

Broadband Case Study: United Electric Cooperative



Cooperative Profile

United Electric Cooperative (UEC) provides electricity to 7,500 members on 3,600 miles of distribution lines across eleven counties in northwest Missouri and southwest Iowa (see Figure 1). The majority of its members are in Missouri. UEC serves one of the lowest density areas in rural America with only 2.6 meters per mile of line, less than half the nationwide average for NRECA cooperative members. The area's extremely low population density helps to explain why an estimated 89 percent of the co-op's roughly 5,000 square mile service territory was unserved or underserved in terms of broadband Internet access as late as 2010.¹

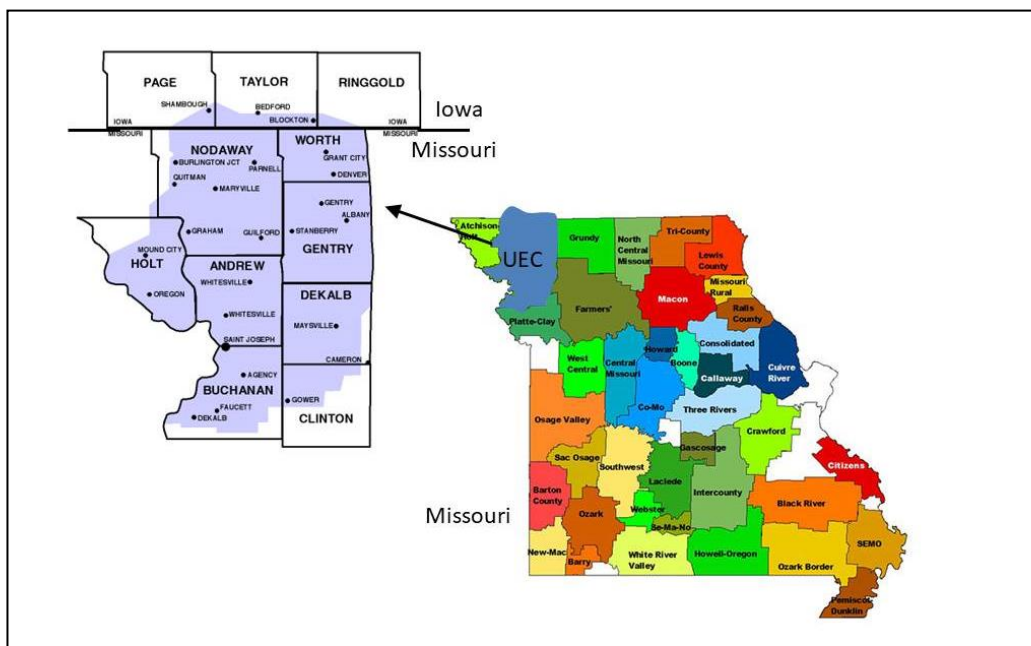


Figure 1.
United Electric Cooperative's electric membership area in Missouri and Iowa

Missouri map courtesy of Association of Missouri Electric Cooperatives

¹ According to a UEC membership survey taken in advance of the co-op's application for funding of its fiber broadband initiative under the American Recovery and Reinvestment Act of 2009 (ARRA).

The prospect of high cost and low profit had made it difficult for Internet providers to justify offering true broadband service there. UEC's board of directors, however, was not averse to the idea of launching a fiber broadband business, having operated a subsidiary with a DirecTV franchise from 1994 until 2010. So, in the same year that UEC's subsidiary United Services exited the DirecTV business the cooperative landed a American Recovery and Reinvestment Act of 2009 (ARRA) grant and U.S. Department of Agriculture Rural Utilities Service (RUS) loan totaling \$21.2 million, enough to cover the initial phase of its fiber broadband network buildout. This phase was intended to extend the reach of fiber broadband to some 4,200 households, 58 businesses and 150 community anchor institutions² in six Missouri counties.

Fast forward to 2019. United Services, doing business as United Fiber, has invested over \$50 million to deploy 1,800 miles of fiber mainline and has 9,200 broadband subscribers to date. The co-op has landed another \$20 million grant, this time under the Connect American Fund Phase 2 auction (CAF-II). Along fiber-optic lines that have been completed within the electric membership area, its take-rate is an impressive 55 percent, meaning that a majority of homes passed have opted in for broadband service. Moreover, since 2014, United Fiber has been routinely providing broadband connectivity to households and businesses outside its membership area. UEC's fiber broadband business became cash-flow-positive in 2014. More remarkably, its broadband gross revenues are expected to surpass electric revenues by 2020 and to be more than double electric revenues by 2028.

The cooperative's electric members are reaping the benefits in ways that go beyond the availability of high-speed Internet. Because of the infusion of non-electric revenues and profits, no rate increase is planned for a decade or more, and cash refunds have been returned to members at several times in the past eighteen months. In a low-density area where costs are disproportionately high and electric revenues are flat or declining, operating a broadband business alongside electric distribution appears to be a good way to provide a significant economic boost to ratepayers, the communities in which they live and work, and the cooperative itself.

Business Drivers of the Broadband Investment

UEC's CEO Jim Bagley is realistic about the challenges of operating an electric distribution co-op in an ultra-low-density, rural area and positive about the community benefits that wider broadband access will bring. Both came into play when the co-op decided to enter the broadband services market. He appreciates the need for affordable, high-speed Internet access to encourage people and businesses to remain in northwest Missouri and to support community anchors. Yet, his approach to extending UEC's fiber network is pragmatic. According to Bagley, "If another company is already providing adequate broadband service in an area, we aren't going to spend the money." On the realistic side, he comments, "We could only push so much cost on our membership. Broadband helps us address this problem and maintain stable rates over time."

UEC's fiber network also enables enhanced electric operations. All 23 of the co-op's distribution substations are now connected with fiber, enabling backhaul of metering data from the co-op's wireless mesh network, load control, and automated reclosers on the electric system. System engineers are also looking into

² Anchor institutions typically include: primary and secondary schools, colleges and universities, libraries, museums, healthcare organizations, and governmental buildings.

Volt/VAR optimization and control.³ Bagley envisions the impacts broadband will have on future electric operations, saying, “Broadband has already helped us create a mini-smart grid. With an expanding fiber network, we will be in a good position to understand the options for smart homes down the road.”

Project Overview and Deployment Approach

Construction of UEC’s fiber network began in the spring of 2011, and the first subscribers were connected in 2013. The initial phase of work, funded largely by the ARRA grant and loan, was closed out at the end of 2014. A primary goal of connecting 14 of UEC’s substations was also met. By 2014, the co-op began to extend its network reach into non-member areas. Currently, the network covers approximately 70 percent of UEC’s electric service territory.

According to CEO Bagley, United Services frequently goes outside UEC’s electric territory. The co-op has even partnered with its neighbor, Platte-Clay Electric Cooperative, to enable broadband access in parts of its service area. According to Dave Diehl, General Manager of Platte-Clay, his co-op has “partnered with United to facilitate their delivery of fiber to parts of Platte-Clay’s service territory where it fits their business model.” Diehl adds, “This partnership with United will allow some members in our area to be served fiber Internet service without Platte-Clay’s membership taking on the financial and regulatory risks associated with it.”⁴

UEC’s expansion plans avoid the areas of rural telephone companies that have deployed fiber to the home networks, and feature fiber mainlines running close to health clinics, schools, and other anchor institutions that previously lacked broadband connectivity. Bagley notes that he has seen strong interest from the business community, adding that commercial revenue has contributed significantly in his march toward profitability. Construction of the fiber network throughout additional portions of UEC’s electric area will be financed by a \$20 million CAF-II grant awarded to UEC in October 2018⁵, augmented by ongoing loans from CoBank and CFC. What about UEC membership areas currently beyond the reach of fiber broadband? United Services offers wireless



Figure 2. Sample recruitment mailer created by United Fiber

Image courtesy of UEC

³ **Volt/VAR Optimization (VVO)** optimally manages system-wide voltage levels and reactive power flow to achieve efficient distribution grid operation. VVO assists distribution operators reduce system losses, peak demand or energy consumption using Conservation Voltage Reduction (CVR) techniques. Source: <https://etap.com/product/volt-var-optimization-control>

⁴ <https://www.linkedin.com/pulse/embracing-future-david-deihl/>

⁵ <http://unitedelectriccoop.cms.coopwebbuilder2.com/content/united-receives-20-million-broadband-funding-award-fcc-connect-america-fund-caf-ii-auction>

connectivity under its United Sky brand and, in locations where neither fiber nor wireless is available, Exede satellite as a last resort option.⁶

Broadband Business Case

UEC's broadband investment case has turned out to be very strong. \$15 million of the estimated \$50 million invested to date has been funded by grants with another \$20 million of CAF-II funding being received over the next 10 years (\$2 million per year). This funding, in combination with commercial revenue from off-system builds, allowed the broadband business to become cash-flow-positive in just four years (2017). Fiber revenues in 2020 are projected to be \$26 million, against \$16 million in operating expenses. After returning royalties of \$3.1 million back to the cooperative, EBITDA⁷ is forecasted at \$7 million. While reaching positive cash flow in four years is impressive, Bagley observes that there is an even more remarkable trend here. By 2028, the end of UEC's current financial forecast, gross revenues from the fiber business are expected to more than double electric revenues.

Broadband Business Model

United Services (dba United Fiber) is a wholly owned, for-profit subsidiary of UEC. Bagley notes that the co-op parent had to undergo a change as a result of its highly successful launch of United Fiber. He describes his new co-op business model as "a taxable nonprofit."⁸ The CAF-II funding to be received in 2019 through 2029 necessitated this change. What happens to net profits from the broadband business? They are allocated back to the electric cooperative's patronage capital account, with electric members' shares based on electric usage. All electric members share in the benefits, regardless of whether they are broadband subscribers — this is a key part of the arrangement. Even members who are served by a third-party-broadband provider reap a benefit from UEC's broadband business and this helps offset their electric costs. Bill credits averaging \$150 have been distributed to members in the last eighteen months alone.

Who owns the fiber? The answer is: it depends on where it is located. Within the electric membership area, UEC owns the fiber and leases it to its subsidiary. Outside the membership area, United Services owns the fiber directly. Of the approximately 30 personnel working in the broadband business, management-level employees are shared between UEC and United Services. Staffers below the management level are fully dedicated to broadband. Five of these are dedicated to handling fiber calls. Fiber network construction is mostly contracted out.

What services does United Fiber offer? Customers can elect to receive triple play services — high-speed Internet, TV and telephone — as well as managed WiFi, which has proven popular with more than 50 percent of residential subscribers opting in. The company has its own video headend facilities and also leverages another co-op's video streams to cut down on equipment costs.⁹

⁶ <https://unitedfiber.com/exede/>

⁷ EBITDA stands for earnings before interest, tax, depreciation and amortization.

⁸ UEC is still a non-profit but as of 2019 will be taxable. With the combination of revenues generated by the fiber business and about \$2 million per year over the next ten years from the CAF-II award, UEC will exceed the 85-15 rule.

⁹ A cable (or fiber) television headend is a master facility for receiving television signals for processing and distribution over a cable (or fiber network) television system. Source: https://en.wikipedia.org/wiki/Cable_television_headend

Network Architecture

UEC's fiber broadband network is, like many of the cooperatives featured in this NRECA broadband series, a GPON architecture, with active Ethernet for some business customers.¹⁰ What Bagley likes most about GPON is that he can increase network capacity by adding equipment, "Traditional GPON architecture provide 2.5 Gb download capacity to the PON, but with new advances in technology, we can now offer 10 Gb or 40 Gb capacity across the same newtwork. We see that increasing to as much as 80 Gbps in the future. This is part of why we consider fiber to be 'future-proof.'" Where fiber has not yet been deployed, other Internet access technologies are available from United Services as a stopgap — wireless or satellite, as discussed earlier. Only about 5 percent of subscribing members are currently served by wireless. The majority of fiber placements within UEC's membership area are overhead on poles. Outside the membership area fiber placement is mainly underground.¹¹

Market Setting

Several other broadband service providers operate within certain parts of UEC's electric membership area. Among the primary competitors are CenturyLink (mainly DSL), SuddenLink (cable), Windstream (DSL), Mediacom (cable), Viasat (satellite), AT&T (DSL), fiber and fixed wireless. United Services is not a new entrant to this market area, having owned a DirecTV business from 1994 until 2010 and offering satellite and wireless internet services since 2001.

Regulatory and Tax Issues

Other than the aforementioned change to a taxable organization, regulatory and tax issues have been relatively minor. Some of the requirements associated with UEC's 2010 RUS loan were somewhat burdensome due to environmental, prevailing wage, and engineering requirements tied to the program. In addition, a condition of UEC's 2018 CAF-II grant was that each grantee had to become an Eligible Telecommunications Carrier (ETC) and provide universal telephone and Internet access services.¹² However, Bagley observes that since United Services was already providing telephone service, this was not a big issue. United was not an ETC prior to receiving funding.

¹⁰ GPON (Gigabit Passive Optical Network) is a point to multipoint technology than connects an Optical Line Terminal (OLT) to many Optical Network Terminals (ONTs), also known as Optical Network Units (ONUs). A GPON network utilizes passive splitters between the OLT and ONT to split the wavelength so all ONTs on the fiber can see it. The GPON standard specifies up to 128 splits can be on a single GPON port, but traditional GPON deployments use 1:32 or 1:64 way splits.

Source: <https://community.calix.com/s/question/0D50g00004pX3k7CAC/frequently-asked-questions-about-gpon>

¹¹ UEC does not own the infrastructure outside its electric service area and typically there are already additional wires on the poles in the communities United Services builds into. Due to initial application cost, make-ready costs, and additional time requirements, the business generally does underground construction in those communities.

¹² For a discussion of this requirement, see: <https://www.fcc.gov/general/universal-service>

Measurable Community Impacts

UEC's broadband initiative has already had a significant impact on the local community beyond the provision of reliable, high-speed Internet access. Declining school enrollments due to population outflows had been a challenge for districts in northwestern Missouri for years. As enrollments declined, school budgets were impacted, and educational programs had to be scaled back or eliminated. Smaller schools, in particular, lacked the resources to provide the necessary range of educational offerings. Prioritizing the extension of broadband access to schools has helped create a virtual learning environment where in-school programs can be augmented by online courses and educational resources.

Cost and time savings are also being created by the new fiber network. Many of UEC's members had relied on satellite services to access the Internet in the past. The availability of fiber broadband has reduced the cost of high-speed Internet access (on an apples-to-apples basis) very dramatically. Examples include an ambulance service in Maryville where nightly off-site data backups that had been taking eight hours or more are now completed in 22 minutes. Another example is a United Cooperative member who had been driving over 150 miles round trip daily to her office in Kansas City. Once fiber was installed to her home, she was able to save time and money by telecommuting four days a week. She has stated that her connectivity at home is now better than the main office in the city.

Lessons Learned

What are Bagley's key takeaways from the successful launch of his fiber broadband business? He says, "*Plan for success. Everyone plans for the possibility of failure, no one plans for a big success. In hindsight, I wish we had started thinking about this on Day One.*"

Specifically, he suggests that his peer co-op leaders and their boards consider the following issues (specific impacts on UEC shown in italics):

- If the broadband business blossoms, or large grants become available, to the extent that the 85/15 rule is triggered, how will becoming taxable affect our current business? *The amount of the CAF-II award received by United forced the co-op to become taxable, which simply means they submit a different tax form.*
- How might covenants in an RUS loan impact the organization, as they may not be geared for successful outcomes? *Due to RUS rules, revenue generated by the fiber business is treated as "non-member income" and is not allowed to offset the expense of the fiber construction and maintenance. Due to this revenue treatment, the cooperative is at risk of not meeting their RUS financial ratios as the fiber business grows.*¹³
- How can loan guarantees be issued by and for a successful, growth-oriented subsidiary of an electric utility? *The electric cooperative can guarantee up to 15 percent of plant value for the subsidiary. As*

¹³ UEC holds all the debt service for the construction, maintenance and operational cost of the fiber network but since the fiber operating revenue coming back to the co-op is treated as non-operating income there is a negative impact on its financial ratios with RUS.

the subsidiary has become successful, borrowers now have a “level and separate” clause where the cooperative and subsidiary guarantee each other’s loans.

What is the bottom line for Bagley? He reflects on the remarkable journey UEC has taken over the past several years, “Broadband for us has been a very successful extension of our traditional business and that has changed our core business model in some pretty significant ways.”

Why is this Case Important?

UEC’s experience is in many ways similar to prior case studies in this NRECA broadband — the co-op’s strategy is 100 percent fiber-to-the-home, the fiber network investment was largely underwritten by major grants under ARRA and CAF-II, underserved members proved themselves eager to sign up, and significant impacts have been seen in the community, especially in education.

What makes this case different is that UEC’s membership area is one of the lowest-density, rural areas in America with a mere 2.6 meters per mile of electric line. UEC determined that a move into broadband services would not only address unserved and undeserved communication needs, it would also provide financial relief to electric members and help stabilize electric rates. As Bagley puts it, “With our very low density demographics, we may never be the lowest cost, electricity provider. We make it up to our members by saving them on the combined cost of electricity and broadband services.” Perhaps most remarkable about UEC, management has forecast that fiber broadband revenues will exceed electric revenues by 2020, and more than double electric revenues by 2028.

Through the acquisition of grant funding and bringing in revenue from high-density residential and commercial customers outside of their electric footprint and funded by private capital, the UEC model can serve as a blueprint for other low-density cooperatives looking to deploy fiber. Broadband has changed the life of UEC’s members in significant ways. It has also changed the cooperative itself.

For additional information, contact:

Darren Farnan
Chief Development Officer
United Electric Cooperative, Inc.
dfarnan@ueci.coop
Ph: 800-748-1488

Paul Breakman
Senior Director, Cooperative Organizational
Development
Business and Technology Strategies
Paul.Breakman@nreca.coop
Ph: 703-907-5844

This case study was researched and written by Eric Cody, Cody Energy Group:
CodyEnergyGroup@gmail.com