

Broadband Case Study: Barry Electric Cooperative



Cooperative Profile

Missouri is home to forty electric distribution cooperatives serving approximately 600,000 member-owners from one end of the state to the other, about one in every five households (see Figure 1). Barry Electric Cooperative (BEC), located in Missouri's southwest corner, delivers electricity to some 6,700 members over 1,100 miles of distribution lines in the southern part of Barry County. BEC's service area is low-density and rural. How rural? The co-op's Fiber Network Manager, JR Smith, explains the co-op's relatively high ratio of meters (9,700) to members (6,700), saying, "We have a lot of electric meters on chicken houses."

Smith's part of the business, brand-named goBEC Fiber, while relatively new, was not the first broadband service provider among Missouri co-ops. Although BEC had previously been providing reliable, high-speed telecommunications access to schools, banks, and hospitals in Barry County using its power supplier's (KAMO Power) broadband network, it was three other Missouri co-ops that first took the big leap toward providing wide access to broadband services in their communities. Co-Mo Electric Cooperative, United Electric Cooperative, and Ralls County Electric Cooperative applied for and received federal stimulus grants to begin building their fiber networks in 2010.

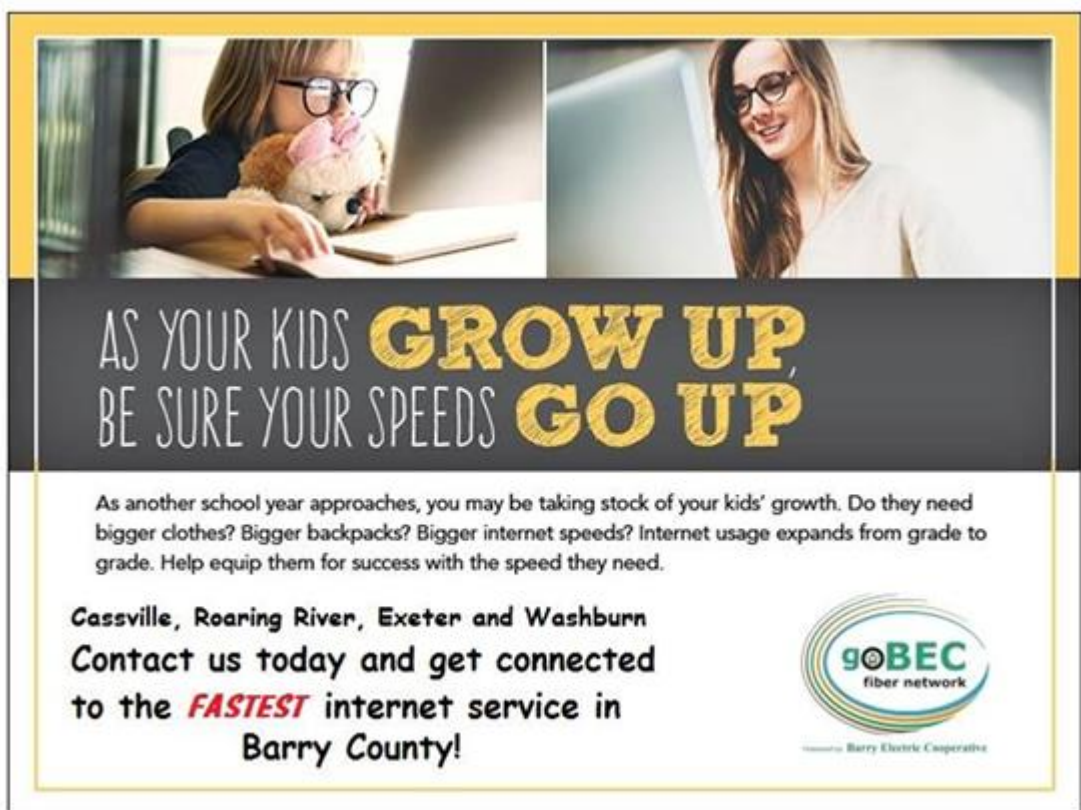


Figure 1.
Barry Electric Cooperative and
its Neighboring Missouri
Cooperatives.

Map courtesy of Association of
Missouri Electric
Cooperatives.

It was partly as a result of its sister Missouri cooperatives' projects that BEC undertook its own fiber-to-the-premises (FTTP) project. BEC members heard about the other co-ops' projects via MoBroadbandNow,¹ a public-private initiative of multiple cooperative partners committed to expanding broadband accessibility, and began pleading with BEC to extend high-speed Internet service within Barry County. As Smith puts it, "As a cooperative, you take care of your members. These days, broadband is more of a necessity than a luxury."

BEC responded to its members' call. Construction of the fiber network began in August 2016 (Cassville schools were the first active subscriber — See Figure 2), and BEC has now completed buildout of roughly 50 percent of the fiber network throughout its service territory, with approximately 1,500 members connected to date.



The advertisement features two photographs at the top: a young girl with glasses and a stuffed animal looking at a laptop, and a woman with glasses smiling at a laptop. Below the photos is a dark banner with the text "AS YOUR KIDS GROW UP, BE SURE YOUR SPEEDS GO UP" in white and yellow. The main body of the ad is white with black text: "As another school year approaches, you may be taking stock of your kids' growth. Do they need bigger clothes? Bigger backpacks? Bigger internet speeds? Internet usage expands from grade to grade. Help equip them for success with the speed they need." Below this is a call to action: "Cassville, Roaring River, Exeter and Washburn Contact us today and get connected to the **FASTEST** internet service in Barry County!". The goBEC fiber network logo is in the bottom right corner, with "Barry Electric Cooperative" written below it.

Figure 2. Schools are a Community Anchor Institution. goBEC's first fiber customer was a school.

Business Drivers of the Broadband Investment

BEC listened to members at cooperative meetings and conducted community surveys to identify the critical, and often unmet, telecommunications needs of its membership. The cooperative determined that its member-consumers, businesses, and Community Anchor Institutions (CAI in fiber networking circles — generally includes government facilities, schools and colleges, law enforcement, fire districts, senior centers,

¹ For more information, see: <https://mobroadbandnow.com/mo-broadband-initiatives/mobroadbandnow-overview-test/>

hospitals and clinics, libraries, news media, and financial institutions) in the areas it serves had the following essential needs:

- Internet with higher upload and download speed and bandwidth than was currently available.
- VoIP (Voice over Internet Protocol) phone service that is less costly than conventional phone service.
- Point-to-Point Ethernet connections.
- Video packages for members unable to receive a reliable, over-the-air broadcast signal.
- A trusted, local provider for multiple services.

The co-op's earlier telecom subsidiary, Barry Technology Services, had been providing dedicated Internet connections to schools, businesses, and hospitals in Cassville and Springfield since 2000.² However, it had become clear that the upload/download speeds of 15 Mbps (megabits per second) the co-op was providing would be incapable of meeting the area's growing data communication needs, or the electric cooperative's advanced metering and system monitoring infrastructures. What BEC began to envision was a 100 percent fiber broadband network encompassing its service area that would ultimately be capable of reaching 10 Gbps (gigabits per second) speed.

Project Overview and Deployment Approach

BEC initially constructed a 10 Gbps fiber ring to ultimately connect all parts of its service territory and BEC offices. Each subsequent phase is being built outward from the ring. This network concept provides not only high speed, but also high reliability. The co-op's plan was to build its fiber network in eight phases with full completion in 2021 (BEC is now eyeing 2020 for completion). Construction started in the county seat of Cassville and is expanding into the co-op's rural areas to eventually encompass 1,100 route-miles of fiber.

Four phases are currently complete and BEC has seen an average of about 300 signups during each phase, a take rate discussed later in this case study. A trusted business partner, Finley Engineering,³ of Lamar, Missouri, assisted BEC with its feasibility study and network design. This relationship proved so effective that BEC retained the company for the make-ready stage of the work ("make-ready" involves preparing the electric system for fiber deployment — inspecting poles and cross-arms and measuring clearances from existing equipment and obstructions). Fiber Network Manager Smith advises other cooperatives to ask their outside consultants "what they're doing with fiber" to identify partnering arrangements that are likely to succeed in broadband initiatives. Trans-Tel, operating out of Norman, Oklahoma, was the winning bidder for construction of BEC's fiber network. Early on, BEC extended a seventeen-mile fiber connection to third party facilities that enable its video and phone service offerings, as will be discussed briefly in this case study.

Most of the network infrastructure is being placed overhead on poles and in rights-of-way that BEC owns. Burying of fiber is needed in some locations, according to Smith, where too many poles would otherwise need to be replaced because of inadequate clearance from existing CATV and telephone lines. Terrain in

² All members previously served by Barry Technology Services are being converted to goBEC customers for ongoing service.

³ <http://finleyusa.com/>

southwestern Missouri is, Smith adds, “made up of peaks and valleys,” so overhead lines are often the *de facto* choice. (This terrain works to BEC’s advantage as far as telephone signups are concerned — cellular coverage can be spotty.) Underground fiber, where needed, is laid using a directional bore machine and trenching.



Figure 3.
Bulk spools of fiber-optic cable arriving at BEC.

Broadband Business Case

BEC began a business-to-business broadband service in partnership with its G&T, KAMO Power, in 2000 as noted previously in this case study. By 2015, the cooperative had developed a construction work plan to deliver the broadband communications system necessary for meter and utility automation (SCADA and Smart Grid applications in particular), as well as FTTP for its electric members. One of the goals for what became the goBEC Fiber Network project was to address the needs of an underserved area with gigabit or faster download speeds. The project had to overcome a host of hurdles, including financing, engineering, easements, right-of-way maintenance, pole height make-ready, main-line fiber construction, outdoor drop construction, indoor wiring, fiber tech maintenance training, billing and customer service process development and training, and marketing.

BEC’s electric service territory was the initial target for investment and now several non-member census block areas are also being served, thanks to the Federal Communications Commission’s Connect America Fund (CAF) grant-based investments.

- The capital cost for the fiber network build-out to each home and business premise in BEC’s membership communities was estimated at \$42 million and projected to take up to five years to reach break-even.
- For non-member areas, CAF proceeds are expected to amount to at least \$4.5 million over ten years to build fiber into areas currently underserved by communications service providers.

The take rate for fiber within BEC's service area was projected to be 50 percent over five years. The first four completed phases focused on areas served by slower speed vendors and returned a lower-than-expected 20 to 26 percent take rate, reflecting in part competitive providers' previous push to get customers onto long-term contracts that made switching to BEC difficult. Take rates are currently growing at 2 to 4 percent per month as members' contracts with their existing providers expire.

PRESS RELEASE

September 2018

Barry Electric Co-op Awarded \$6.1 Million to Expand Internet Service in Barry County

The Federal Communications Commission has announced the winners of the CAF II Auction. The CAF II (Connect America Fund) auction was held to award \$1.5 billion in grant monies to subsidize the cost of building broadband Internet to underserved and unserved areas. Barry Electric Co-op was awarded \$6,103,454.20 to be distributed over a ten-year period. Barry Electric Co-op is the only winner in Southwest Missouri committed to provide gigabit service and is one of the thirty-three rural electric cooperatives across the nation winning grants. A considerable number of rural areas across the nation will continue to go underserved or unserved because entities bidding in those areas dropped out of the auction in the later rounds of lower bidding.

The grant funds were awarded using a reverse auction process. The competing entities that won were the ones that committed to deploy broadband by accepting the lowest level of government support. In this way the FCC will distribute the available money in the most efficient method. The auction utilized a weighted system of bidding that gave the entities who pledged to provide higher speeds and lower latency preferential treatment in the bidding process. Barry Electric Co-op is able to meet these requirements with its fiber to the home design, giving their bids the most favorable weighting.

Barry Electric Co-op is currently building reliable and high speed internet service to portions of Barry County served by the electric cooperative. Their wholly owned subsidiary doing business as goBEC Fiber Network is now providing internet, phone and TV services to some of Barry Electric Co-op's members. goBEC's fiber construction is ahead of schedule to the members of Barry Electric Co-op. Half of the electric co-op members have main line fiber access now and most of the remainder will have access in 2019 or 2020. JR Smith, goBEC Fiber Services Manager said, "The CAF II funds will provide the Barry Electric Co-op Board options to consider how to further provide reliable, high-speed internet service over the next decade. I am thankful for the foresight of the Management Team and Board of Directors for this new way to serve our community."

The board of directors of Barry Electric Co-op believe building gigabit service to the members and the communities served by Barry Electric Co-op is a great benefit now and even more so in the long term future. Barry Electric Co-op is well suited to provide this service because it already has poles, conduit, rights of way and other infrastructure that helps minimize make-ready costs. In addition, they have a lower cost of capital and are a not for profit member owned entity. As always the cooperative's goal is to provide valuable services to everyone in the cooperative electric service territory and possibly extending to other adjacent areas as funding becomes available.

Even with lower-than-expected, initial take rates, BEC is exceeding its *pro forma* budget estimate. Annual operating costs are currently \$1.6 million and annual revenues are expected to exceed \$2 million. BEC is updating its long-term budgets and forecasts, and has retained a CPA firm to perform a Transfer Pricing Analysis that will meet IRS requirements for a for-profit subsidiary providing fiber broadband services.

Broadband Business Model

BEC's broadband business, named goBEC, currently operates as a not-for-profit subsidiary of the electric cooperative. All employees working on fiber broadband are employees of the cooperative. JR Smith himself was hired in 2015 as the co-op's 31st employee. BEC's current employment of 47 speaks to the significant growth in staffing brought on by the co-op's move into fiber broadband services.

BEC's plan is to extend its fiber network to enable high-speed Internet access to all 6,700 of BEC's members. Internet access speeds offered start at 250 Mbps and run to 1 Gbps.⁴ The decision to offer fiber broadband services to members was aided in part by the revenue stability the business offers, according to Smith. "This investment can help you stabilize revenues," says Smith, noting that fiber revenues are predictable, while electric revenues can vary significantly due to weather factors, economic conditions, and member behavior. BEC intends to focus mainly on its electric membership base as the market for its broadband service offerings for the foreseeable future. Each successive network construction phase is taken to the co-op's board of directors for approval prior to proceeding.

The cooperative has partnered with Co-Mo Connect, the communications subsidiary of Co-Mo Electric Cooperative, to gain access to the video head-end⁵ facilities necessary for offering TV to subscribers. This avoids the need for upfront investment in an expensive component of bundled ("triple play") telecom services (Internet, phone and TV services), and hedges against a trend shift to Internet-based TV in the future, which could undermine the head-end investment. BEC also partners with Arkansas-based Pinnacle Telecom to enable its phone service offerings.

Network Architecture

BEC's network is 100 percent GPON⁶ FTTP, with the capability to provide direct Ethernet connection, enabling goBEC to provide video and Internet service up to 1 Gbps using the combined solution of Calix Compass Consumer Connect Plus software, 844G GigaCenters, and E7 systems.⁷ Fiber network reliability is enhanced by the availability of KAMO Power's fiber network as a backup path in an emergency, a critical consideration given that Missouri is tornado-prone, if not officially part of "Tornado Alley." KAMO owns all the electrical substations in BEC's service area and has fiber-connected them to BEC's offices.

⁴ For current goBEC plans and packages, see: <http://gobec.net/plans-packages/>

⁵ According to Techopedia, a headend is a facility that accepts TV signals as input from satellites, processes them into cable-quality signals, and then distributes them to homes and cable networks. It can be considered as the master distribution center where incoming television signals are received, selected, amplified and re-modulated, and sent for transmission to cable networks. <https://www.techopedia.com/definition/7550/headend>

⁶ GPON stands for Gigabit Passive Optical Network. Its main characteristic is the use of passive splitters in the fiber distribution network, enabling one single feeding fiber from the provider to serve multiple homes and small businesses. Source: www.multicominc.com

⁷ <https://www.calix.com/press-release/2016/02--february-/three-electric-cooperatives-leverage-calix-to-bring-a-world-clas.html>

Regulatory Issues

Fiber network manager Smith was unable to point to any regulatory or tax issues arising from BEC's move into broadband services.

Market Setting

Pre-existing providers of telecommunications services in Barry County included CenturyLink, with a significant presence in downtown Cassville; Windstream (up to 100 Mbps); Total High Speed Cellular (advertised speeds of 2-6 Mbps); Mediacom cable; and a few satellite options. Internet service offerings in Cassville tend to be more competitive than in rural areas; it is common knowledge that CenturyLink promoted three to five-year contracts to retain subscribers in anticipation of BEC's fiber network rollout.

Lessons Learned

In spite of a careful project planning approach and phased deployment to manage cost and risk, BEC overcame some challenges and willingly shares insights it has gained along the way to broadband:

- The cost and time associated with make-ready work were somewhat underestimated. Inspecting poles, clearing rights-of-way, and otherwise preparing the electrical system to “host” a fiber network can pose significant challenges, especially in densely populated areas where there are a lot of poles and an equally high number of pre-existing pole attachments.
- Issues can arise when IT back-office systems are adapted to handle a new broadband services business. Customer billing for telecommunications services is different from electric billing. Customer-service calls revolve around different issues. BEC was the first electric cooperative in its IT service provider's client base to request new software features. As Smith says, “We broke the ice.”
- Careful, upfront resource planning can facilitate the inevitable growth of the new business and reduce the number of surprises. “What staff will we need?” and “What skillsets will they require?” are essential questions, according to Smith. Although the headcount numbers may be small for a co-op the size of BEC, 50 percent growth in personnel in five years is significant and can be disruptive to the business.

Why is this Case Important?

Not every electric cooperative will have the advantage of a major federal grant to underwrite its investment in the new, broadband infrastructure needed to enhance electric system operations and offer members affordable, high-speed Internet access. Barry Electric Cooperative and goBEC highlight an approach that can be followed when revenues must be generated while the network is being built. BEC's network architecture, consisting of a fiber ring that connects each successive phase of network construction with the cooperative's offices and communications facilities is a sensible and measured approach. Focusing initially on cooperative members and Community Anchor Institutions delivers what matters most to cooperatives — enduring service to the community. Partnering with others to “rent rather than buy” expensive components, like video head-end facilities and telephone switches, conserves capital and reduces investment risk. When,

as BEC's Fiber Network Manager Smith suggests, the cooperative's main mistake was not committing to a faster deployment schedule, the plan appears to have been pretty solid.

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