to meet with the owner of Smithville, acknowledge the missteps, make it clear that SCI REMC did not want to damage Smithville's business, and renew his commitment to working together. That moved the relationship in a new direction.

Under the agreement the two companies reached, SCI REMC will build the fiber service in the partnership area according to the electric co-op's NRTC-developed specifications that match the network it is building to the rest of its service area. Smithville is paying for 80 percent of the project during construction. "They ultimately will own those facilities. That allows them to get their federal funding," Tanneberger says.

Residents in the partnership area will have the option of ordering service from either SCI REMC or Smithville. However, Smithville likely will take the lead in marketing the area. For SCI REMC, it was important to make fiber available to all of their members, but it doesn't make sense for both companies to spend marketing dollars and compete for the same customers.

Tanneberger estimates that a project that might have cost as much as $83 million working alone will now be $67 million thanks to the partnership. He advises having somebody in the organization who understands the financials. His staff ran the numbers and realized that SCI REMC would never be able to justify the expense of working alone.

"That's a real motivator for coming together and working something out for a win-win," he said. "Come back to the table every time and realize that, ultimately, it pays to work together."

CUMBERLAND CONNECT powered by CEMC

Rural Fiber Build-Out and Make-Ready at Cumberland EMC

Cumberland Electric Membership Corporation (CEMC) was formed in 1938 to construct, maintain, and operate a rural electric distribution system in Tennessee. The cooperative began with 610 members and 100 miles of overhead line. Today, their members exceed 101,000 served by 8,100 miles of overhead and underground line.

Cumberland Connect was formed following the establishment of the Broadband Accessibility Act to establish high-speed internet, phone, and television service over a state-of-the-art fiber optic network. It also provides CEMC a communication network infrastructure for future smart grid applications

Project Overview

CEMC recognized a need for broadband services where members and others in the service area were underserved. CEMC knew high-speed internet could provide a great deal of local benefits. Such investment into the community sparks development, entrepreneurism, job growth, and opportunities in education and brings new business to areas.

The first phase of the project involved new fiber optic construction, which was primarily pole attachments, following National Electrical Safety Code (NESC) standards. CEMC's goal during this phase was to quickly capture pole data, analyze the information, produce construction designs, and begin construction of their new broadband system. This phase was the first of several that will be repeated geographically across CEMC's service area. Implemented over the next several years, each subsequent phase leads to CEMC's end goal of installing fiber optic cable for future smart grid technologies for their electric members, as well as providing the infrastructure for broadband services.

The key to this undertaking was a partner that could efficiently evaluate the pole condition, verify available space to support the new fiber, and produce cost-effective engineering designs so construction crews are not waiting for work packages or surprised by additional effort needed at the pole before they can hang fiber. Osmose proposed and executed a solution for field verification of poles, make-ready review, deliverables, and reporting, as well as development of remedial make-ready designs to prepare the poles for fiber attachment.

Osmose designed the solution to work closely with CEMC and Conexon, the contractor CEMC hired to manage and engineer their project, to follow a structured and detailed methodology that met the project objectives.

"Osmose has been a trusted partner of CEMC for many years. The project scope was very aggressive, and we weren't sure if any company could meet the objectives of the make-ready engineering. Osmose has met and exceeded those expectations in the first phase of our multi-phase project," said Mark Cook, broadband manager, CEMC.

"The comprehensive and accurate evaluation of existing infrastructure, along with knowledgeable, efficient make-ready support are foundational for an electric cooperative's successful fiber-to-the-home network deployment," said Randy Klindt, Conexon partner. "Osmose has proven itself to be a valued partner in this regard with the ability to mobilize and scale quickly and produce great work well ahead of schedule."

PHOTOS: CEMC

During phase one of the project, the following milestones were completed:

1,377 miles of fiber optic cable construction
27,000 estimated pole attachments

Challenges and Surprises

Speed to market was a critical element for success. Cumberland needed to get ahead of their make-ready construction and mainline construction crews so the construction phase was not delayed due to poles requiring make-ready or replacements not being identified. To remedy this challenge, Osmose:

1. Quickly mobilized experienced, make-ready resources which allowed for completion of 1,000 poles per week within two weeks and 3,000 poles per week within three and a half weeks. This allowed construction teams to meet their aggressive build schedule.
2. Utilized Digital Measurement Technology™ (DMT) to accurately capture and deliver field measurements as annotated images, providing all parties the opportunity to visualize current pole conditions from the office and save additional field visits.
3. Partnered with Cumberland to identify and complete communication and power make-ready in the most efficient way possible so construction was not delayed.

wintek
POWERED BY TIPMONT

Headquartered in Linden, Indiana, and incorporated in May of 1939, Tipmont Rural Electric Membership Cooperative serves eight Indiana counties surrounding Lafayette and Crawfordsville. The cooperative serves close to 24,000 members, operating over 27,000 meters. With just over 100 employees, Tipmont manages about 2,700 miles of power lines. After a few years of study and evaluation, Tipmont embarked on a comprehensive broadband project to bring better connectivity to its unserved and underserved communities.

Business Drivers for Broadband

Tipmont's broadband journey began with a plan to bring smart grid capabilities to the cooperative. As a part of that initial smart grid plan, the cooperative began connecting its substations with fiber. As Tipmont was going about its smart grid plan, the cooperative's members began inquiring about broadband and whether Tipmont would consider offering it. There was considerable frustration among Tipmont's members regarding the availability of quality broadband. As a result, providing broadband became a member-driven initiative.

To meet this challenge, Tipmont embarked on a two-year due-diligence effort, which included feasibility studies and internal and external surveys. That due diligence revealed that over 50% of Tipmont members could not get broadband as defined by the FCC. Those that could get broadband were dissatisfied with their current provider in terms of quality and customer service.

Tipmont's due diligence also included partnering with nearby Purdue University for an econometric study to determine the economic impact of bringing broadband to the cooperative's service territory. The Purdue study determined the net present value (NPV) of benefits of rural broadband in Tipmont's service area far exceed the costs over a 20-year horizon. That value is defined as a net benefit per member of $24,757 or $2,158 per member per year. Additionally, the study found that every dollar invested by Tipmont in rural broadband will return $4 in economic benefit to the community.

The result of this multi-year due diligence gave Tipmont the data it needed to green light its rural broadband journey. The cooperative embarked on connecting its members in the fall of 2018 with an advanced fiber-optic network that will eventually bring gigabit-capable service to all members.

Broadband Business Structure

Tipmont initially developed an eight-year broadband buildout plan. But early in the process, the cooperative identified a potential strategic partner that could help accelerate its plan. Discussions began with a local IT and service provider firm, Wintek. This partner had some key desirable attributes, including a highly skilled technical workforce, an established customer base, and an existing fiber network. Tipmont decided that acquiring Wintek could add tremendous capability for its broadband efforts. Ultimately the cooperative did just that, acquiring Wintek in January of 2019 and allowing Tipmont to accelerate its build-out plan to just five years.

"Wintek had the technology expertise and a network, and Tipmont had the horsepower to really make it run," says Tipmont Communication Director Rob Ford.

Tipmont enlisted the help of Pivot to determine the right branding strategy for this emerging broadband business. The goals included how best to leverage the strength of both the Tipmont and Wintek brands, capturing as much of the established brand equity from both companies as possible. After some market research and branding strategy work, the Wintek Powered by Tipmont brand was born. A new visual identity was established, along with defined brand attributes and messaging.

PHOTO: TIPMONT

Challenges and Surprises

Projects of this importance always generate challenges and surprises. Tipmont has experienced both. Major challenges have included the entire cooperative embracing the cultural shift that adding broadband to its service mix brings. Ford calls the shift "Cooperative 3.0," where 1.0 was the status quo of offering electricity only and 2.0 was beginning to offer a competitive service within the cooperative's territory. Cooperative 3.0 brings it all together, combining the best of both: stability, innovation, and a relentless focus on customer satisfaction rather than profit. The transition requires embracing the new market realities of offering competitive services. Both employees and members can sometimes be challenged by this shift.

Tipmont leadership embraced the shift and began a multi-year effort to train and equip its employees for this new reality. It wasn't easy and required working with an external partner like Pivot to develop the right mix of training and encouragement to create this new workforce culture that now operates in Cooperative 3.0 mode. Members didn't always understand the shift either, and Tipmont had to develop and execute communication strategies to keep them educated about the importance of the transformation of the cooperative.

"You need partners, and you need partners with broadband experience," says Ford. "That was key to our success."
A welcome surprise for Tipmont has been the initial response from members for their broadband service. Tipmont's initial business plan called for 300 new customers in the first year. First year results exceeded 1,100 new customers. Tipmont is now embarking on year two of their five-year build-out plan.

Why is this Project Important?

The Tipmont broadband experience highlights important factors that all electric cooperatives interested in broadband can learn from. Much focus on broadband projects centers on technology, and rightfully so. But equally important to the success of broadband projects includes critical steps including branding and marketing plans, workforce development, and partner evaluation. Some key lessons learned from Tipmont include:

1. Strategic partnerships are key for a successful broadband business. In addition to finding partners with adequate broadband experience to support all phases of your launch, cooperatives should explore service provider partnerships like Tipmont did with Wintek. Adding the right expertise can shave years off the timeline of bringing broadband to your full membership.

2. Entering the broadband business is transformational for cooperatives. Tipmont equates the move for them as Cooperative 3.0. Don't underestimate the need to implement the appropriate workforce development and training programs that will get your staff ready and prepared to take on and succeed in not only broadband, but the cooperative's transformation.

Launching broadband is a typically a multi-year process, with different phases. Having a long view and recognizing the transformational impact is key. There will be significant challenges along the way, so lining up the right partners with the right experience to help support the cooperative, its staff, and members can be hugely beneficial.

HEARTLAND REMC

A Touchstone Energy® Cooperative

Heartland Rural Electric Membership Cooperative started as three distribution cooperatives in 1936: Huntington County REMC, Wabash County REMC, and Wells County REMC. In 1964, Huntington County REMC consolidated with Wells County REMC and rebranded as United REMC. In 2014, United REMC and Wabash County REMC consolidated to form Heartland REMC.

Heartland REMC serves approximately 17,600 meters across parts of nine north-central Indiana counties. Its service territory encompasses 2,292 square miles of distribution lines. The area is rural in character with 7.65 meters per mile of distribution line. Sixty percent of co-op revenues are from commercial customers.

Business Driver of Broadband Investment

Pursuit of a broadband project was driven by members' interest in faster and more available broadband. The co-op was already providing fixed wireless internet service to some members, but not all. Additionally, the available speeds of the current fixed wireless deployment were not adequate to meet the demand for large-bandwidth applications.

Heartland REMC approached current broadband partner TWN Communications to explore the feasibility of a network to serve all members with speeds of at least 25 Mbps.

The resulting project is a fiber optic and enhanced fixed wireless hybrid designed to ensure that all members desiring a broadband connection can receive it. "Co-op members today need broadband much like members in the 1930s needed power," says Rob Pearson, CEO of Heartland REMC. "If electric cooperatives do not step in to bridge the divide, who will?"

Project Overview

The goal was to serve members with broadband access speeds of at least 25 Mbps or more for a 30-year time horizon. This meant understanding the co-op's operating territory in terms of its projected population growth, its proximity to nearby metropolitan areas and the potential of Heartland REMC to serve out-of-territory nearby communities of interest, should those communities wish to participate.

Broadband Business Case and Structure

The business case was grounded in a granular assessment of the service area to determine what areas are served, underserved, and unserved. Data was entered into proprietary TWN automated design tools to create individual bill-of-materials costing for each area. A business plan was developed, integrating aspects of design, construction, certification, and operations.

The business plan was subjected to "stress tests," including potentially lower or higher take rates, changes in cost assumptions, etc. The result was two scenarios: one with the cooperative having all risks of funding the project, and with operations being the responsibility of the co-op. The second model, which was ultimately chosen, presented the idea of shared capital costs between the co-op and TWN with all operating costs being solely the responsibility of TWN Communications.

Structuring the project in a five-year contractual partnership with TWN reduced risk to the REMC and ensured future flexibility. It is expected that all project costs will be recouped within 17 years of the completion of the project. All operating costs are the responsibility of TWN as are all costs associated with installations, inventory, and rolling stock.

Relationships with equipment vendors can make all the difference to the bottom line of a project of this magnitude. Heartland REMC and TWN work closely with Walker and Associates, a national distributor of network products for broadband providers. "When a co-op is

dealing with equipment that is this complex and expensive, it's imperative to have trusted vendors that will provide pricing and service metrics to keep things going on time and on budget," says Colin Wood, CEO of TWN Communications.

Network Architecture

The network architecture of the Heartland REMC project used high-performance equipment and operational frameworks. The access network provides members with symmetrical services at speeds up to 10Gb/s. The network supports commercial subscribers at speeds up to 100Gb/s. The core network provides redundancy with 5-nines (99.999%) availability, through its ring and sub-ring topology. A software-defined networking framework ensures that network operations are seamless and fault isolation processes are optimized for expedient resolution. The network architecture also accommodates Network Functions Virtualization, allowing the deployment of new applications and services without disruption of the network.

Challenges and Surprises

- Be prepared for red tape; the state grant process can be unfair and time-consuming.
- National broadband maps are unreliable and inconsistent. The only way to get accurate market data is to perform a granular-level market assessment.
- Permitting is more difficult, costly, and time consuming than expected. Working with government entities can take an inordinate amount of time.

Why is this Case Study Important?

Many rural customers will simply not be served by incumbent providers. Cooperatives have an opportunity to provide these services leveraging advantages such as existing rights-of-way and knowledge of member demand points.

This case is unique in the approach the co-op took for this project. Rather than deciding on a blanket deployment of fiber to all areas, the co-op decided to be strategic, and financially responsible, by investigating a hybrid fiber-wireless approach. This project is also important because Heartland REMC chose to partner with a solutions provider that will carry some of the financial risk and all the operational risk for the project.

A primary reason Heartland REMC engaged this project is that the co-op will own the infrastructure. The network will provide internet access to members and will also enhance the members' remote access to co-op devices and provide communication to downline devices. The co-op can assign a large portion of the capital to co-op plant without eroding their equity ratio.

Heartland REMC decided to move forward with this project well ahead of the COVID-19 crisis this past spring, but in hindsight, are happy they did. Pearson says, "The coronavirus crisis made it clear, almost overnight, how crucial reliable broadband is for our members. I heard stories every day about children in our community who were unable to complete their online classes because their internet connection was so slow. For that reason, we decided to accelerate our five-year project to be completed ASAP. If another crisis hits, we want to be ready."

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