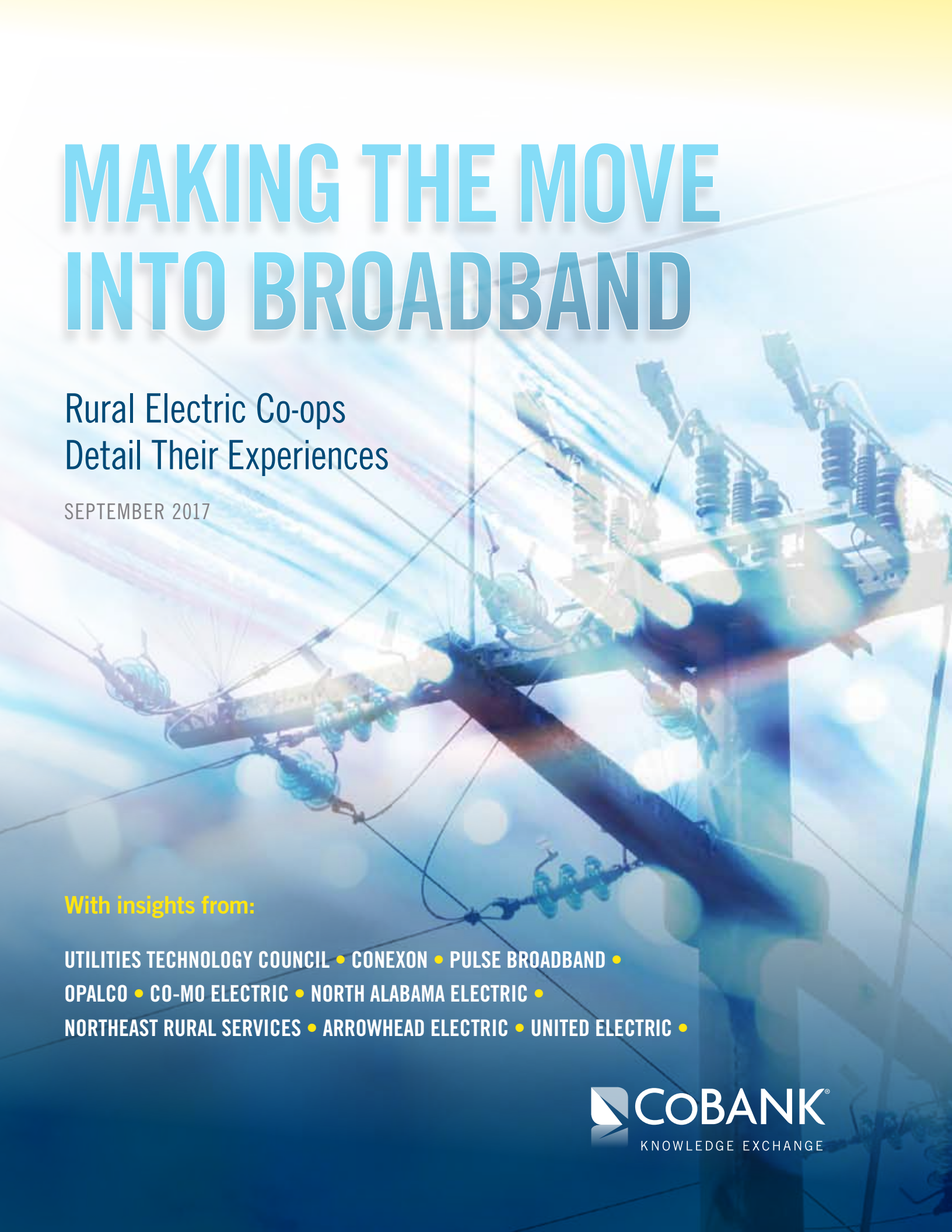
MAKING THE MOVE INTO BROADBAND

Rural Electric Co-ops Detail Their Experiences

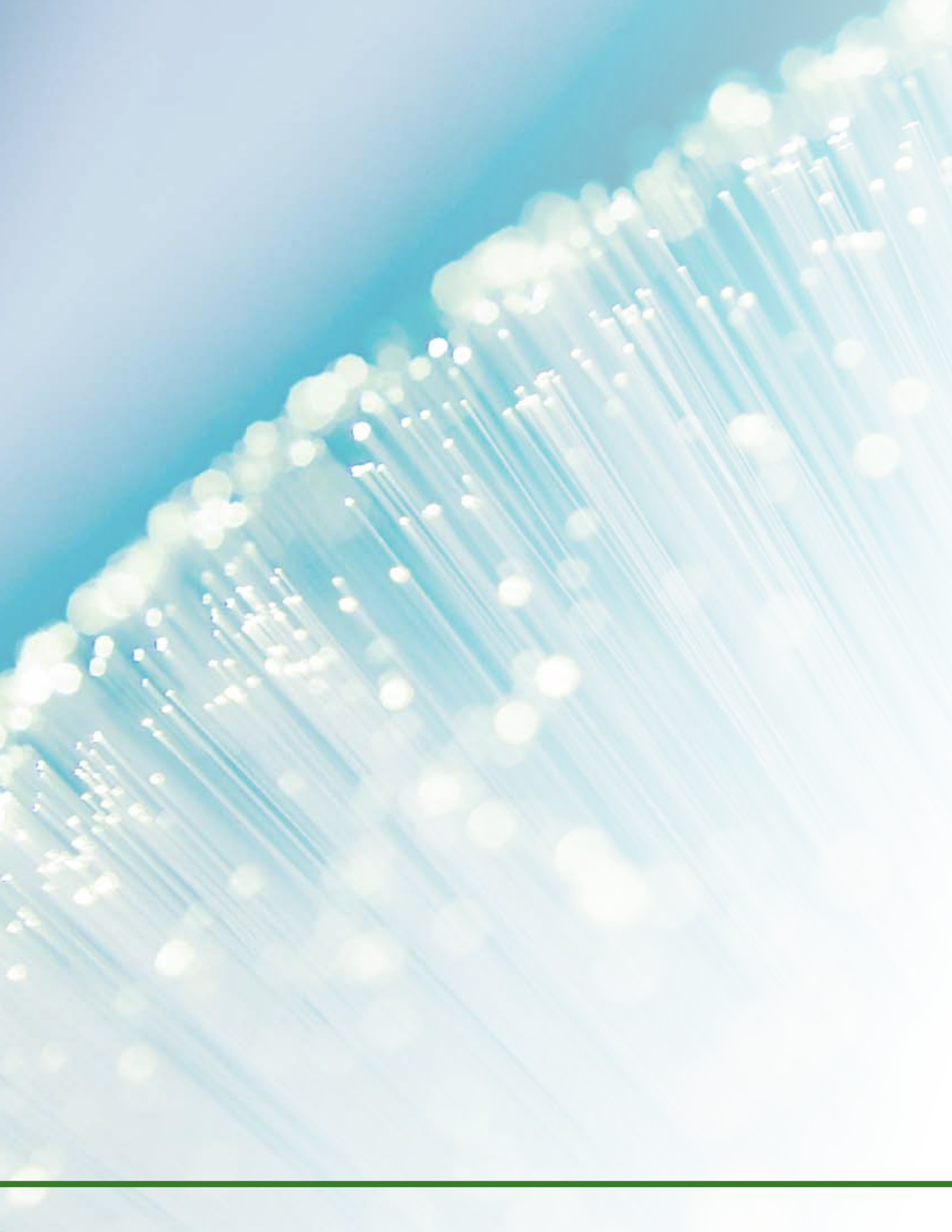
SEPTEMBER 2017



With insights from:

UTILITIES TECHNOLOGY COUNCIL • CONEXON • PULSE BROADBAND • OPALCO • CO-MO ELECTRIC • NORTH ALABAMA ELECTRIC • NORTHEAST RURAL SERVICES • ARROWHEAD ELECTRIC • UNITED ELECTRIC •

CoBANK®
KNOWLEDGE EXCHANGE



MAKING THE MOVE INTO BROADBAND

CoBANK KNOWLEDGE EXCHANGE

Rural Electric Co-ops Detail Their Experiences

SEPTEMBER 2017

CoBank's Electric Distribution/Broadband team is proud to present this collection of interviews with industry experts and rural electric cooperatives that have made the move into broadband. We hope these interviews serve as a guide for any electric co-op considering an expansion into broadband.

COBANK'S ELECTRIC DISTRIBUTION/BROADBAND TEAM

The members of CoBank's Electric Distribution/Broadband team played an integral role in developing and conducting the interviews contained in this booklet.

BILL LADUCA

Sector Vice President,
Electric Distribution Division
Atlanta Office
WLaduca@cobank.com
770-618-3276

JEFF BRACKER

Senior Relationship Manager,
Austin Office
JBracker@cobank.com
512-782-2575

DORAN DENNIS

Regional Vice President,
Denver Office
DDennis@cobank.com
303-740-4336

JOHN DONNER

Lead Relationship Manager,
Minneapolis Office
JDonner@cobank.com
952-417-7934

MARK DOYLE

Senior Relationship Manager,
Fargo Office
MDoyle@cobank.com
701-520-8867

ALLISON DUNN

Lead Relationship Manager,
Atlanta Office
DunnA@cobank.com
770-618-3216

SETH HART

Lead Relationship Manager,
Denver Office
HartS@cobank.com
303-740-4076

GRAHAM KAISER

Relationship Manager,
Denver Office
GKaiser@cobank.com
303-740-4386

JONATHAN MANN

Supervisor, Credit,
Denver Office
JMann@cobank.com
303-740-6522

CoBANK
KNOWLEDGE EXCHANGE

EXECUTIVE SUMMARY

Making the Move Into Broadband: Rural Electric Co-ops Detail Their Experiences

By
BILL LADUCA
Sector Vice President for
Electric Distribution, CoBank

Many electric cooperatives got their start back in the 1930s with the mission of bringing electrification to the far corners of rural America. Now many of those same co-ops are involved in bringing an equally vital technology to those areas: broadband communications. Just as electricity was the key to a modern economy during the Depression, broadband is a necessary component to thriving rural communities in the 21st century. Precision agriculture is hastening a revolution in data usage on the part of America's farmers, and increased bandwidth is critical to health care, manufacturing, schools and even tourism in these communities. And obviously, broadband has become vital for residential customers as well, who rely on the internet to keep them connected to the rest of the world.

Within this landscape, more and more rural electric cooperatives are learning that their existing distribution networks can lend themselves to highly efficient deployment of broadband for their member-owners. Based on the distances that define rural America, one of the surest ways to effectively build a broadband network is to use an existing electric co-op infrastructure.

Many co-ops have found that building out a broadband network is a productive way to serve customers, and can actually be profitable as well. But the challenges they face are numerous, and every build-out brings a new set of circumstances. With that in mind, CoBank interviewed leaders from six co-ops that have launched successful broadband initiatives in order to find out what works – and what doesn't. We also spoke with key partners, including representatives from Conexon and Pulse Broadband, two of the leading consultants in this field, as well as the Utilities Technology Council, for a broader view of the issues that co-ops face.

The first step for most of these co-ops was selling the idea to their boards. Many boards are fully supportive once the idea is presented: "As we looked around, no one else was going to do it if we didn't," says Ken Johnson, general manager of Co-Mo Electric in Tipton, Missouri. "I think that is really what helped my board get their mind around it." But for other boards, deploying broadband is a momentous decision that can require years of thought and research before they're ready to move forward.

That process can involve the development of accurate financial forecasts, member surveys and feasibility studies. Although a feasibility study is an intensive undertaking requiring significant resources, most co-ops have found them essential. "We consider our feasibility

study process more of a business planning process," says Randy Klindt, founder and partner of Conexon. "The results of our evaluation process produce a financial model – a financial business plan that is attainable."

The cooperatives used a wide range of marketing efforts to communicate to broadband subscribers; some co-ops have done virtually no marketing, yet still have waiting lists for service. Others have gone out into their territory from the very start of the build-out with door hangers and yard signs. For financial reasons, it's helpful to get members registered as quickly as possible. "We wanted to get everybody to sign up while we were constructing the main backbone," says Sheila Allgood of Northeast Oklahoma Electric Cooperative. "It's less expensive for us to get a drop at that point than it is for us to go back and put in another contract for a service drop later."

Those costs are a chief concern for the cooperatives. Broadband projects can be very expensive, running into tens of millions of dollars, even with much of the infrastructure already in place. The co-ops we spoke with were candid about their funding sources for these projects, including government grants, which can introduce challenges of their own. "Waiting on the grant money to come was often months after we actually had invoices that had to be paid," says Bruce Purdy, the general manager of North Alabama Electric Cooperative. "Lead time on fiber is approximately 18 weeks, so you can't wait – you have to stay ahead of the lead times." Many co-ops have found that they need a line of credit, short-term facilities, and long-term loans to fund the project.

> *"Given the necessity for broadband in rural communities, the number of electric co-ops branching into this crucial service seems likely to continue to grow.*

But despite high costs and potential funding challenges, several co-ops have developed cost-effective installations. "The projects became profitable in under four years," reports Jim Bagley, CEO of United Electric in northwestern Missouri. The next step is to spread those benefits to the entire membership. "We want to use any profits to help mitigate our future electric rates and be a blessing to the membership," says Bagley, "whether it's through the service, or through reduced electric rates."

Electric cooperatives are a natural option for bringing broadband to rural areas, especially given the lack of incumbents providing this service in these areas. These co-ops have existing relationships with their members and a long history of reliable, cost-effective service, as well as a proven record of project management and construction. Given these factors and the necessity for broadband in rural communities, the number of electric co-ops branching into broadband seems likely to continue to grow. We hope this collection of interviews can provide guideposts for any co-ops that are considering bringing this crucial service to their members.

CoBANK
KNOWLEDGE EXCHANGE

INDUSTRY INTERVIEW 1:

Supporting the Move to Broadband: A Talk With the UTC

A talk with

BRETT KILBOURNE

Utilities Technology Council

By

JONATHAN MANN

CoBank

The Utilities Technology Council (UTC) is a global trade association dedicated to serving critical infrastructure providers by driving innovation, fostering collaboration and influencing public policy. In recent years, UTC's membership has become more involved in deploying broadband, and the association has created several councils dedicated to the growth of these enterprises. Jonathan Mann of CoBank spoke with Brett Kilbourne, general counsel and vice president of policy for UTC, regarding its membership's efforts in deploying broadband in rural service territories.

Jonathan Mann: Why should rural electric utilities consider a broadband deployment?

Brett Kilbourne: The utilities that UTC is primarily working with are doing broadband because their customers are not currently being served and to promote economic development in their communities. They are attracting new businesses, making it possible for their members to work from home and promoting opportunities for improved education, health care and overall quality of life within these communities.

JM: How do these rural broadband deployments tie together with smart grid?

BK: It is perfectly aligned with smart grid because at the same time the utility is deploying their smart grid infrastructure, they can leverage that to provide broadband as well. Leveraging existing infrastructure creates synergies and cost savings. Smart grid also provides the utility with additional benefits such as improved reliability, efficiency and quality of service.

There are also opportunities for utility companies to leverage certain loan programs from the USDA Rural Utility Service Electric Program to finance these smart grid deployments.

JM: How exactly can utility companies leverage the USDA RUS programs to finance smart grid projects?

BK: What the USDA and utility companies are realizing is that there are benefits that go along with funding an electric program that can figuratively "pay dividends" for broadband. And by virtue of having the Electric Program funds out there, it makes more efficient use

> *Living in a rural area, you are four times more likely to lack access to broadband compared to those living in urban areas. The "Digital Divide" is a real problem.*

of that scarce resource to support applications on the broadband side as well. USDA is making it easier for electric cooperatives and other utility companies to access localized funds through a variety of funding sources to help underwrite some of the high costs of deploying this infrastructure in these rural areas. Therefore, it is a timely opportunity, as there are utilities eager to deploy broadband, but at the same time also have an increasing need to roll out smart grid for more reliable electric utility services to the consumers they serve.

JM: What percentage of rural America currently has access to broadband? Can you elaborate on the need for broadband in these areas?

BK: The FCC's most recent Section 706 Report states that one in 10 Americans lack access to what's currently considered "broadband," which is 25 Mbps download speeds and 3 Mbps upload speed. The report further finds that when you get into rural areas, access to broadband drops significantly, whereby 39 percent of people in those areas lack access to advanced telecommunications capabilities. In other words, if you are living in a rural area, you are four times more likely to lack access to broadband compared to those living in urban areas. The statistics are even worse when looking at the nation's tribal areas. The "Digital Divide" is a real problem.

The FCC has produced several reports supporting the idea that rural broadband deployments are still not happening on a reasonable and timely basis, and it has an obligation when it makes these findings to try and remove roadblocks that may inhibit these types of investments.

JM: What does it mean for a rural community to gain access to broadband? What benefits can a community expect to gain?

BK: Today, broadband is just as essential as electricity service was during the turn of the last century. Electric companies are proposing to provide broadband service and internet connectivity for the same reason they began providing electricity back in those days, and the reason is simple: you will attract new businesses in rural areas, where today we are currently seeing population declines. We believe lack of broadband is driving migration from rural areas to urban areas. For example, lack of broadband creates difficulty for people trying to find jobs. Another example is improved education, where students are able to complete and submit their assignments from home. Further, telecommuting is becoming customary in today's workforce and cannot be accomplished without access to reliable and high-speed broadband service.

The utilities that are deploying broadband are doing so by and large with future-proof technology (i.e., fiber), because they recognize that it is a more efficient and effective investment, and will likely not require continual upgrades, even as consumers demand higher speeds. Further, by virtue of having those capabilities, the utilities can meet the needs of commercial customers as well as residential customers. It also facilities telehealth applications, including file sharing and remote surgery.

JM: How does broadband affect the agriculture industry?

BK: There is something called precision farming, an application that some of the major manufacturers, including John Deere, utilize. The application includes surveying crops and evaluating whether certain areas need more attention than others. For example, data is collected using drones, relayed to a central headend, where the data can be pulled and analyzed by the companies, and provide service to their customers more effectively. What is interesting about this is that there is currently a limitation on the drones collecting that information, based

on the amount of data stored in a video and the amount of broadband needed to send that file to the company. So as a practical matter, what they are doing in the meantime is physically taking those files out of the drone and sending them to the companies to be analyzed, rather than relaying them over airwaves or fiber. We see this as a major opportunity when it comes to deploying broadband in rural areas.

JM: How can electric utilities provide broadband in areas where telecommunications providers have been reluctant to provide a similar service?

BK: Electric utilities have successfully deployed broadband in areas where the telecom providers and cable TV operators have been reluctant to do so. That success is based on a number of factors, and one of the primary ones is the proven commitment of the electric utilities to the communities they serve. Whereas a national telecommunications provider has commitments in many large suburban and urban markets across the country, the electric utility is based in its community and has a stake in the growth of those communities. It is, therefore, an investment in the future of the company and its service territory, aligning the interests of all parties.

Another primary factor in this success is the existing electric infrastructure that is available to help support broadband deployment. And as previously mentioned, deploying broadband in concert with smart grid deployment is an efficient use of those resources and creates synergies.

JM: How many electric utilities are in some stage of a broadband project, and is there any utility leading the way?

BK: There are approximately 35 electric cooperatives that are deploying fiber-based services, and there are about 100 other cooperatives that are offering some other form of broadband services. In addition, there are approximately 500 municipal utilities that are offering broadband services, and many if not all of them are using fiber networks.

"Broadband adoption rates are not universally high, yet the adoption rates in these rural areas often appear higher than the market as a whole.

As far as public utility districts, there are 18 in the state of Washington alone, which is about half of all the public utility districts in that state, that are offering broadband as a wholesale business.

Last, you also have investor-owned utilities, federal power authorities and large public power providers that are supporting broadband by leveraging their existing infrastructure (i.e., fiber) to offer both lit and dark fiber services on a wholesale basis.

Those that are "out in front" in terms of deploying broadband include Co-Mo Electric Cooperative, Midwest Energy Electric Cooperative and Ozarks Electric Cooperative. Those are some of the larger cooperatives who have been able, in some cases, to provide broadband across their entire service territories. I deem these companies to be successful because they have been able to offer broadband in areas that have population densities as low as four customers per square mile, and provide 1 Gbps speed at a price of less than $100 per month.

These developments are revealing some things that the FCC never before thought were possible. Broadband adoption rates are not universally high, yet the adoption rates in these rural areas often appear higher than the market as a whole, and by customers in demographics that don't typically seek broadband at such high levels. For example, older populations are adopting broadband and even reporting to their electric utilities that those services led them to use a computer for the very first time in their lives.

We think internet connection is going to change these communities and the way their residents live, and we are very excited about it.

JM: Do you think there is a subset of electric cooperatives that have not yet deployed broadband but may be on the brink of doing so? If so, how many, and what might be the trigger events that lead them to make the final decision to invest in broadband services?

BK: There is definitely a trend upwards. For some, the customers are looking for broadband and asking their electric utilities to offer it. Some of the local exchange carriers that only offer basic landline services are getting out of the business in these rural areas. Therefore, there is a change in the market taking place, where it is becoming more important that broadband is available, yet there is a chance that even telephone service might be eliminated in these areas if not for the electric utility coming in and providing broadband.

There is another thing that is taking place in states like Tennessee, where they recently passed a new law that allows co-ops to offer retail broadband. That kind of regulatory action signals to utility companies that this is something that policymakers will support. So in Tennessee, we're suddenly seeing a lot of interest. The Tennessee Valley Authority just announced that they are going to double the amount of their fiber over the next five to ten years, and they will more actively provide wholesale services. That may stimulate more local companies to provide broadband because it will provide the backbone and middle-mile connectivity they need to be able to provide fiber transport. One of the initiatives that UTC is trying to support is exactly that: supporting regional networks, backbone providers providing interconnection between various local distribution cooperatives such as large generation and transmission utility companies, which could provide backbone connectivity so that it makes it easier to provide retail broadband to their customers.

So there is a lot going on, and we are very excited about the future!

JM: What is the role of UTC in the deployment of broadband?

BK: UTC has been around since 1948. It continues to be the only association out there that represents the telecommunications and IT interests of all types of utilities. We created a Rural Broadband Council in 2012 due to the large number of cooperative utility companies that were looking to provide broadband in rural areas. Since that time, the number of companies interested in these efforts has increased. In 2017, we created a Utilities Broadband Council, which will continue and expand upon the work of the Rural Broadband Council. This is a reflection of the varying types of utilities currently interested in this space and entering the market either on a retail or wholesale basis.

UTC is enabling utilities to succeed by advocating for policies (primarily at the FCC, but also at other federal agencies) to grant access to federal funding. Similarly, we are looking at ways for utilities to access funds at the state level. We are also providing services related to education and networking in these areas, through conferences, webinars and workshops for utilities around the country. We also provide information through our newsletters and quarterly journal, as well as our website.

JM: Aside from UTC, what other resources should utilities be exploring when investigating a broadband project?

BK: Well, certainly we think that, in addition to the services that UTC provides, the utilities need good partners like CoBank, as well as equipment providers, consultants and attorneys. Therefore, we provide networking opportunities with those resources through UTC, and we share information among our members. One of the great things about cooperatives is that the seven principles of cooperative organizations encourage knowledge sharing, and that has been very effective. We are encouraging utilities to join UTC, participate actively with our broadband councils and get involved in other initiatives and councils within UTC.

An additional council we have that I did not mention is the UtiliSite Council, which focuses on fiber-optic leasing and wireless co-location. The reason I bring this up is because I think there is a real opportunity when it comes to wireless access in rural areas. I think it would benefit these utilities to consider whether they would want to do something to support wireless in conjunction with a fiber to the home project. Many of these rural areas not only lack fixed broadband, but also lack wireless access. Deploying a fiber network could enable a wireless provider to come in and provide that type of additional service.

JM: How can a cooperative get involved with UTC? What are the steps they would need to take?

BK: Getting involved is easy! If you are not a member, you simply call UTC (202-872-0030) to join. If you already are a member, getting involved is simply a matter of getting in touch with our staff, and we can include your utility in various email and newsletter distributions. We can also notify the utility of our regularly scheduled meetings in which we'd encourage those companies to participate as well.

BRETT KILBOURNE *is currently vice president of policy and general counsel at the Utilities Technology Council (UTC), where he provides legal guidance to utilities on telecommunications issues both pending before federal and state agencies and being considered in Congress. In this role, he works with the FCC, Congress, state public utility commissions, federal courts and other federal agencies, such as the Department of Energy, the Federal Energy Regulatory Commission, the U.S. Environmental Protection Agency, and the National Telecommunications and Information Administration.*

Based in Washington, D.C., UTC is the national representative on telecommunications matters for its electric, gas and water utilities and natural gas pipeline company members. These members range in size from large combination electric-gas-water utilities serving millions of customers to smaller, rural electric cooperatives and water districts that serve only a few thousand customers each.

Mr. Kilbourne earned his bachelor's degree in 1987 from the University of the South and received his juris doctor degree in communications law in 1998 from the Catholic University of America. He is licensed to practice law in the state of Maryland, and is a member of the American Bar Association and the Federal Communications Bar Association.

INDUSTRY INTERVIEW 2:

The Uses and Importance of a Feasibility Study in Preparing for a Build-out

A talk with
RANDY KLINDT
Conexon, LLC and OzarksGo, LLC

By
DORAN DENNIS
CoBank

A feasibility study can help a cooperative determine the viability of pursuing a broadband strategy. At the same time, the study serves as the basis for developing the business plan needed to execute this strategy. Working with a consultant that has extensive broadband construction and operational experience can help a cooperative avoid many of the pitfalls and capitalize on the opportunities presented by delivering a broadband solution to their member-owners.

One of the industry's experts in feasibility studies, Randy Klindt formed Conexon, LLC in 2015 to assist rural electric cooperatives with fiber to the home project decisions and implementations. Randy's first fiber to the home project was at Co-Mo Electric in central Missouri, where he was general manager of Co-Mo Connect (see p. 24). Co-Mo Connect was first in the nation with rural gigabit service and is still the only co-op project without government subsidies or grants that has fiber service available to 100 percent of its members. The touchstone for all of Conexon's feasibility studies, Co-Mo Connect was built on schedule, on budget and is years ahead of its original financial projections. With each new project, Conexon replicates and improves upon Co-Mo's success.

Randy is also general manager of OzarksGo, LLC, a subsidiary of Ozarks Electric Cooperative in Fayetteville, Arkansas. He spoke with CoBank sector vice president Doran Dennis about how cooperatives can use feasibility studies to develop their broadband plans, and other factors that can move the process along.

DORAN DENNIS: What are the key parts to a feasibility study?

RANDY KLINDT: Well, probably the easiest way for me to describe that is to talk about how we do a feasibility study, which starts with the cooperative's geographic information systems (GIS) data. If they don't have GIS data, we can still do a feasibility study, but it sure makes for a more accurate study.

We summarize the co-op's GIS data and use it to fill in all the key components – construction, electronics and capital expenditures – in our financial modeling software, creating the inputs for our model. We also use the data for the second part of our study process, which is competitive analysis.

We think the key components to the take rate calculation, which is a big driver for the revenue side of the model, are based on existing competitive service offerings from other providers in the area. So we analyze all the locations the cooperative serves. We analyze what offerings are available to each of their members – what service level offerings each of those competitive providers offer, and their pricing. Based on that and data we have experienced with our other clients across the country we do a demographics comparison. We use eight to 12 different demographic indicators of broadband take rates that we believe can adjust the take rates up or down, based on the geographic area of the country and the demographics there.

We think our methodology for take rates is more accurate than a survey. I know some might use surveys, but I've done enough surveys in my life that I think people will tell you something on a survey that may not actually take place in reality. If you ask somebody if they want high-speed broadband internet for a low price, the answer is almost always yes. So I think it's more important to compare and use realistic data from other projects.

After we do the take rate analysis, of course that gets put into the model, and then from there we start to organize the cooperative's areas and substations and feeders into a specific order of construction over a phased approach. We always do phases going back to when I worked on the Co-Mo broadband project. It's important to do these projects in phases to prove the financial model assumptions during the first phase before you proceed to the second phase. After we organized each of the cooperative's feeders and substations into an order of construction, then we do the construction cost modeling.

We also have started to assemble a large database of construction costs across the country in different market areas. So we use that information, and we take and extend the build in the phases. We do some projects in three phases, four phases, some six, some eight, some 12 depending on the financial health of the cooperative, the scale of the project, and the ability to get crews to do the job.

> *"One key component of our study is to ensure that there's no subsidization of the fiber project by electric rate payers – that our project can stand on its own and be paid for by the revenue from the fiber project itself.*

Another key component of the study is the financial forecast. We ask cooperatives to provide us financial forecast information so we can adjust our model and manage for equity or modified debt service coverage, and to make sure that the impact doesn't harm the cooperative.

Some of the other key components of our study are to ensure that there's no subsidization of the fiber project by the electric rate payers, and that our projects can stand on their own and be paid for by the revenue from the fiber project itself.

Lastly, we present all the key financial reports from projected income statements, cash flows and balance sheets, and then we do a consolidation with the electric business to show the impact on the electric cooperative itself.

DD: Do you do all of these feasibility studies yourself? Or do you have some work done by other parties?

RK: We have both in-house employees and subcontractors that we use occasionally based on load, but all of the GIS work is summarized by our VP of projects and fiber design. She does all the review of the GIS data provided by the co-op, tests it all and then summarizes it. The competitive analysis is done by our VP of client services, Darren Farnan, who was at United Electric in Missouri.

I currently do most of the financial modeling, but we're adding a financial resource very soon. The whole team gets involved, really, on every feasibility study. Lastly, our entire team reviews the study before we deliver it to the staff of the co-op. We typically deliver that to the staff before we take it to the board to get their input and any suggested changes or alterations, and the last step is we deliver that to the board of directors in person.

> *The results of our evaluation process produce a financial model – a financial business plan that is attainable. We use real prices for construction, labor, equipment, materials, wholesale costs of bandwidth, phone, and TV.*

DD: How long does it typically take to prepare a comprehensive feasibility study?

RK: Anywhere from 30 to 90 days for us. A lot of it depends on how quickly the cooperative gets us all the requested information that we need to perform the study and the quality of that data. It is important that their financial forecast is up to date.

Then we have to take a look back to try to project the future of the electric co-op. Every co-op is a little different, but we've done some as quickly as 30 days and some in 90 days, which is what we typically specify in our agreement.

DD: What are the costs involved in completing a feasibility study?

RK: It can vary by cooperative depending on complexity. We don't typically price by size; we price by resources involved to complete it and what they're looking for. We've done group studies, where multiple co-ops have gone together to do a joint study, and the other costs are typically adjusted based on the scale in those type of situations. We've done one statewide study and are getting ready to do a large regional study for multiple cooperatives.

DD: Have you ever come across a situation where a feasibility study wasn't warranted, or one where the feasibility study indicated the cooperative should not proceed?

RK: We haven't had one where we said no. We've had some difficult ones, and we try to find a way to make it feasible as far as adding density, so we may show a cooperative how they could make it feasible as far as adding in non-member areas.

Several cooperatives that we've done, their density is very low. They may surround a small community. And building into that small community might add just enough density to make their project feasible. But we typically model every co-op deploying to 100 percent of its membership without including non-member areas, and then we very specifically tell the co-op that if it's not feasible that way, then here's a way that it is feasible. But we always specify that as a condition of it being feasible.

Is there ever a reason to skip doing a feasibility study? To be clear, we consider our feasibility study process more of a business planning process. The results of our evaluation process produce a financial model, a financial business plan that is attainable, so we use real prices for construction, labor, equipment, materials, wholesale costs of bandwidth, phone, and TV, if it's a co-op that wants to do TV. So we use all real, obtainable pricing in our business plan. I would still recommend that the co-op at least have a business plan, a road map.

We do our process a little different. We remain engaged after the evaluation phase. If the cooperative continues, we want to provide accountability and assistance to executing the business plan. I would recommend that even if a co-op was high density and had no competitor, that they at least they have a business plan prepared that becomes their budget, which then keeps them in line with a realistic and detailed plan.

DD: What are some of the other uses of the feasibility study or business plan?

RK: It's part of our initial engagement process. If they were to decide to act on our business plan and feasibility study, and construct a fiber to the home project, we remain engaged for some period of time – to guide them on how to start the business and how to stay in line with the business plan that we've provided.

We provide them with a set of templates, agreements, organizational charts, job descriptions, fiber lease agreements – everything that you do to get started and meet all of the assumptions that are in a business plan. They can also share it with their bank and their legal counsel to secure financing. I think that's typically required by banks, even CoBank.

DD: How can a consultant bring value to a cooperative that may be looking at a broadband project? Couldn't they just do it on their own?

RK: I think experience is the number one issue and the number one concern. For example, I was at Co-Mo from the first day and built that project from the ground up, including hiring the team, selecting the technology, selecting the construction methods and the architecture. So I've been there. I've not only built it, but I had to operate it. I have experience in not just constructing, or not just in doing a business plan. I think there are some consultants that will do financial modeling, but they have absolutely no experience in constructing and operating a network for an electric co-op.

These projects are very difficult. They need to be built efficiently. Most of the net income payback periods are extended and the margins are slim. Everything counts to us. I think you want somebody with not just experience in doing financial modeling, but somebody with experience in construction, experience in operations, and that's what our team focuses on.

Anybody can develop a spreadsheet and make assumptions, but without knowledge of what those assumptions are, it doesn't add a lot of value.

DD: Of the projects you've seen out there, what percentage would you say have hired a consultant versus trying to do it on their own?

RK: Most.

DD: What is the role of the consultant after the feasibility study has been completed?

RK: You want a consultant who will produce a business plan and then be alongside you during the implementation of that business plan. You have to be able to achieve the pricing inputs, you have to be able to obtain the construction labor rates, the material pricing, the electronics pricing.

I think it's important that a consultant comes alongside you when you're building to assist you in those aspects. Part of what we are providing now, for our clients that are

> *"These projects are very difficult and the margins are slim. You want a consultant with experience in construction, in operations, not just experience in financial modeling.*

building and using us for project management and design, are reports back to the staff and the board on how they're doing compared to the models. I think that's critical. You can't just do a business plan or a feasibility study and put it in a drawer, and then just go build the system absent the parameters of the study.

DD: Is there a general recommendation that cooperatives need to hire staff who have expertise in the communications business?

RK: Going back to employees, part of our evaluation phase is that we calculate a headcount and what we would recommend that they hire by role. That goes into the parts of the costs of the financial model. But yes, I would look for certain expertise when hiring.

We are also encouraging co-ops to work together in partnerships. We do see a lot of neighboring co-ops getting in the business and duplicating a lot of effort.

But if you form a subsidiary to operate the business and be in the retail business, definitely look for some outside expertise. At the same time, you have to be careful because certain outside expertise does not translate. We do believe that you want to hire expertise from companies that have been in the broadband business, and I mean in the real broadband business. Somebody who knows the difference between slow DSL and robust broadband; somebody that knows how to operate a business without subsidies. Unlike many communications companies, electric co-ops today are not being subsidized. They have to know and understand how to build a network that will operate and be breakeven, cash-flow positive, without subsidies. That's a different mindset and culture. So, yes, outside expertise is beneficial, although technical expertise is typically the hardest to find in small rural areas.

DD: You've mentioned partnerships. What does a successful partnership look like? What are the partnership models that seem to work?

RK: I think it usually comes back to being equally valued. Contributions need to be spelled out very early in the partnership. We've seen and been involved in evaluating a project that's failed, a partnership that's failed.

In these failed cases, what we typically see is an unequal value of what's being contributed. For example, an electric cooperative may contribute fiber and electronic assets and the partner would contribute only expertise, and those would be valued equally. I think it's important that the electric co-op guard their membership and their equity and make sure that if they're putting up the capital for the fiber and equipment that they have a larger share of the business.

We also make sure that the partners are not mismatched culturally. That's something we've seen too, just a different outlook on the business, and you need to vet those out early because in the long term they just won't work. For example, electric cooperatives serve 100 percent of the members with the same level of service, and that's important to the electric cooperative. They translate that business to the broadband business so part of our philosophy is that the electric cooperative should plan for building and serving 100 percent of the membership if it's financially feasible, and provide them all the same level of service. If you provide a gigabit at $79 or 100 Mbps at $49, all of your members should be able to get access to that level of service, not some lower level of service because they are too far away or too expensive to build. If you partner with somebody who doesn't have that philosophy, one that's more focused on profit or thinks that varying levels of service are okay for members, then it can create conflicts in the future.

DD: One of the partnership models we've seen more recently is the concept of a white label service, where one electric cooperative offers services like broadband services, TV and/or phone to another cooperative that owns the fiber but prefers not to be the service provider. Do you have a perspective on that type of partnering?

RK: When I was at Co-Mo, we worked with multiple cooperatives to provide them access to television headend services, shared voice services, access to transport, and bandwidth. By the time I left Co-Mo, we were working with five other co-ops, including one telephone co-op providing service. So yes, any time that you can leverage a neighboring cooperative's efforts is to your benefit.

And like I've said before, especially with partnerships, we just think the natural partnership of the electric co-op is another electric co-op especially if multiple co-ops working together can accomplish and make even smaller, less dense projects feasible. So we've seen that. We've modelled it. We know it can work and probably the hardest thing is just getting co-ops to work together from a political standpoint. But we've done an eight co-op model, we're getting ready to do a 10 co-op model and then soon after that, a three co-op model, where they all work together providing service to their members.

DD: In your opinion is 5G or some other form of wireless broadband a legitimate threat for electric distribution cooperatives that enter the broadband marketplace?

RK: I don't believe so. First of all, 5G relies on more radio equipment closer to the end-user device. The only way to enable that is through fiber. If you read or saw the story of Verizon buying a billion dollars' worth of fiber from Corning, that was to enable 5G. And if you saw the TV interview with the CEO of Corning and Verizon, this is them creating their 5G backhaul. Even with a billion dollars of fiber, it's only around 150,000 miles of plant.

By our calculations, that's building a fiber ring in 20 of the biggest U.S. cities, so that's not coming to rural areas anytime soon. We get asked this question often when we meet with boards and employees of co-ops. My response is to pose back the question, "How good is your current 4G LTE coverage?"

If you don't have good 4G LTE coverage today, there's absolutely no chance you're going to have 5G coverage, because it requires even closer proximity to the towers. And without fiber, there is no 5G. So the only way you get 5G in an electric co-op's rural service territory is to build a fiber to the home project first.

Then maybe you can have a complimentary 5G service along with the fixed wireline business.

DD: If not 5G, is there another wireless solution that will be competitive? Most of these projects have long paybacks. Are you comfortable that there will not be another wireless competitor, a 6G or a 7G, 10 years from now?

RK: First of all, most of the projects we work on have paybacks that are 15 years or less. I also believe that fiber doesn't stand still. We are seeing rapid advancement in fiber technology. For example, we see a rapid conversion from GPON 2.5 GB to Next-Gen 10 GB growing to 40 GB and then 80 GB per fiber strand over time.

And once you have a fiber connection to your home, and it's built and it's paid for, it's a hard technology to beat. As far as comparing the total capacity of a fiber cable with multiple strands and 80 gigabits per strand, there's nothing that can touch that kind of capacity.

The other thing, too, is consumer demand for broadband isn't standing still, so even if there's a technology today that could meet the demand today, can it grow to meet the future consumer demand for broadband? I just don't see it – nothing beats fiber. And you hear a lot about drones, blimps, low-earth-orbit satellites and satellite technology. Someone's always looking for a magical inexpensive solution, but if you can build fiber to the home – to every home – then it's solved once and for all.

DD: Is there anything else that would be important for a cooperative to consider?

RK: Yes. Some of the biggest challenges are managing expectations of the membership. Also, this is a competitive business, it's a different business than the electric cooperative has been in for 70 or 75 years.

Marketing can be important. Some of these projects will market themselves because they're so underserved that additional marketing is not needed. We worked on projects back at Co-Mo where you sent a packet of information to somebody saying it's time to sign up and you got a 40 percent take rate, and there are other areas that you need to actively market and do things like upsell, which is foreign to co-ops.

So those are some key components. We also always recommend that a co-op build in phases, that they measure along the way and make sure that they're meeting their targets before they commit to any future phases.

RANDY KLINDT *is general manager of OzarksGo, a subsidiary of Ozarks Electric Cooperative in Fayetteville, Arkansas, as well as a founder and partner of Conexon, a firm that works with rural electric membership cooperatives to bring fiber to the home to rural communities.*

Mr. Klindt began his first broadband project in 1999 at a rural electric cooperative, culminating in a 3,000-square-mile fixed wireless network. In 2008, he joined Co-Mo Electric Cooperative in Missouri as the co-op's information technology manager, with the plan of launching fiber to the home service, since only 15 percent of the population in Co-Mo's service territory had broadband access. In 2010, he developed a plan for a pilot fiber to the home project using an innovative architecture that lowered initial capital requirements but allowed success-based growth for capacity. In less than 12 months the pilot project was completed on time and 20 percent under budget, and today has over a 55 percent penetration rate.

Co-Mo began building 4,000 miles of fiber to the home to the cooperative's entire 2,300-square-mile service territory, and Mr. Klindt was appointed general manager of Co-Mo Connect, the cooperative's new telecommunication subsidiary, which was the first privately funded cooperative fiber to the home project in the nation to serve every one of its members. Under his leadership, Co-Mo Connect launched the first gigabit residential service in rural America in 2014, providing gigabit broadband, high definition IPTV and telephone service. With more than 14,000 subscribers and growing daily, Co-Mo Connect now stands as one of the defining standards of rural fiber optic builds.

INDUSTRY INTERVIEW 3:

The High-Level View From a Leading Broadband Partner

A talk with
ERIC FREESMEIER
Pulse Broadband

By
DORAN DENNIS
CoBank

Pulse Broadband, an NRTC company based in South Bend, Indiana, proudly partners with rural utilities across the United States to design, build and operate fiber to the home networks with world-class internet, video and phone services. Pulse Broadband was formed with the sole purpose of partnering with rural America to bring fiber technology to underserved areas. Since its formation in 2008, Pulse has partnered with cooperatives, municipal entities and private groups to implement successful fiber to the home projects. In addition to fiber design and construction management expertise, Pulse offers a full suite of telecom services, from feasibility studies for a new network to back-office support services for existing companies. This 360-degree view of the industry, along with years of hands-on experience, gives Pulse the distinction of being one of the true leaders in the rural fiber to the home industry. Pulse has planned networks, designed and built networks, launched services and eventually managed these networks for their clients.

Doran Dennis from CoBank's Electric Distribution team met with Eric Freesmeier, the president and CEO of Pulse, to discuss how Pulse views the relationship between rural electric cooperatives and the need for broadband in rural America. Eric addresses the challenges, opportunities, technologies, and risks associated with a rural electric cooperative deploying a high-speed broadband solution to their members and surrounding communities.

Doran Dennis: What advantages do electric utilities have over other entities that provide broadband services?

Eric Freesmeier: There are a lot of advantages, but succinctly, one of the biggest advantages for electric co-ops to provide broadband services is their organizational structure. They're not-for-profit and member-owned. That means they understand and accept long payback periods.

Like electricity, which is their core business, fiber optic networks are multigenerational networks. They have 25-to-50-year lives.

Electric cooperatives also have a direct relationship with their members, which is interesting. National satisfaction surveys have pointed out that rural electric cooperatives have very high customer satisfaction rates. The ACSI, the American Customer Satisfaction Index, conducts an annual report, and rural electric cooperatives have traditionally scored higher on satisfaction than municipal-owned utilities or investor-owned utilities and significantly higher than telephone and subscription TV companies and other internet service providers (ISPs). My point is that this direct relationship with their members is a positive reason for providing broadband services.

There are also advantages from an infrastructure standpoint. Electric cooperatives own their own poles and they have existing right-of-way agreements. Their infrastructure is predominantly aerial plant as opposed to underground plant. The cost to construct a mile of aerial plant is significantly less than for underground.

They've got property, plant, equipment and people already in place to serve their electric members. These same people can build, manage and operate the broadband network. There is overlap in things like back office, billing, customer service, maintenance and repair, warehouse. Electric cooperatives have had those functions for 70 years.

Electric cooperatives are also not-for-profit. They have lower cost of capital and a lower return on investment and hurdle rates. Of course, they have to maintain TIER and debt compliance, but these networks, if they're feasible, will allow them to do that.

Most private networks will not pursue this rural business opportunity. For them, a dollar of capital will always find a better use in a higher density area. That's why the rural electrics are oftentimes seen as a provider of last resort for high-speed internet.

DD: Is there one technology that best serves the broadband needs of rural America? And if not, what technologies could be deployed successfully?

EF: Well, I think everybody acknowledges that the best technology both for rural and urban is fiber, with rich fiber backbones. Though fiber is costly to deploy, it is clearly the best technology. Having said that, there are other factors

"Though fiber is costly to deploy, it is clearly the best technology.

that come into play like density; topography of the land; distances between pole spans, feeders, substations, and offices; and percentage of aerial versus underground plant.

When we began Pulse ten years ago, we were proponents of fiber to every premise, but we have pivoted our focus. We're still predominantly a fiber to the home advocate, but we have to address the financial feasibility of building such a network.

We strongly encourage electric cooperatives or any small rural utility to build a rich, high-count fiber backbone to lay out the distribution network. Then we consult with the utility on the best last mile technology based on topology and distances.

In some instances, fiber to the home makes financial sense. In other instances, it will not result in a payback because there's not enough density or the distances are too long. In those cases, fixed wireless is an opportunity to provide last-mile internet access. In really remote locations, satellite broadband may in fact be the only way to deliver affordable high-speed data. Often, the best last mile solution is a combination of all three.

DD: Can you talk a little about the challenges and opportunities associated with each of these technologies as well as the expected life of each?

EF: Fiber is certainly the costliest and takes the longest to build, but fiber has the longest life. The actual fiber itself is not unlike the electric line. The fiber gets depreciated over 20 to 25 years, but the generally accepted useful life of fiber is over 40 years. There have been studies that have proven that a well-constructed, well-maintained fiber network will last over multiple generations.

The biggest advantages for fiber are speed, scalability and the ability to keep up with the increasing bandwidth demand. The need for bandwidth continues to explode in rural areas for things like telemedicine and distance learning. Fiber is the only technology that can deliver reliable speeds necessary for the real-time, two-way communications required for these applications.

> *I don't see 5G being a legitimate threat in rural areas. Even though the spectrum for 5G is set up to deliver very high speeds, the distances that these radio waves will travel are so short that it can't propagate.*

All of the other technologies are primarily wireless. Microwave is really a point-to-point technology. It works really well, but it has to have line of sight. It is generally used for transport, not for last mile.

That leads to fixed wireless technologies to provide the last mile service, and there's a whole host of wireless technologies that deliver high-speed broadband. They operate with different radio frequencies using different spectrums – some licensed, some unlicensed.

Each of these wireless technologies propagates differently, meaning their reach is different for each of the wireless radios. We are proponents of using wireless in those areas where fiber all the way to the home doesn't make sense.

The beauty of having a fiber distribution network is that all technologies, wireless or wired, require a fiber backhaul to carry the data back to a headend or a central office and ultimately transport it out to the internet. Nothing does that better than fiber. The challenge of wireless technologies is that the laws of physics will not allow them to continue to keep pace with the increasing demand for speed.

In 2009, the definition of high-speed data was 256 kilobits down. Recently, the FCC's minimum definition was ten megabits down and one megabit up. Going forward, they define high-speed as 25 megabits per second down and 3 megabits up for rural areas.

Wireless radios in good conditions can deliver the 25/3 really well. Projections are that within the next 10 years, the average speed will certainly increase to 100, 200, even 1,000 megabits per second down. The disadvantage of wireless technologies is that they can't keep up with the demand for bandwidth.

The other problem is that they are subject to rain fade. Different frequencies perform differently. Lower frequencies can deliver broader coverage, which might make financial sense in a rural market, but broader coverage means lower speeds, and it won't travel the distances that you need in rural areas.

DD: Will 5G or some other form of wireless create a legitimate threat for electric distribution cooperatives that enter the broadband market place?

EF: There's a lot of talk about 5G. It's a term that people use frequently, but really don't know how to define. There has been a lot of speculation that it might be a legitimate threat for electric distribution cooperatives.

I honestly don't see 5G being a legitimate threat in rural areas. Even though the spectrum for 5G is set up to deliver very high speeds, the distances that these radio waves will travel are so short that it can't propagate.

These distances are measured in feet, not in miles: the reach of 5G extends only 500 to 1,000 feet from a radio. It may be a very complementary technology for rural electrics that have deployed broadband, but it's not going to be a competing technology. It will never replace fiber because the thing that 5G and any wireless technology requires is a fiber backbone to backhaul the data.

I don't think 5G is going to ever be the predominant technology for rural markets because of the short distances that it can travel.

DD: Does a provider need to fund all aspects of their network or can they partner with others? In your opinion, when is partnering the best option?

EF: We're strong advocates for partnering. Pulse Broadband was purchased by the National Rural Telecommunications Cooperative last September. NRTC has about 1,600 members, 800 electric co-ops and 800 telecommunications companies.

There are a lot of different partnership models that work. Certainly, electric cooperatives partnering with other electric cooperatives is a model that we've long

advocated. Early cooperatives built fiber networks that had their own headend. Those systems are now leveraging that headend to extend services to other cooperatives in adjacent areas. Electrics with electrics make a lot of sense horizontally.

Vertically, partnerships between electric cooperatives and G&Ts make sense. A G&T providing middle-mile fiber is a great way to partner – they can provide low-cost transport bandwidth back to peering points.

There is also an opportunity for electric cooperatives to partner with rural telecommunications companies. Generally the overlap in the service areas is not that great, and small telcos are largely community-based. Some have deployed fiber, but most have deployed DSL and copper-based technology. The telcos have extensive experience being a broadband provider on fixed landline, telephone and high-speed data. They've got the infrastructure in place – the billing systems, the back-office systems. We think there's an opportunity for electrics who are building fiber networks to partner with telcos that are good operators and share revenues.

There are plenty of other combinations and permutations. We've seen electric clients that have built into small municipal utilities that have lost their cable company to bankruptcy or that have exited the market.

There are opportunities for electric cooperatives that launch fiber networks to extend their reach and to serve other communities. We have one client that extended into an industrial park outside their service area that did not have access to high-speed data. It was a relatively short line extension and they were able to provide great service to all of the businesses in this industrial park. While it's not a formal partnership, it's an example of public-private partnerships that work.

While we are strong proponents of partnerships, there are a lot of existing relationships that have to be vetted. Early in any feasibility study, we will identify all of the potential partners in the area, bring those ideas to the table and discuss them with the electric cooperative. We found that if we can do that early in the process, before there is a lot of emotion attached to the project, then we're hopeful that we can see more and more successes with partnerships.

> *"There are a lot of different partnership models that work. Electric cooperatives partnering with other electric cooperatives is a model that we've long advocated.*

In my opinion, the best partnership may be between a small telco and an electric cooperative. In cases where a small telco operates in a relatively constrained geographic area providing quality services to a community that doesn't overlap with an electric cooperative's territory, and an electric cooperative is building a fiber infrastructure, then a partnership would be ideal. The telco can provide the services and cost sharing while the electric utility can provide certain infrastructure.

DD: What is different about serving commercial customers as opposed to residential, and what opportunities are presented by serving commercial customers?

EF: Commercial customers generally require dedicated point-to-point fiber connections. Commercial customers have more need for security, a higher quality of service and for service level agreements, so there's a higher standard of network monitoring operations that commercial customers require and demand.

Commercial customers generally need redundant path networks and ringed networks because business interruption can cost them substantial money. They obviously need higher bandwidths. It is not unusual for businesses to require 1-gig circuits or 10-gig circuits. Additionally, they will require higher throughputs and upload speeds in particular. It's not uncommon for copper-based and cable coax-based networks to provide high speed down but not high speeds up – that is called asynchronous feeds. Different speeds down versus up

> *There are 900 rural electric distribution co-ops in the country. We think within the next 10 to 20 years, all 900 will build a fiber communication backbone network to support their electric business.*

works great for homes that download a lot of data and view videos on Netflix, but businesses need to upload large files. Telemedicine needs to be able to upload high resolution X-rays and MRIs, as well as download them. Schools need to deploy high speed to communicate both ways, as do commercial businesses.

Now these requirements also create opportunities for serving commercial customers. An electric cooperative that builds a fiber backbone will be able to provide all of these quality-of-service standards, SLA standards and through-put standards through their distribution backbone. And the real advantage of serving commercial customers over residential customers is the reality that revenue from one large commercial customer can help fund the build-out for a lot of residential customers.

The opportunity for revenue from commercial customers is a great one. We encourage our clients to identify those large commercials, large anchors in their area, and prioritize the build to them first. By building to these large commercial accounts or schools or hospitals, the cooperative may be able to generate a revenue stream that will pay for all of the cost of building the fiber line. Then any residential services on that line will just add to the bottom line.

There's also a business case to just serve commercial accounts. But once that point-to-point commercial connection is built, there's no reason that you can't serve all of the residential customers and small businesses along the way to pick up incremental revenue.

DD: How does a broadband deployment tie together with smart grid?

EF: We think they go hand in glove. Again, when we started Pulse we were a broadband fiber to the home company. That was when smart grid was just being defined, and it was defined largely as smart meters that you can pull data from. It didn't require a lot of bandwidth at all and slower, low-bandwidth technologies worked fine.

Increasingly, if you think about the internet of things, smart homes, smart devices, renewable energy, demand response, all of the things that are required to run an efficient electric utility require a high-speed, two-way communications backbone.

There are 900 rural electric distribution co-ops in the country. Candidly, our financial feasibility models would suggest that, realistically, probably less than a third could ever support and pay back a full fiber to the home build.

We think that on average, a co-op needs a seven or eight homes-per-mile density to have a full fiber network break even. We've done our analysis. There are probably 200 to 250 electric co-ops that have the average densities necessary to support a full build-out. Now, there are more systems that could deploy fiber to parts of their systems.

All of the 900 electric distribution cooperatives provide electric service, and we think within the next 10 to 20 years, all 900 will build a fiber communication backbone network to support their electric business. Smart thermostats and smart appliances along with an increasing number of other devices will ultimately allow an electric utility to maximize the efficiency of the electric system if they have the ability to communicate with the smart home by having information flow both ways. That requires the real-time flow of information, not just batched, slow polling of one-way information. Fiber networks are perfectly suited for these emerging smart grid purposes.

Interestingly, in 2003, the Electric Power Research Institute laid out its challenges in a report called "Grid 2030." It identified the number one goal as increasing transmission capability, grid control and stability. That was

the first goal of a fully functioning electric power grid, not a fiber grid, but a power grid, in 2030. If you think about grid control and stability and monitoring, that requires a high-speed, two-way, fiber-rich communication network.

Grid control is increasingly defined by the security of energy infrastructure – having the ability to share data in a controlled environment. Cybersecurity is critical. Fiber networks are perfectly suited to enable the electric grid to function properly.

Additionally, there are about nine other goals. If you looked at all of them, you would find a reason to build a fiber network in almost every one of them.

That becomes the common denominator that best enables the overcoming of any economic challenges. The fiber-optic communications backbone is needed for the efficient operation of the electric utility.

DD: Can existing electric utility personnel be utilized to work on a broadband plant, or is it advised that a separate crew be hired?

EF: We think that existing electric personnel can be used. In particular the back-office support, the billing, the customer care, the warehouse, shipping, receiving, logistics, all of those functions are perfect opportunities for co-ops to utilize their existing personnel for both the electric business and the broadband business.

It gets a little bit more difficult on the actual construction and maintenance of the fiber network. We thought early on that electric linemen would be great candidates to learn fiber. We even offered training for electric linemen who were interested in enriching their careers to learn the fiber communications businesses. We've had some success, but not a lot of success. The reality is electric linemen that have been doing electric line work for a long period of time are probably not interested in learning a different line of work.

We've had good success with young electric linemen who are interested in expanding their careers and learning new technologies. In general the electric linemen are great on things like make-ready and pole maintenance and many of the other things that support a fiber network.

> *"It is critically important to really understand the business case for a fiber build through the analysis of a comprehensive feasibility study.*

In terms of the actual maintenance of the fiber plant, we find that it's probably better for the electric co-op to hire an inside plant person to be responsible for the central office and the network gear, and an outside maintenance tech to oversee the maintenance and the construction of the fiber plant.

DD: Is there anything else that would be important for a cooperative to consider?

EF: We could go for probably another hour on that one, but one area I would like to mention is that the board's appetite for risk is an important point to consider. Fiber networks are high-dollar investments and they're not for everybody. It requires a champion within the co-op. Generally we find the champion in a senior level manager, the general manager or the head engineer. Sometimes we find a champion on the board.

It is critically important to really understand the business case for a fiber build through the analysis of a comprehensive feasibility study.

I know at Pulse Broadband we pride ourselves on doing a feasibility study that our clients can use to make well-informed, thoughtful decisions about pursuing a broadband strategy and evaluating all of the risks associated with a deployment. After a decision is made, we then shift our focus to assisting clients in building, operating and managing a successful communications network.

Another thing that goes along with that appetite for risk is understanding the underlying financial performance of the electric portion of the cooperative. You don't want to ever put the co-op at risk financially. I think the thing that makes Pulse a strong advocate for doing feasibility studies for electric distribution cooperatives is that electric and telephone co-ops are our primary

business. We know the electric co-ops. We have grown up talking to those boards. Our employees come out of those environments.

Organizational structure is important. Does the best organizational structure have the electric as the parent and a for-profit subsidiary to run broadband services? Similar to what distribution co-ops did with propane and other ancillary businesses over the years, that's probably the most common organizational approach. It allows electric cooperatives to answer many political questions from their members. A lot of electric members may rightfully say, I don't want or need broadband, and I certainly don't want my electric rates to pay for your broadband network.

That's why most co-ops will set up for-profit subsidiaries for their operating entities. It also keeps things clean between RUS, CoBank, and others.

We're strong believers that you don't have to do a build-out all at one time. In fact, we advocate building in phases. Furthermore, we suggest financing it and evaluating the feasibility of a project in phases as well.

I mentioned our first recommendation is to connect the offices and the substations with a fiber-rich backbone. That would be an example of the first project to potentially invest in.

You don't have to spend multimillions of dollars to do this all at one time. Starting with the fiber backbone, financing that, building it out and then looking for selective opportunities to extend that network are ways that we think control the financial risk and ensure the sustainability and financial viability of the networks.

ERIC FREESMEIER *is the chief executive officer of Pulse Broadband, an NRTC company, based in South Bend, Indiana. Pulse designs, builds and operates fiber broadband networks for rural electric utility and telecommunication purposes.*

Prior to joining Pulse, Mr. Freesmeier was the chief administrative officer for Broadstripe, a broadband provider based in Missouri; the founder of Deepwater Enterprises, which advised startup and emerging businesses; and senior vice president of administration for Charter Communications.

Mr. Freesmeier holds bachelor's degrees in marketing and industrial relations from the University of Iowa and a master's degree in finance from the Kellogg School of Business at Northwestern University.

CoBANK
KNOWLEDGE EXCHANGE

CASE STUDY INTERVIEW 1:

On a Chain of Islands in Washington, an Unlikely Recipe for Broadband Expansion

A talk with

FOSTER HILDRETH

Orcas Power & Light Cooperative

By

JOHN DONNER

CoBank

Orcas Power & Light Cooperative (OPALCO) is a member-owned, nonprofit cooperative utility that has provided energy services to San Juan County in far northwest Washington State since 1937. Delivered to 20 islands in the archipelago by way of submarine cables, the majority of its power is hydro-electric energy generated by Bonneville Power Administration (BPA).

Delivering power and broadband in this topography and environment creates a unique set of challenges. Together with its wholly owned subsidiary, Rock Island Communications, the cooperative has met these challenges with some very creative solutions to bring smart-grid technology and broadband services to its members. John Donner from CoBank's Electric Distribution team met with Foster Hildreth, the chief executive officer of OPALCO, to discuss how the co-op has used a unique combination of partnerships, member contributions and varying technologies to meet the critical needs of its members.

John Donner: What was the initial driver behind your project?

Foster Hildreth: San Juan County was a severely underserved community for modern communications, with sole reliance on a national carrier that made little to no ongoing investment in its infrastructure. As with many co-ops, the very initial driver was a need to better communicate with key grid infrastructure (substations and submarine terminals). Starting in 2000, OPALCO began sharing surplus fiber with larger institutions (public safety, government, schools, libraries) in the county to meet their demand for connectivity. However, a complete failure of an undersea fiber cable belonging to the national carrier disconnected the county for 10 days in November 2013. The immediate impact on emergency management systems, the economy and normal daily life initiated our current course of action.

JD: What was the viewpoint of your board and membership before you started, and has it changed over time?

FH: Yes, it did change over time. We do really see our world as the time before the cable broke versus the time after it. It was a defining moment in the community that brought home the need for self-determination and the broad acknowledgment that we needed to fix our own problems. Relying on others to deliver a critical infrastructure, satisfying cooperative quality and service levels, was not going to happen.

JD: What are the demographics of the area that you serve?

FH: We are an older, seasonally driven economy and demographic. Our service territory has an average age of 52, compared to a Washington State average age of 38. Additionally, 35 percent of the home ownership is part-time/seasonal residents.

JD: Are you providing broadband outside of the electric service territory?

FH: Not currently. However, if a cooperative is facing similar challenges, they can call us. We have had some interest from other communities and may explore replicating our fiber/LTE model in other parts of the county.

JD: What broadband/telecommunications offerings already existed in your marketplace?

FH: The primary offering was DSL internet delivered over an aging copper infrastructure, mixed with minimal cable and satellite. DSL was either provided by the incumbent carrier or resold via local ISPs.

JD: Was there a competitive response to your offering?

FH: We acquired the largest local ISP in an effort to expand our existing customer base and get closer to our subscriber break-even targets right from the beginning.

The incumbent carrier started to upgrade portions of our mutual service area using governmental grants. However, those efforts were short-lived; the cost to upgrade infrastructure in our county is very high and our pricing and baseline service offering is beyond their best capability. Based on substandard service for a number of years, there remains an overwhelming desire from folks to get away from the incumbent.

JD: Did you complete a feasibility study and if so, did you prepare it internally or hire an outside firm?

FH: Over the years a number of studies were performed both internally and externally. The current plan was derived in mid-2014 after hiring a team to define a plan of action.

JD: What technologies are you utilizing?

FH: Our core network is an active Ethernet fiber to the home/premise supplemented with an LTE fixed wireless network. We entered into a long-term partnership with T-Mobile US, whereby we share investment and capability allowing us to offer a private wireless solution using multiple LTE spectrum bands (2, 4 and 12). We do deliver some services via public spectrum WiFi as well as reselling DSL connectivity.

JD: What services are you offering – triple play, broadband only?

FH: We offer broadband and voice service. We do not offer traditional TV, taking the view that if you deliver a superior connection, people will adjust their consumption habits to streaming services. We also offer a full suite of IT services: hosting, email, technology classes, etc.

JD: How are you marketing your services?

FH: We market via the full range of media (print, online, social media, sponsorship, etc.).

JD: Did you hire any new personnel for this project?

FH: Yes, our broadband business has grown to 30 full-time employees since its inception in 2014. We have hired an extremely dedicated and talented group with a wide range of skills including technology, finance, marketing and retail experience. Perfecting our team culture has been one of our largest challenges. Providing internet services is a competitive business and requires a slightly different attitude and sales mentality. We are fortunate to be able to attract talent from all over the United States.

JD: What is your organizational structure? Who holds the broadband assets?

FH: OPALCO is a 100 percent equity owner of Island Network LLC, doing business as Rock Island. OPALCO maintains ownership of our backbone infrastructure, while Rock Island owns all distribution assets installed.

> *Long-term, we would like to see growth in the social and economic capabilities of our now "connected" rural community.*

JD: Did you partner with anyone?

FH: As mentioned previously we have a very unique partnership with T-Mobile. We each have access to each other's LTE spectrum. T-Mobile provides Rock Island with a managed virtual network operator (MVNO) arrangement through which we can deliver fixed wireless services.

JD: How are you funding the project?

FH: Operating revenue, loan/line of credit from CoBank and direct investment for construction from property owners. We have also benefitted indirectly from a multimillion-dollar investment in infrastructure by OPALCO and T-Mobile.

JD: Did you collect contributions to aid in construction from your subscribers?

FH: Yes, an average of $3,500 to $4,000 per location. Connecting parties organize and fund the cost of construction to bring this utility through their neighborhoods and to their homes. The Rock Island team is actively working with organized groups of homeowners in HOAs, road or water associations, or simply groups of neighbors who come together to share costs.

To help offset the cost of construction, we are offering two types of incentives. The first is a construction incentive of $1,500 toward the last-mile construction. The second is a discount incentive for those willing to cover their entire construction cost. Rock Island provides a $20 per month discount on fiber subscriptions for as long as the customer lives at their service address.

JD: Did you encounter any surprises or challenges along the way?

FH: In short, yes, lots of surprises and adjustments along the way. The introduction of T-Mobile was a massive benefit to our ability to quickly deliver a major improvement in services to a large number of customers, especially in remote areas of the county. The continued demand and need we are seeing has been a great surprise. Also, the degree to which we've been able to solve the cell coverage gap in our community – thanks to our partnership with T-Mobile US – was a surprise, and the benefits to our electric utility, public safety and our co-op membership are huge.

JD: What is your long-term measurement of the success of this project?

FH: On a practical level, cash-flow positive. On a wider community level, we would like to see growth in the social and economic capabilities of our now "connected" rural community. Our long-term goal is to put a Gig into every building and 100 Mbps into every hand. ■

FOSTER HILDRETH *is the general manager at Orcas Power & Light Cooperative (OPALCO), which distributes power to 15,000 meters across the San Juan Islands in far northwest Washington State. A seasoned financial manager, Mr. Hildreth joined the OPALCO team in 2006 and took the reins as general manager in September 2014. In that role, he oversees all of OPALCO's departments and functions, including engineering, business development, accounting and finance controls, reporting and member services, communications, capital projects, and hiring key personnel.*

Mr. Hildreth earned his bachelor's degree as well as his master's in business administration and finance from the University of Southern California. He lives on Orcas Island with his wife, two children, their dogs and a flock of chickens.

CASE STUDY INTERVIEW 2:

How a Pioneer in Fiber to the Home Succeeded With a Phased Approach

A talk with
KEN JOHNSON
Co-Mo Electric Cooperative

By
SETH HART
CoBank

Co-Mo Electric in Tipton, Missouri, was one of the first electric cooperatives in the nation to build out a fiber to the home network to its members. Utilizing a four-phased approach, Co-Mo Electric's fiber build-out has served as the model for others looking to extend fiber to their members. With more than 15,000 subscribers to date, Co-Mo Electric has demonstrated that an electric cooperative can successfully extend fiber to its membership if done correctly. In fact, Co-Mo Electric has now extended the option of fiber to all of its members.

Ken Johnson, Co-Mo's general manager and CEO, spoke with Seth Hart, a lead relationship manager in CoBank's Electric Distribution banking division, about how the build happened, and the important lessons the co-op learned from it.

Seth Hart: What was the initial driver behind your project?

Ken Johnson: The initial driver behind our project was really need – the need of our members. I had been here for a short while, and it was evident that broadband access was very limited. Many of our folks were using dial-up. If you went out into the community, many times the discussion would lead you into the poor connections that folks had to work with. We were created as an electric co-op to meet a need for our members, and we just saw the project as an opportunity to help our members with another problem that they had.

SH: Can you give a brief description of your system?

KJ: Our electric co-op serves about 32,000 meters in central Missouri. I like to say that we're in the heart of central Missouri. We do provide service to a lot of folks around the Lake of the Ozarks, so it is very seasonal in nature, but yet those folks, when they come to the lake, like to bring some work along and be able to stay at the lake longer because they now have access to high-speed broadband. So that has really been helpful economically for us and the surrounding community if folks are staying a little bit longer during the season.

We also have about one third of our members who are more agricultural in nature. This is the northern part of our service territory. We have 4,000 miles of electric line, and we've built out the whole electrical system with fiber where it made sense. And so we ended up with about 3,000 miles of actual mainline fiber when we were done.

We have about 15,000 subscribers on our broadband, video and phone service today, and that continues to grow monthly by about 100 to 120 subscriptions. I think last month we even had over 200. So we're continuing to see very good growth in our fiber customer base. And our take rate is around 50 percent right now.

SH: What are the demographics of the area you serve?

KJ: We actually have an age group that is on average older than most of rural America. And I think primarily the driver of that is the region around the Lake of the Ozarks that we serve. A lot of folks retire here. I would also say that, because of a lot of the fixed incomes and the type of work that is available, agriculture and farming, our average income tends to be slightly below the statewide average.

SH: What was the viewpoint of your board and membership before you started, and has that changed over time?

KJ: Well, I think the board has always been supportive. Like most electric cooperative boards, they are very conservative. We had to do a lot of soul searching about whether or not this was something that really fit our calling, whether or not it was something we really needed to do. But as we looked around, no one else was going to do it if we didn't, and I think that is really what helped my board members get their minds around it. Of course we did a lot of work to prepare the project and present it to them in a way that made it real and made it achievable.

Keeping our board in the loop all along the path was really helpful in helping them understand what we were doing and the real need that we were trying to meet. Once they saw the success, they became very enthusiastic and very supportive. It can be kind of hard to hold back the board sometimes, as they get excited and want to see this be successful. As long as we have a solid business plan and we bring that to our board, they are usually very receptive.

"We had to do a lot of soul searching about whether or not a fiber to the home project really fit our calling. But as we looked around, no one else was going to do it if we didn't.

SH: How did taking a phased approach help you and your board gain comfort with this project?

KJ: It is important to note that when we brought this to the board we started out with a pilot. And when that was successful, we came back to our board with a four-phased approach. The reason was that we wanted to start with the most densely populated areas first, in order to get as many folks hooked up as quickly as possible. Because there are a lot of upfront costs, you want to begin to get your investment back. Also, by having it divided up into four phases, it gave our board an opportunity for an off-ramp if the economy changed and if take rates didn't produce what we thought they needed to. It was really kind of that safety valve – an exit strategy.

As we were nearing the end of phase one, if everything was on track budget-wise and we were meeting all of our metrics, we were able to come back to the board and say, "We need to consider phase two." The reason for that is once you get your contractors on-site and working, you want to keep them here, because if they have any inkling that the work is winding down, they start sending crews elsewhere. We had a massive workforce here, and we really needed to keep them working as long as the project was working out financially. And so we went through the whole project in that fashion. Because of demand and because of some of the service territories we decided to add like the communities I noted earlier, we actually

> *Keeping our board in the loop all along the path was really helpful in helping them understand what we were doing. Once they saw the success, they became very enthusiastic and very supportive.*

robbed some service territory out of phase three to put into phase two. We also ended up doing phase three and four together.

But all in all, in regards to our board, we had a very good relationship with them and we were very open about the success. At every step along the way, they had the opportunity to say, "We're not comfortable, we need to pause for a moment and let the economy recover," or whatever the problem may have been.

Fortunately, from a timing view, we hit some of the lowest interest rates in history. From that perspective, we couldn't have chosen a better time to start. And so we believe we've got a very good project here, and it has worked out very well. But I wanted to add the four-phase approach because I think that is really important for others to consider.

SH: Are you providing broadband outside of the electric service territory?

KJ: That is a very interesting question. Originally our plan was to obviously serve our members who own us. But it wasn't very long after we got started that we began to build around some of the communities that are served by either a municipal or the investor-owned utility, and interest grew. The role is really reversed here, in that originally, when electricity was brought to the area, it was the rural areas that were left behind. So it was really interesting to see the level of interest from these other communities as we built fiber around them. We received requests from city councils and mayors. We had petitions brought to us asking us to consider building into these communities. So yes, we did take a look at these communities, as they were very attractive compared to our rural areas.

So we had some work to do with our members to help them understand that as we built out the rural area, we were also going to include these areas that weren't served electrically by the co-op. It has been a great addition to our project, and it was something that wasn't originally planned when we started. But it's been a wonderful thing for our community and for our schools and the businesses that our members rely on for their services.

SH: What broadband/telecommunications offerings already existed in your marketplace?

KJ: I think we were underserved as compared to a lot of urban areas. Most telecommunications companies in the area were offering DSL as much as they could. They would extend that as far as they could, but usually that's only a couple or three miles outside of an urban area. And much of the area was served either by wireless or dial-up service. There's one area down around the lake that was served by Charter, a cable system, and they were able to provide broadband via that. But for the most part, dial-up was pretty prevalent out in the rural areas. Some had satellite, but most found that too expensive with some latency issues and data caps that made it unattractive.

SH: Was there a competitive response to your offering?

KJ: I think initially most really did not know that we were building fiber. We didn't advertise this nationally or regionally or anything, but more through a grassroots outreach to our membership. So we were able to get in and build a lot of our system with our membership. But as we moved further into the project, some of the local telephone companies were trying to lock in two-year contracts on DSL and phone service to try and compete with us. But honestly, there really was very little competition.

SH: Did you complete a feasibility study, and if so did you prepare it internally or hire an outside firm?

KJ: Yes, we did complete a feasibility study. Originally with our project, we took a look at the stimulus money and went through the grant application process. We had a consultant who we worked with on that and unfortunately our application was turned down, so we did not acquire any of that funding. But we learned a lot through the process. We then took what we learned and fine-tuned and further developed our own modeling and internal system. In the end, we developed our own feasibility study and the financials associated with it.

SH: What technologies are you utilizing?

KJ: We have deployed a complete fiber to the home project and have built out about 3,000 miles of fiber to our members. We're using GPON technology with a distributed tab. As far as the services we are offering, we offer IP telephone, bandwidth for connection to the internet and video services. So we have a triple play bundle with discounts for different options.

SH: How are you marketing your services?

KJ: The interesting thing about our project is that we have not spent a lot of money on marketing. Of course, when we were building out the project, we would send out a packet of information to those individuals who were in the area where we were beginning to build. We also use social media quite a bit, and of course there were some press releases. But we really have not had to do a lot of advertising or marketing.

Since we initially got started, we have also put up some billboards. There is a lot of traffic to and from the lake, and so we try to inform those who might be passing by to the lake that they can get some exceptional services through Co-Mo Connect. Now that we've completed our project, we are beginning to do some further marketing. We have tried to figure out if there was a reason that folks did not subscribe to our services initially. And what we are finding is that sometimes people were new to the area and they just did not know about our service.

> *"We were originally created as an electric co-op to meet a need for our members. We just saw this project as an opportunity to help with another need that they had.*

SH: Did you hire any new personnel for this project?

KJ: When we first started, we made the commitment to the board that for the pilot we would not add any personnel. We wanted to make sure this thing would work; we thought it would. So initially we started out with using only the resources we had within the co-op, and of course contractors to build it. Once we knew it was going to be successful, and once the board gave the okay for our four-phased approach, we then began to hire folks. Today, Co-Mo Connect has 25 full-time employees with eight part-time employees.

SH: What is your organizational structure? Who holds the broadband assets?

KJ: We are governed by a nine-member board of directors for the electric co-op, and the electric co-op actually owns the subsidiary that operates under the name of Co-Mo Connect. The co-op owns the fiber assets on the poles, and we lease to the subsidiary all of that dark fiber. The subsidiary then lights that fiber. The subsidiary owns all of the electronics in our headquarters, the TV headend, and all of the electronics in the home.

Through a lease agreement between our subsidiary and our parent company, we are repaid so that we have principal and interest in the cost to operate the subsidiary. The co-op really put its equity on the line to fund and build this fiber to the home project.

> *As we look back at our project, our construction costs came in very close, maybe a little bit under budget even. We got better at each phase at estimating costs.*

SH: Did you partner with anyone?

KJ: No, we did not partner with anyone. There was no one to partner with at the time that we started. Many areas I know have opportunities to look at partnering, but in our particular case, no one was interested in upgrading service to the rural parts of our service territory.

SH: How are you funding the project?

KJ: We worked very closely with CoBank and CFC to create the funding mechanisms for our project, so it is totally funded through debt capital with those two banks. We are very pleased with our relationships with both entities as they have allowed us to build this wonderful network for our members.

SH: Did you collect contributions in aid to construction from your subscribers?

KJ: We actually took a deposit. We required folks who were interested in receiving our services to put down $100 to secure a spot, and that deposit then went toward the installation of the equipment in their home. We built based on subscriber interest and success, so if there was a particular part of our service territory where folks really did not want it, we did not build there. And if there were little pockets in our territory that we did not build to today, we designed it so that it could be built out to in the future.

SH: Is the project on time and on budget?

KJ: Well, that is a really good question. We have completed construction of our mainline fiber and we are almost finished up with the initial subscribers who applied for service while our project was open. But it is hard to say we're done because we continue to get about 100 to 200 new subscribers every month, so it continues to grow. We're very close to closing the work orders, but we're also very happy about the continued growth and interest in our products and services.

As far as on budget, I would say yes, but it's not an easy answer because when you build out a system there are so many things that will become opportunities along that way that they're hard to turn down and say no to. During our project we had opportunities to build several miles of fiber that became part of our project, and we just did it ahead of schedule. But we still had to come up with the funding early on for cell towers. When they come through and they want backhaul, you have to be able to do that. We also had other requests from other businesses as we were building that we originally did not put into the project. And we built into the four communities I mentioned earlier that were not in our original project.

As we look back at our project, our construction costs came in very close, maybe a little bit under budget even. We got better at each phase at estimating costs. But the real driver is the take rate, and that adds costs that you maybe didn't put into your initial estimate. That's a good thing, if your take rate was higher than what you originally thought it might be.

At the end of the day, we're very pleased with the project, and we are on budget. I think we've added a little bit that will stretch the project out a little bit further as far as breakeven goes, but we're very pleased and everything is working well.

SH: Did you encounter any surprises or challenges along the way?

KJ: That is a question I have thought about quite a bit. There are always challenges when you take on a project like this. I think for me, the surprise was that once you started and the members found out you were going to do this everywhere, they would ask, "How soon will you be to me?" The enthusiasm and excitement around this service, and people wanting it, was tremendous! And so that was a surprise initially.

One of the main challenges I think when you take on a project like this is that you rely on contractors to do much of the work. And even though you work really close with these contractors, helping them understand how important it is to respect your member's property, like closing gates to a pasture, is important. If you tear up their right-of-way, we need to go back and get it fixed. Managing at the peak of our project was key, because once we kind of hit peak performance, we kept moving the project forward. We had about 200 contractors on our property every day for about three years. And so I think the challenge of keeping the work and the material flowing and getting the subscribers hooked up is key – we did it, but it was very challenging.

SH: What is your long-term measurement of the success of this project?

KJ: Well, obviously, to provide the service at a competitive rate, to see our rural area continue to grow, and to provide our members with services that they deserve like many folks in the urban areas. We don't want our area being left behind. And so we believe that is our job, and we'll be successful as long as we'll be able to continue to do that.

I think financially, we believe this is going be very healthy for the co-op as well. There are a lot of costs that are able to be shared among the two entities, and so it helps stabilize some of those costs such as right-of-way and infrastructure costs along the way. But I think the success of the project speaks for itself. We've done something that met a need, and we provided a state-of-the-art service that hopefully will be here for many years to provide wonderful service to our members. ■

KEN JOHNSON *is the general manager and CEO of Co-Mo Electric Cooperative in Tipton, Missouri. He started his electric utility career in 1979 with the Nebraska Public Power District and spent 21 years in line operations, systems control and regional operations before being named the general manager of Twin Valleys Public Power District in Cambridge, Nebraska, in 2000. Five years later, he moved east to become the general manager of Co-Mo.*

During his time with Co-Mo – a system with more than 32,000 meters and 4,000 miles of line – Mr. Johnson has led a team that has implemented vast technological improvements to improve efficiencies and member service. In 2010, the cooperative began a pilot project to explore the possibilities of bringing fiber to the home broadband connectivity to its entire membership. The service, named Co-Mo Connect, was launched in December 2011. In May of 2014, gigabit service once only available in large cities became an option available to all Co-Mo Connect subscribers. The final phase of the project was completed in 2016. Currently, Co-Mo Connect has more than 15,000 subscribers receiving service.

CASE STUDY INTERVIEW 3:

Broadband as a Way to Rebuild a Community in a Disadvantaged Landscape

A talk with
BRUCE PURDY
North Alabama Electric Cooperative

By
ALLISON DUNN
CoBank

Economic development is a primary driver for some rural electric cooperatives considering broadband builds. Time and effort spent reviewing options for construction, engineering and design can save significant money in the project. Grants can help protect the financial position of the cooperative, but additional private funding availability is necessary for speed of access.

North Alabama Electric Cooperative, headquartered in Stevenson, Alabama, relied primarily on a grant stemming from the American Reinvestment and Recovery Act to help build its broadband project. Allison Dunn, a lead relationship manager in CoBank's Atlanta office, spoke with Bruce Purdy, the general manager of North Alabama Electric Cooperative, about how the funding and the project came together to the benefit of an area with a difficult topography and a ravaged economy.

Allison Dunn: What was the initial driver behind your project?

Bruce Purdy: There were two primary reasons I wanted to tackle broadband access and pursued application through the American Reinvestment and Recovery Act. First, in 2002, we were an electrical system of approximately 80 megawatts. We began to lose industry, and by 2008, we had declined to around 33 megawatts. Not only did we lose over half our load, we lost basically our entire industrial load. Economic development was a driver. Second, we had a very large section of our service territory that was unserved by any broadband carrier, and when you added the portion of underserved, it was almost our entire territory. Those were the two drivers: economic development, and the co-op members who did not have quality access to the internet.

AD: What was the viewpoint of your board and membership before you started, and has it changed over time?

BP: The board's major concern was the potential for large telecommunications companies to come in and price us out of business. That was probably the major topic that was discussed in board meetings. A distant second was doing it right,

building the network correctly, and it being quality, reliable service. The members were just excited, at least the ones we heard from. They were very excited initially, and then over time some expressed aggravation with how long it would take to get service to them. I think some members assumed that if we announced the project on Monday, they would be connected by Friday, not realizing it was going to take two and a half to three years to build out.

> *"Initially, a very large section of our service territory was unserved by any broadband carrier. When you added the portion of underserved, it was almost our entire territory.*

AD: What are the demographics of the area that you serve?

BP: The best answer I can give, that the people in the co-op world would understand, is we average 8.5 meters per mile. We have approximately 18,200 meters. I would consider our area low income, similar to neighboring north Alabama counties, with the exception of Madison County, which includes Huntsville. We are low income, especially with the loss of jobs from the loss of industry. The geography is pretty tough. We have two kinds of land: we have mountains and we have water, and you're either climbing a mountain or you're crossing a body of water. That's not a demographic, but it sure makes it a little bit more difficult. Our flat land is basically one valley corridor located between several different mountain ranges.

AD: Are you providing broadband outside of the electric service territory?

BP: Not as an ISP.

AD: What broadband or telecommunications offerings already existed in your marketplace?

BP: In two of our incorporated towns, Stevenson and Bridgeport, Charter was an existing provider. Though they did not serve the entire city limits, they did serve the downtown areas and the neighborhoods surrounding downtown. CenturyLink also had a portion of our service territory, but not a large portion. CenturyLink served Hollywood and a little bit of the surrounding area outside of Scottsboro, Alabama. CenturyLink was limited in a lot of places to 1.5 Mbps, and in some areas 3 Mbps. Charter, at that time, was limited, if I remember correctly, to 6 Mbps. Even though Charter and CenturyLink, large companies, were available in some places, the territory was still very much underserved. AT&T also provided 50 accounts with internet, but no more. It had been at 50 for years.

AD: Was there a competitive response to your offering?

BP: CenturyLink does so much marketing that I can't tell you if any was directed at us. More recently Charter has done a pretty aggressive price marketing plan, which is basically triple play for $99 for two years. I don't think that's directed at us because I think they're doing that in a number of places. That is pretty much it.

AD: Did you complete a feasibility study, and if so, did you do it internally or hire an outside firm?

BP: We used an outside firm, and then we revised it internally. Our initial feasibility indicated a much higher cost than we felt we could manage, so I tabled it. I can tell you that we ultimately built our entire fiber network for significantly less than the original estimates. It took a lot of legwork and time on our part to find the right partners for engineering, design and construction, but we had good contacts and excellent internal expertise.

For our revised projections, we reached out to ADTRAN out of Huntsville. Then ADTRAN brought in two or three others. Basically I went into the boardroom with this group of companies, and I said, "I'll tell you what, guys, if we're fortunate enough to go forward with this project, I will buy your material, I'll buy your access equipment, I'll use your engineering services." And that's how we put together

> *Our initial feasibility study indicated a much higher cost than we felt we could manage. I can tell you that we ultimately built our entire network for significantly less than the original estimates.*

the revised projections. I had a group of people from the different aspects of building this project in a room, and they all put their numbers together. We took those numbers, we added them together, and we came up with our new cost. That new cost came in the low twenties, which turned out to be pretty accurate and about half the original projection. To date we have $24 million in the project with 4,000 installs. In the end, how many customers will we have? I'm hoping somewhere around 7,000 to 9,000.

All that said, the feasibility study is very important, because you have to have something to present to your board.

AD: What technologies are you utilizing?

BP: We built a GPON network. More importantly, because the population density is so low in much of our service territory, we did distributed split. Distributed-split GPON is a term that's very important for rural electric co-ops. Without getting too technical, instead of there being a cabinet on the ground, for a distributed split you have splicing enclosures on the pole. You just don't have the population, the density, to just build active Ethernet. When you go into an area like we have called Paint Rock Valley, and you probably have 2.5 customers per mile, distributed split is the only way to financially reach those areas.

I know that there is discussion about wireless for the more rural areas. I get wireless, and I'm sure you could line up 10 million people that disagree with me, but wireless is not hardwired and it will never be. Wireless fluctuates for what appears to be millions of different reasons. When you're an electric co-op, people expect reliability and quality, especially reliability. The only way to accomplish that is a wire or fiber.

We use the Cisco 9000 router, and all of our access equipment is ADTRAN.

AD: What services are you offering – triple play, broadband only?

BP: Triple play.

AD: How are you marketing your services?

BP: Basically we are not. *Alabama Living* magazine is the only place that we have marketed anything, but there's a reason for that: we keep a wait list of seven weeks, and we really don't want any more people calling, requesting service, than we have now. There will come a day when we begin marketing, but we've actually, for a while, hoped our requests for service would slow down, and let us catch up.

AD: Did you hire any new personnel for this project?

BP: Yes, of course. At one time, we had approximately eight construction crews, and we had drop guys and install guys. Now, we have two local guys work with our engineering and design firm, then work with the construction contractors, then work on drops and installs so that we ultimately have two local guys who went through the entire project and would immediately go to work for us at the completion. Additionally, we encouraged contractors to hire local people, and we contracted separately with others who will eventually be hired full time at the co-op.

AD: What is your organizational structure? Who holds the broadband assets?

BP: The assets are at the electric cooperative. Because of the federal grant money, the broadband cannot be a subsidiary. We call it, for internal purposes, North Alabama Fiber Co-op, but that's not a legal distinction. We do keep separate accounting for the fiber side.

AD: Did you partner with anyone?

BP: We did initially partner with a local telephone cooperative for the first three years. Earlier this year, we dissolved that partnership and took everything in-house.

AD: How are you funding the project?

BP: We were awarded a $19 million grant under the American Reinvestment and Recovery Act that covered the bulk of the build. Right now we owe approximately $4.5 million in borrowed funds. At this point, we're paying for everything out of our operating revenue, so we're not borrowing. We haven't borrowed money in a while. All of the heavy expense is behind us now. As far as funding the project, you're going to need the ability for immediate monies from time to time, because these projects have many different moving pieces. You've got the fiber construction. You've got the electronics. You're building your network operations center. Lead time on fiber is approximately 18 weeks, so you can't wait until you're almost out. You have to stay ahead of the lead times. You're probably going to need a local bank or other bank that will provide you the means to get money immediately.

Waiting on the grant money to come was often months after we actually had invoices that had to be paid. That was difficult. You need a line of credit, you need short-term borrowing, and then at some point you'll turn it into long-term loans.

AD: Did you collect contributions in aid to construction from your subscribers?

BP: Zero. It's what we felt like we had to do as a co-op.

AD: Is the project on time and on budget?

BP: Yes. The project was on time, because we didn't have a choice. That $19 million grant turned into a loan if it was not on time. On budget, yes. I feel very good about us having a total of $24 million or so, and being completely built out and now serving 4,000 people.

AD: Did you encounter any surprises or challenges along the way?

BP: Answering that could literally take the rest of the day. The biggest issue that we had, period, was the bad contractors that came in and did work. That is very hard to overcome. In the beginning you don't know enough, and by the time you figure out they're doing bad work, there's already quite a bit of bad work completed. You're trying to keep your schedule, but you're having to back up and redo work. That happened multiple times, and it really caused us problems. I'd almost classify it as devastating at the time.

"As far as funding the project, you're going to need the ability for immediate monies from time to time, because these projects have many different moving pieces.

The biggest mistake I made – and on a scale of one to ten, it is a ten – I did video. I had many people telling me from day one that you had to do video, that it was the sticky service that would keep people from leaving. I was convinced, and we did video. I can't describe the mistake I feel like that was. Now, I don't have specific numbers based on facts, but I feel confident in what I'm about to say: 80 percent of our problems are video related, and I may be selling that short. It may be 85 percent or 90 percent. You absolutely have no margin to go along with that. Our other broadband services are subsidizing our video customers to the tune of between $6 and $7 per account. We were taking the margin off of our broadband and subsidizing every video customer. Video programming costs are outrageous. The restrictions they put on you, you don't understand but you have to live by them.

I just cannot say anything positive about video, and even in rural Alabama, we're beginning to see people cut that cord and go to Amazon Prime and Netflix. It's happening, so video will die. We did have someone close by with a reliable quality service, and we got signal from them. We don't have a lot of money in our video today, so we'll be okay, but I could not imagine spending a few million dollars building a headend. As negative as my video story is, we're not sitting out here with a headend, so when it does go away, we won't have stranded costs in some of the infrastructure.

AD: What is your long-term measurement of the success of this project?

BP: If we can improve our reliability to the point that almost all of our members have nothing but positive things to say, even about video, that's a success. It's about reliability, and here in the next month, we're going to begin offering a gig residential speeds. I feel like we have crossed the threshold where we're going to be okay now. The people we hired locally are more competent each day. You have to build up your personnel, because when you first get started, you can't just go steal the skill sets. You can't pay enough. You have to kind of grow your own workforce. That's what we've done.

How do I measure success? Financially, we're stable. We're a nonprofit. We're not here to make money. We're very reliable, and we hope to get our gig service to a point that most of our customers can afford a gig to their house.

BRUCE PURDY *is the general manager of North Alabama Electric Cooperative as well as for its subsidiary North Alabama Fiber Co-op. He has been with NAEC for 25 years, serving as general manager for the past 15 years.*

Mr. Purdy serves on the executive committee of the Jackson County (Alabama) Economic Development Authority. He is also a member of numerous other education-related and industry-related boards, including Rural Broadband Initiative.

Mr. Purdy earned his bachelor's degree in accounting as well as his MBA from Jacksonville State University.

CoBANK
KNOWLEDGE EXCHANGE

CASE STUDY INTERVIEW 4:

Getting to Yes: How an Oklahoma Co-op Sold Broadband to Its Board and Owners

A talk with

SHEILA ALLGOOD

Northeast Rural Services

By

JEFF BRACKER

CoBank

Northeast Rural Services (NRS), founded in 1989, is a wholly owned subsidiary of Northeast Oklahoma Electric Co-op (NEOEC), a member-owned electric distribution cooperative headquartered in Vinita, Oklahoma, that provides power to 38,631 customers through 5,293 energized miles across five counties in northeast Oklahoma. NRS operates three divisions: a full service right-of-way management, a technology and communications division, and Bolt, its fiber-optic division. Bolt manages the broadband deployment to over 30,000 homes and business. Bolt's available services include internet connectivity up to 1 gigabit, as well as high-definition television services, Voice over internet Protocol (VoIP) telephone services, and home security services.

Jeff Bracker with CoBank's Electric Distribution team met with Sheila Allgood, manager of Bolt, to discuss how NRS was one of the first electric cooperatives to deploy fiber to the home to parts of their electric distribution territory as well as others served by IOUs and municipals. Their model to reach high-density areas first will ultimately bring fiber to the home for all their members.

Jeff Bracker: What was the initial driver behind the broadband project?

Sheila Allgood: For the past 15 years, Northeast Oklahoma Electric has done a survey at our annual meeting, and one of the questions we always ask is: "What could the cooperative do to enhance your quality of life?" One hundred percent of the time, members responded with "reliable high-speed internet service." We knew for a long time that the demand and need was there. While our board did not make the decision overnight, they did begin researching the feasibility of providing a high-speed internet solution to our member-owners. Ultimately, the board made the decision to deploy a fiber to the home solution for our members.

JB: Was it an easy decision for your board? Did all the members buy into it?

SA: It actually took four years to make the decision to move forward. First, we did surveys with several thousand of our members to determine demand. Then we went through several financial forecasts to see if we could construct a financially feasible project. During those four years, business owners who were members would come in and plead with the board to move

> *It took four years for our board to make the decision to move forward. It was a huge undertaking, and they all seriously considered every element of the decision.*

forward on the project. While the board was united in their final decision, there were times during those four years that some of the board members didn't want to move forward. It was a huge undertaking, and they all seriously considered every element of the decision.

JB: Did the co-op complete a feasibility study? If so, was it prepared internally or by an outside firm?

SA: We utilized an outside company, but the majority of the financial calculations were done internally. We did a member survey utilizing a telecommunications engineering firm to help us come up with questions and determine a take rate. We internally managed the survey. The project has tracked very closely to the survey, as we are experiencing the take rates that were expected. The board was pleased with the statistics from the member survey, which gave them the comfort to move forward with the project.

JB: What are some of the demographics of your service area?

SA: We have a mixture of demographics in the area. Some of the communities are very rural, and we also have a large recreational lake with a lot of seasonal homes. The project has areas where there are a lot of homes per mile, but there are also some areas that are a lot less dense.

JB: Are you providing broadband services outside of your territory?

SA: The full project will pass around 30,000 homes. Half of them will be our members, while the other half are served by IOUs. Once the project starts cash-flowing, we will be able to build out and serve our entire membership.

JB: How did the board decide to serve non-member areas? What was the member response?

SA: The board knew that in order to make the project work, dense areas would have to be served first in order to generate more revenue. Once the project is cash-flow positive, then we can expand the project to the less dense areas and our really rural areas. Every day, we have to explain this to our electric customers who will not be getting broadband service for some time because they live in very rural areas. It's just a business decision that was in the best interest of all the members, and it was the right one.

In addition, we borrowed money from the Rural Utility Service (RUS), a government agency. RUS would not provide funding for us to deploy fiber in areas where they had loaned money to other communication providers to provide broadband. That is hard to explain to our members. As mentioned earlier, once the project cash-flows, we will go into those areas without the use of RUS funds by funding that build internally or with the help of other lenders.

JB: What technologies are you utilizing and what services are you offering?

SA: We are building a GPON network. We have our own media room headend for television services and have a soft switch. Recently we received permission from the state of Oklahoma to offer our own phone services. We are now an independent telephone company and do not have to utilize a third-party service. We also offer home security through our fiber network.

One of the things that our board of directors made a priority in the early days was quality. Whatever services we go into, they wanted to make sure that we were able to control the quality of the services that we provide to our membership and customers. We have invested heavily in some high-end service equipment and feel that we are reaping the rewards of investing in the best because it's been very reliable and made the network incredibly robust.

JB: What broadband or telecommunications offerings already existed in your marketplace? Was there a competitive response to your offering?

SA: When we started the project, providers were offering some fixed wireless and satellite internet. Some of the communities had incumbent providers, and they challenged us for going into those areas. When we tried to get our competitive local exchange carrier (CLEC), we were hit very hard by the incumbents and were delayed for multiple months in receiving it. We have all moved on from that, and there are no issues right now.

Regarding a competitive response, our competitors started offering a $200 gift card or free service for three months to get customers to stay or even come back. That's competition, and we expected that from the beginning. Even with those incentives, it's not affecting our overall budgeted take rates. Our services are competitively priced. We're not always the cheapest; however, the services are far superior to what the competitor is offering.

Another reason that we are seeing a consistently high take rate and people switching over to us is our customer service. We are a service company first and foremost. Even though we're a subsidiary, we are still owned by our members, and the co-op is our parent. We have the same philosophy in our day-to-day business as the cooperative. I think that's a competitive advantage over the competition. People are willing to pay more for the services that we offer. Most of our competitors don't have the infrastructure to offer gigabit internet, television and phone service.

JB: How are you marketing your services?

SA: We started first by going in neighborhoods with door hangers and banners on the side of the road letting them know we were coming into the area and asking them to sign up. We wanted to get everybody to sign up while we were constructing the main backbone. It's less expensive for us to get a drop at that point than it is for us to go back and put in another contract for a service drop later. We also place yard signs once a customer gets the service and give them a discount if they will leave a yard sign in place. Our biggest marketing tool is word of mouth because the service sells itself. Our marketing budget is very low compared to a television or internet company.

> *"In order to make the project work, dense areas would have to be served first in order to generate more revenue. Once the project is cash-flowing, we can expand it to our really rural areas.*

If a customer wants our service, we make them pay $100 for the installation fee and hold those funds in a non-interest-bearing escrow account. We do this mainly to make sure that we don't build a drop to a home and have the customer not take the service. If a customer is willing to put $100 down it shows commitment, and that's been beneficial.

This project is a huge undertaking, and it's a competitive environment. It is completely opposite of everything that the electric side has been involved in for the past 75 years. So we had to change that mindset, and everyone had to understand the competitive world that we entered. In the end, it will be a wonderful place where the quality of life for people improves, similar to what happened 75 years ago when electricity was brought to rural America. That's the big benefit of what we're doing today.

JB: Did you hire new personnel for the project?

SA: We had to hire approximately 30 people, from installers to engineers. The manager of customer service, director of engineering, and director of operations along with several other employees came from the co-op. It is not just the new employees we hired but the overall economic impact this project has on our area.

> *In the end, it will be a wonderful place where the quality of life for people improves, similar to what happened 75 years ago when electricity was brought to rural America.*

JB: What is the impact of your fiber project on your rural communities?

SA: Rogers State University determined that a $90 million fiber construction project with a three-year build-out would bring over $200 million in economic impact. Most of that is bringing in all the crews, food, gas and hotels, which have been great for our communities. Recently, there's been construction of a new high-end convention center, which only came to the area because of the high-speed internet. The developer said they would have never built the facility without it. We've had a couple of industries that have doubled the size of their manufacturing division because of the services we can now provide to them. Others are moving their company headquarters into this area. In the end, the economic development impact will be immeasurable.

JB: What is your organizational structure, and who holds the broadband assets?

SA: The general manager of the electric cooperative is also the general manager of the subsidiary, and I report directly to the general manager. I have a director of operations, director of engineering, director of IT and account representatives that report to me. The remaining employees report up through one of them. The subsidiary owns all of the broadband assets, and we are a wholly owned subsidiary of the co-op.

JB: Did you partner with anyone during this project, like an outside telco, or maybe an incumbent provider? Have you partnered with any other electric co-ops to provide some sort of white label service?

SA: We reached out to several local telephone co-ops along with other incumbent providers, but none of them were interested in partnering with us for this project. We are in the process of working with another electric co-op in Texas to share video headend services, and we are in talks with other co-ops in Oklahoma and Missouri to provide video headend services. By partnering with us to provide the headend services, the co-ops will save money by not having to build their own headend, which can cost several million dollars.

JB: How are you funding the project? Are you getting any grant funds?

SA: We are funding our project with an RUS broadband loan through the Farm Bill. The loan process with RUS took around two and a half years. The people at RUS have been good to work with and have really done their best to try to work as diligently as they can through all the red tape.

That said, there have been funding delays and general confusion surrounding our funding as a result of the difference between loans resulting from the Farm Bill program and loans tied to the Broadband Initiative Program. We utilize CoBank for bridge financing during the interim construction periods and the delays in RUS reimbursements. Finally, we have applied and been awarded around $4 million from the Rural Broadband Experiment. Those funds will be helpful in the most underserved areas that we serve.

JB: Did you collect any contributions in aid to construction from your subscribers?

SA: As mentioned earlier, we collected $100 upfront. We have considered additional contributions in certain rural areas requiring some line extension costs, but we have not implemented that.

JB: Is the project on time and on budget?

SA: We are slightly behind and have asked RUS for an extension for an additional 30 days on our main build-out. The management and board are very pleased overall with the project. We are anticipating positive cash flow by April of 2018. Our goal is to install 12 to 15 drops per day. Currently we have 4,600 customers receiving services and another 2,500 signed up that are awaiting service. Our biggest hurdle has been getting drops completed in a timely manner. I would like to see 20 drops a day, 100 per week, and we will push for that going forward once the main backbone is built out.

JB: Did you encounter any surprises and challenges along the way?

SA: During construction the crews hit a lot more rock when digging than was anticipated or budgeted. That caused more unplanned expenses and took longer than expected. In addition, getting pole attachments from large IOUs was a difficult process which would hold up construction crews.

JB: How are you going to measure the long-term success of the project?

SA: The long-term success is going to be what we continue to see in the economic development of the communities and in the rural areas that we're serving. We're putting together a team that's going to be monitoring that overall economic success. We have a couple of people who go out and meet with new businesses. We're very active with all the chambers of commerce in the communities we serve. Those organizations will try to draw new businesses into our areas and will be able to promote our products for us. With our broadband services, any industry in the world can locate its business right here in northeast Oklahoma and have the capacity to do business worldwide. People are able to start working from home or they're able to do classes online and get a college degree. Our technology will provide the same services available to someone living in a large city.

Another goal is to have 10,000 subscribers in order to continue to grow and expand out to our really rural membership. We really need to get 10,000 customers to be able to have better cash flow and to be able to expand into those areas so our whole footprint has access to broadband. ■

SHEILA ALLGOOD *is the manager of BOLT Fiber Optic Services, a subsidiary of Northeast Oklahoma Electric Co-op. She has worked in the utility industry for 18 years and managed the technology division of Northeast Rural Services (NRS), including BOLT Fiber and RECtec, for 15 years. NRS is a wholly owned subsidiary of Northeast Oklahoma Electric Cooperative. Prior to her career at NRS, she owned her own successful business.*

Under Ms. Allgood's leadership, BOLT received a Rural Utility Service broadband loan to construct a 3,200 mile fiber to the home network, passing 32,000 rural homes and 1,200 underserved businesses. More recently, under her leadership BOLT has been awarded support from the FCC Rural Broadband Experiment, and is launching services that include IPTV, gigabit internet Service, VoIP and Home Security.

Ms. Allgood also oversees RECtec, another division of NRS that offers ultra-high speed internet along 300 miles of final-mile fiber. RECtec manages, consults and engineers data networking solutions including Wi-Fi LAN, server integration and network maintenance to rural anchor institutions.

Ms. Allgood studied computer science at Northeast Oklahoma A&M College and graduated from the National Rural Electric Cooperative Association Management Internship at the University of Wisconsin-Madison.

CASE STUDY INTERVIEW 5:

Bringing Broadband to a Remote, Underserved Community in Northern Minnesota

A talk with
JENNY KARTES
Arrowhead Electric Cooperative

By
MARK DOYLE
CoBank

Arrowhead Electric Cooperative (AEC), an electric utility cooperative serving the northeast corner of Minnesota, recognized several years ago that broadband was a necessity for the growth of its region. The co-op has since built out a fiber to the home network to its entire service territory as well as the local municipal service area.

Jenny Kartes, the finance and administration manager for AEC, has been with the co-op since the start of the broadband build-out six years ago. She spoke with Mark Doyle, a senior relationship manager for electric distribution in CoBank's Fargo, North Dakota, office, about how a solid partnership with a telecommunications utility and a strong dedication to the community formed the basis for AEC to successfully build its fiber to the home network.

Mark Doyle: What are the demographics of the area that you serve?

Jenny Kartes: We are a heavily tourism-based community with very little industry. We're almost half residential customers, with many seasonal or second homes, and less than 10 percent of our business is commercial. Those small commercial customers are mostly resorts and small businesses.

MD: What was the initial driver behind your project?

JK: The initial driver behind the project was really the concern for our community staying connected and thriving. There was a study done in the late 2000s that ranked Cook County as the last county in Minnesota for connectivity. Cook County was labeled underserved. There had been some previous attempts to bring broadband, which ultimately did not result in anything. And at that time, we didn't see any other entity in our county that had the resources, the funds or the capability to really build out what we needed to stay connected. It was about keeping our community growing and vibrant, and as a co-op, concern for community is one of our core values.

MD: What was the viewpoint of your board and the membership before you started, and has it changed over time?

JK: We were a little bit split both on the community side and on the board side. There's a portion of our community that really wants to be disconnected. That's why they're here. There was a bit of concern for what this new service could bring to our community as well as if we would be able to make this work.

On the board side, there was concern about the risk to our membership. The project called for a fiber build that was actually larger than our electric distribution system, and there was significant concern about putting that risk on our members. Since then, though, that attitude has completely changed. There are not a lot of people who are unhappy or opposed to the project. From our board's point of view, it's one of the better decisions that we've ever made. There's a lot of growth opportunity in the telecom industry, and this is especially valuable since our electric cooperative is experiencing declining sales. This is another revenue stream for us that's very beneficial and provides some growth opportunity.

MD: Are you providing broadband outside of your electric service territory?

JK: We are. Our electric distribution system is the whole of Cook County, which surrounds a small electric municipal in the city of Grand Marais. We built out fiber to the entirety of the municipal service territory as well as our own service territory.

Arrowhead has about 4,000 electric accounts and the Grand Marais municipal serves roughly 1,500 accounts, giving 5,500 properties in our county. Roughly 2,600 of those utilize our broadband service.

MD: What broadband telecommunications offerings already exist in your marketplace?

JK: It's a select few. As I said, we were ranked last for connectivity when we began. At that time, we had satellite providers. A lot of people were using cell phone hotspots.

"The project called for a fiber build that was actually larger than our electric distribution system, and there was significant concern about putting that risk on our membership.

We had a significant portion actually still using dial-up in our area. In that municipal service territory, where our highest density is, we did have some limited DSL available to community members.

MD: Was there any competitive response to your offering?

JK: Surprisingly, there was not. Because the infrastructure was very limited and our territory is very rural, there was really no response by the one competitor in our area. Since our build-out, the competition is not even providing quotes for building out to rural services anymore. There's almost been a withdrawal by the competition in our area.

MD: Did you complete a feasibility study?

JK: We did not do a preliminary feasibility study. However, we did have a third party, an engineering firm, take the lead on preparing our application for the Rural Broadband Initiatives Program, which required some pretty extensive analysis of our service area.

MD: What technologies are you utilizing?

JK: We are using a GPON distributed tap system, which is different than a lot of systems out there. It's a system that's a little bit cheaper. It has some limitations to it for expanding services. You have to be sure with this kind of a system to put in more than you think you would need. We learned that very quickly. Basically, we did that because of the cost aspect.

> *Word of mouth was probably the most effective marketing. As a small, underserved community, word got out quickly. There was a long waiting list, and we had people calling us asking when it was going to be ready.*

MD: Do you provide fiber to every customer's home?

JK: Yes! Every customer that has fiber has fiber to the home. However, we did not build fiber to every one of our members. We sent out permission mailers at the very beginning of our project asking if they wanted service. There were a lot of community members who did not want it. For those who opted out of receiving it, we did not build.

Many of those who opted out are now having issues with that. Now they're trying to sell their home, and they're having a really hard time selling their property if they don't have that fiber built in to there already. In the end, we built to about 75 percent of the properties in our county.

MD: What services are you offering?

JK: We are currently offering telephone and internet services. Our original intent was for a video offering with a plan to build and own a full-blown headend. However, the change in video from 2009 to now has been significant. The cost and the payback on that have since become questionable. It's not an option for us anymore, and we're still seeking a video solution – trying to find the right pairing because we do have a significant portion of our community, a lot being all the resorts, who really want a better video solution in our community.

MD: How are you marketing your services?

JK: Due to the lack of competition in our area and being such a small community, our marketing initiatives have been relatively small. We did market as we were building out services. Once service was available in an area, we sent out flyers or personalized letters that stated that service was now available. That's where we got the majority of our subscribers. That was the initial push. It has been a long road!

Word of mouth was probably the most effective marketing. Being a small, underserved community, word got out really quickly. There was a long waiting list, and we had people calling us asking when it was going to be ready.

Additionally, we did some yard signs as people were connected, and some door-to-door in our municipal area where there was a little bit more competition. Right now, we're focusing on direct marketing to some of the businesses and community members.

MD: Did you hire any new personnel for this project?

JK: We did, and we actually hired significantly more than we had originally anticipated. Our original financial model called for two additional personnel: one inside customer service representative, and one outside staff for maintenance and installation. We currently have six positions dedicated fully to broadband: three customer service and billing personnel, and three outside plant personnel for maintenance and construction as well as in-home installation.

MD: What is your organizational structure?

JK: We do not have a subsidiary. Broadband is just under the umbrella of Arrowhead Electric, and Arrowhead Electric owns all of the broadband assets. It's essentially another division of our operation.

MD: Did you partner with anyone?

JK: We did. At the beginning of our project, we had a number of options as to how we were going to do this. Were we going to be the retail provider or the wholesale provider? We found quickly that there is a large learning curve especially related to phone and the assets you need for providing phone service. We wanted a partner with

our same values and good industry knowledge. We found Consolidated Telecommunications Company (CTC) out of Brainerd, Minnesota, which as a cooperative really had our same values and has been doing this for a very long time. They were a good fit for us, and they were very excited to work with us as well. It was a good partnership as a small entity. There was a lot more on the front end than we had originally realized. We did indeed need that partnership and rely heavily on it.

MD: How are you funding the project?

JK: We funded this project through the American Recovery and Reinvestment Act, the broadband initiative program. It was funded through a $16.1 million federal grant and loan: $11.3 million in grant and $4.8 million in federal loan. After our application, we realized that due to our terrain and the seasonality of our customers, it was going to cost a bit more than that. We then went to our county, and they provided $4 million more in grant funds to us. It was a $20 million project in total, roughly 75 percent grant funded.

MD: Did you collect contributions in aid to construction from your subscribers?

JK: On the initial rollout of our project we did not. We had a window of a few years, as we were rolling out our construction, when we allowed people to essentially sign up for free construction to the home. It did not require them to take service. Once that window closed, and if you did not sign up within that window, then we do require 100 percent aid to construction from the subscriber. Since our subscribers are not necessarily members of our cooperative, we do require them to fund that construction.

MD: Was the project on time and on budget?

JK: Based on our original projections, it was not. As I mentioned earlier, our original budget was significantly short and we required an additional $4 million to complete the project. We then reworked our budget a few times, and we did stay very close to our second budget that included the additional $4 million.

> *"The long-term measurement for success, being that our initial goal was to just get our community connected, is that the broadband division can be financially self-sustaining.*

However, that did create a timing issue as far as securing the additional funds to complete the project. The project was initially to be done at the end of 2013, and we finalized the project in 2015. Construction delays were mainly due to the terrain. We have a lot of rock, and construction is slow going in our service area. Additionally, the very short construction season in northern Minnesota slowed us down.

MD: Did you encounter any surprises or challenges along the way?

JK: Yes. I could talk for quite a while on that. Having detailed maps and accurate plant records would have saved us a lot of frustration and a lot of time as the project began. We also did not realize the importance of on-site engineering, on-site contractor management and constant quality assurance throughout the project, at every point. We ended the project with those elements in place.

We also ended up changing some of our contractors/vendors mid-project. Many of our contract crews were a bit surprised by our service territory and the time it took to complete work, never doing work up here before.

MD: What is your long-term measurement for the success of this project?

JK: The long-term measurement for success, being that our goal was to just get our community connected, is that the broadband project and division can be financially self-sustaining. We do not want the project to have any risk for our electric members. We're not looking to make large profits off of it. If it can stand on its own financially, and provide good customer service and good broadband service to our community, we will call it a success.

MD: Jenny, do you have any additional comments you'd like to add?

JK: I would recommend really understanding, working with, and vetting your vendors, and coming to a mutual agreement of what you expect out of them. We ran into some problems at the beginning with just that. Having detailed mapping and plant records, along with the quality assurance, is one of the biggest lessons learned. Having someone on-site from your staff as the project manager, heavily involved and really paying attention to every detail, will go a long way and address many problems as they occur. We had that, which is why I think we were successful. Having someone in your house that cares about your cooperative and takes the time to track everything was really an important aspect.

JENNY KARTES *is the finance and administration manager for Arrowhead Electric Cooperative in Lutsen, Minnesota. Serving the northeast corner of Minnesota since 1953, Arrowhead has built out a fiber to the home network across its entire service territory as well as to the local municipal service area.*

Ms. Kartes has been with Arrowhead for six years, since the start of the co-op's broadband build-out. She earned her bachelor's degree in accounting from Bradley University in Peoria, Illinois, and her master's degree in accounting from Illinois State University in Normal, Illinois.

CoBANK
KNOWLEDGE EXCHANGE

CASE STUDY INTERVIEW 6:

Finding Profitability in a Sparsely Populated Service Territory

A talk with

JIM BAGLEY

United Electric Cooperative

and

DAVID GIRVAN

United Fiber

By

GRAHAM KAISER

CoBank

With 10,000 meters spread over 11 counties, United Electric Cooperative, headquartered in northwest Missouri, embarked on its broadband project as a way to reach its undeserved members, never expecting it to become a profit center. But in just four years, the project has become profitable.

The following interview between Graham Kaiser, relationship manager at CoBank, and Jim Bagley, CEO of United Electric, and David Girvan, COO of its subsidiary United Fiber, discusses the cooperative's fiber project in northwest Missouri. The electric cooperative and its subsidiary used stimulus money, public financing and financing from CoBank to build a successful project. Construction of the mainline fiber ring began in 2010 and continues today with a strategic build to adjacent communities. The goal is to provide broadband to every member in an economically sustainable manner.

Graham Kaiser: Please give us a brief overview of your electric co-op and also a brief overview of your fiber subsidiary as well.

Jim Bagley: United Electric has approximately 10,000 meters in 11 counties. We have 2.4 meters a mile. We serve a very sparse area with approximately 4000 miles of electric plant.

David Girvan: We have approximately 1,500 miles of fiber in the air and in the ground. We've gone from zero subscribers to around 5,000 now in just over four and a half years of operation.

GK: How many potential homes passed?

DG: I'll give you the best guesstimate we have of it: it's probably close to 10,000 potential passings.

GK: What was the initial driver behind your project?

JB: United Electric found that our membership had extremely poor service in the rural areas of northwest Missouri and that 89 percent was underserved or unserved. The co-op applied for an American Recovery and Reinvestment Act grant. That got us started with the footprint

> *We found that 89 percent of our membership was underserved or unserved. We applied for an American Recovery and Reinvestment Act grant. That got us started.*

of our membership. In the long run, we see ourselves as a co-op with stagnant sales. United Electric needed something like another line of business to help offset risk, and help mitigate rising rate pressures.

GK: What was the viewpoint of your board and membership before you started? Has it changed over time?

JB: Well, United owned a DirecTV service territory, so the board is used to having a subsidiary and running a competitive business. Our board had seen the success of our fiber business and has become very comfortable with our planning process. They understand the importance of the project being a long-term success for United. Really, our track record of the successful DirecTV deployment gave the board confidence that this would work.

GK: What are the demographics of the area that you serve?

JB: Our membership is very rural, with low density. We have the lowest density in the state of Missouri and lower household income than the state average.

GK: Are you providing broadband outside of the electric service territory?

JB: Yes we are. We have successfully offered it to about 10 of the communities in our territory. We serve right around 1,000 business customers, providing critical revenue to our business. Also, we are starting to fill in residential builds in these communities and getting a very good take rate.

GK: What broadband telecommunications offerings already existed in your marketplace?

JB: Mainly it was satellite and low-grade DSL in our rural markets, and cable in our larger communities.

GK: Was there a competitive response to your offering?

JB: Yes, but not extremely aggressive. More price matching, or new service contracts with lower price, but it really hasn't had a negative effect on us. We've had pretty good luck everywhere we've deployed.

GK: Did you complete a feasibility study? If so, did you prepare internally or hire an outside firm?

DG: Yes we did. Initially for the grant, we used an outside firm, Pulse Broadband. After that initial grant money, pretty much everything has been done internally. We do our own analysis based upon previous lessons learned and internal data.

GK: What technologies are you utilizing?

DG: For our network we utilize GPON technology, with some active Ethernet for some business customers. All our traffic flows over an ERPS redundant ring. We are also 100 percent fiber.

GK: What services are you offering?

DG: We offer triple play services. We have our own video headend but we also leverage another co-op's video streams to cut down on equipment costs. Broadband internet is our core service offering, and white-labeled telephone service is a well-received product. Managed wifi has been remarkably popular, with around 50 percent of our residential customers signing up for it.

GK: Do you do dark fiber as well?

DG: We do some, but mainly lit service.

GK: How are you marketing your services?

JB: We're primarily focused on doing local marketing including door-to-door, yard signs, door hangers, direct mail and backing up these channels with some general advertising: radio, newspaper and social media. Word of mouth has been our best driver. Marketing spending has been very limited, and quite honestly, we have as much demand as we can handle right now with what we're doing in marketing.

GK: Did you hire any new personnel for this project?

JB: Yes, United Fiber slowly scaled up to about 17 full-time resources as needed. We contract out most of the fiber construction.

GK: How about you, David? Did you come to the co-op just for this project or were you there prior to this?

DG: I was actually the co-op's first hire for the fiber build, so there was an internal team and I was the first technical resource. I was tasked to source the technology and basically build the topology and provision the services.

GK: What was your background?

DG: I've been in technology my whole life. I started off at IBM, so I've been a telecommunications guy for going on 21 years.

GK: What is your organizational structure? Who holds the broadband assets?

JB: Well, our subsidiary is a for-profit C corp. For the fiber ownership, if it's on a United Electric pole, United Electric owns the fiber assets. If it's on a community or somebody else's pole, the subsidiary owns the fiber assets.

GK: Did you partner with anyone?

DG: We do have white-label telephone services, and we partner with an experienced telephone provider for these services and just rebranded it. We do get some video service from another electric cooperative that has invested heavily in video and fiber.

> *"The projects became profitable in under four years – more profitable than we originally thought. Our goal now is to make sure that some form of broadband is built to all of our membership.*

GK: Can you expand more on the telephone partner? Is it a large independent, family owned or something else?

DG: It's a small incumbent local exchange carrier (ILEC). We wanted somebody local who would understand our customers and demographics. We have now grown to a point where we are looking for another partner to help us with some of our large commercial customers. Taxing and regulatory requirements are part of the reason we wanted to use a white-label service.

GK: Oh, so you didn't have to become a competitive local exchange carrier (CLEC)?

DG: Correct. We didn't have to do any of that. They do all the taxing calculations for us. It takes quite a burden off the co-op, and I didn't have to have a resource to be able to handle that side of the business.

GK: How are you funding the project?

JB: The early project was financed by the ARRA funding, the American Recovery and Reinvestment Act. Stimulus money, basically. The money that we've had to borrow, we've borrowed from CoBank, and we have also used internal funds, but CoBank has been our only lender on the continuing project so far. We do have some RUS money, but that's actually a debt burden to the cooperative, not the subsidiary.

GK: Did you collect contributions in aid to construction from your subscribers?

DG: Yes, a nominal $100 install fee, and we did a mandatory one-year contract.

When you get started, you have to understand there's going to be a little pain upfront. We're on the other side of that now, and we appreciate the help we got from CoBank.

GK: Was that when you first passed? Are you charging anything different if somebody says no initially and then you come back later?

DG: It's been a little bit different depending on the community. As a general rule, that was for the initial ARRA stimulus build. It was a $100 install if you did it while the construction was happening, and it went up to $200 if you waited. Alternatively you could do a longer contract with a $100 install.

Since then, marketing has been trying to do different things to get better take rates. We have offered free install within the first three months in a couple of communities if they sign a two-year contract. That's one of those marketing decisions that we continue to test. We just want to make sure we get the right take rate for the board and members for continued success.

GK: Is the project on time and on budget?

DG: On the original project, we finished ahead of time and we hit our numbers that we required. For the original grant we were required to connect around 2,500 subscribers on our network, and we got those numbers within the allotted time frame. After that, all the projects have gone fairly close to projected timelines. If there has been some delay, it's normally something to do with permitting and the like. These minor delays have never hurt us because we have always been busy enough building fill-in areas.

JB: I believe we're within budget on most projects, and we're probably ahead of our long-term forecasts. You're always going to take it on the chin for a little bit when you start a subsidiary. You have to make some investment until you get to critical mass where it's paying for all your people, your operating expenses and your debt service plus a margin. United Fiber got to that point earlier than we thought it would.

GK: Did you encounter any surprises or challenges along the way?

JB: I think the biggest surprise is how many requests we get for service from members and non-members, and residents in cities that we serve and don't serve. Our biggest problem is we have more demand than we can get to right now, which is a good way to be.

GK: What is your long-term measurement of the success of the project?

JB: The projects became profitable in under four years - more profitable than the co-op would have originally thought. Our goal now is to make sure that fiber or some form of broadband is built to all of our membership at some point. This being said, United Fiber is a for-profit company. We want to use any profits from United Fiber to help mitigate our future electric rates and be a blessing to the membership, whether it's through the service, or through reduced electric rates.

DG: To add to that, I echo what Jim said. When I first came on board, we were focused on purely serving the underserved with the hope of it becoming a good business. Since then, we realized that we could expand on this network feasibly, and that we can actually be a true profit center. So we've really focused on commercial opportunities probably a couple years into our build. This has had a better net effect to our membership than just serving them with broadband alone.

JB: We really think the more we can go into the communities and serve the denser areas, the more enabled we are to help us give back to our membership and ultimately serve the least dense areas.

GK: Most feasibility studies assume take-rates between 30 and 40 percent, but projects are getting to 40 percent pretty quick and going past that.

JB: We had 10,000 meters and about 4,000 miles of line. We've had 5,000 subscribers on 1,500 miles of fiber. I want to say, we're getting more bang for our buck on the fiber side right now. This all helps offset some of our sparse areas' high cost.

GK: Is there anything else you want to add?

JB: When United Electric first got into this, we had the RUS money from the stimulus grant. As far as the rest of the financing, CoBank was with us all the way. When we were having trouble finding funding, CoBank was there to work with us through the tough times. When you get started, you have to understand there's going to be a little pain upfront to get it going. We're on the other side of that now, and we appreciate the help we got from CoBank. We're reaping the benefits and think we'll continue to build on this and become more prosperous as a result.

GK: Thanks for saying that, Jim, I appreciate that. David, anything you would like to add?

DG: The ARRA 70-30 grant was never going to be a slam dunk. It was always going to be a long-term payoff at best if we just did the ARRA stimulus project. The CoBank money that we've invested into services, building into the communities with about 170 miles of fiber, generates probably close to 50 percent of our revenue. Bang for buck, this secondary financing has been extremely beneficial. Don't forget, the ARRA grant was the vehicle and the enabler for secondary builds. ■

JIM BAGLEY *is the chief executive officer of United Electric Cooperative, which provides electricity to 11 counties in northwest Missouri and southwest Iowa. In his current role he oversees United Electric along with its subsidiary United Fiber, which provides communications services via fiber optic cable and RF along with providing sewer services to rural subdivisions.*

Mr. Bagley has worked in the utility industry for more than 25 years. Prior to joining United, he served as the CEO of Raccoon Valley Electric Cooperative and Glidden Rural Electric Cooperative. He has also worked for Sho-Me Power Electric Cooperative and the U.S. Department of Energy.

A native of Marshfield, Missouri, Mr. Bagley earned a bachelor's degree in business management and a master's in business administration from Drury University in Springfield, Missouri. He is also a veteran of the U.S. Navy, having served aboard a nuclear-powered submarine.

DAVID GIRVAN *is the chief operating officer for United Electric Cooperative, where he has worked since 2011. He has been responsible for the design, build and management of United Electric's technology assets, with his primary focus revolving around the aggressive deployment of commercial and residential fiber services through the co-op's subsidiary United Fiber. Prior to joining United Electric, he served as a consultant to the co-op on internal network infrastructure for two years, while working for a technology consulting firm in St. Joseph, Missouri.*

Mr. Girvan has more than 15 years of experience in the telecommunications industry. Originally from Melbourne, Australia, he moved to the United States in 2008. During his almost two decades working with information technology, he has worked in many different roles including systems engineering, supervisory roles, software packaging and infrastructure builds. With significant international exposure, his career has been filled with project-based assignments for large companies like IBM, HP and other industry leaders.

Mr. Girvan is scheduled to complete his bachelor's degree in business technology at Northwest Missouri State University in fall 2017.

ABOUT COBANK

CoBank is a cooperative bank with over $125 billion in assets serving vital industries across rural America. The bank provides loans, leases, export financing and other financial services to agribusinesses and rural power, water and communications providers in all 50 states. The bank also provides wholesale loans and other financial services to affiliated Farm Credit associations serving farmers, ranchers and other rural borrowers in 23 states around the country.

CoBank is a member of the Farm Credit System, a nationwide network of banks and retail lending associations chartered to support the borrowing needs of U.S. agriculture and the nation's rural economy. Headquartered outside Denver, Colorado, CoBank serves customers from regional banking centers across the U.S. and also maintains an international representative office in Singapore.

For more information about CoBank, visit the bank's web site at www.cobank.com.

CoBank's Knowledge Exchange Division welcomes readers' comments and suggestions. Please send them to KEDRESEARCH@cobank.com.

CoBANK®

800-542-8072
www.cobank.com

Proud Member of the
Farm Credit System