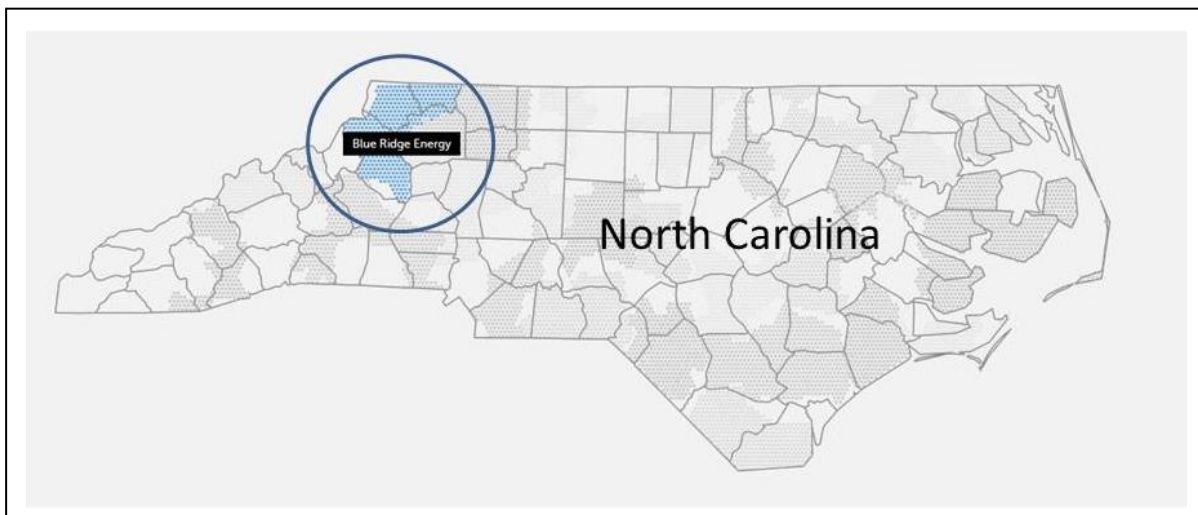


## Broadband Case Study: Blue Ridge Energy



### Cooperative Profile

Blue Ridge Energy<sup>1</sup> is one of the largest electric cooperatives in North Carolina, serving some 76,500 meters from its Lenoir headquarters in the northwestern corner of the state (see Figure 1). Its service territory encompasses four North Carolina counties, as well as parts of three more, in rocky, mountainous terrain that rises to an elevation of 6,600 feet above sea level. With its 8,262 miles of electric distribution lines, the co-op serves 9.4 meters per mile, fairly typical of NRECA cooperatives. The co-op also maintains 282 miles of transmission lines.



**Figure 1. Blue Ridge Energy service area.** Map graphic courtesy of North Carolina Electric Cooperatives.

<sup>1</sup> Blue Ridge Electric Membership Corporation and its Propane & Fuels subsidiary, Blue Ridge Energies, LLC began operating under the d/b/a name of Blue Ridge Energy in 2017. This rebranding initiative was implemented as part of the cooperative's strategic plans to achieve its Utility of the Future vision to be the regions most Trusted Energy Partner. Not to be confused with Blue Ridge Mountain EMC, a Georgia-based electric cooperative with members in North Carolina also featured in this NRECA broadband series.

The cooperative entered the fiber-optic business in 2001, leasing out excess capacity of fiber it had installed on its electric system for a variety of business purposes — SCADA,<sup>2</sup> as well as voice, data and video connections to its four district offices. One of its first customers was Cingular Wireless, for whom the co-op installed an outdoor distributed antenna system (oDAS) on its poles, with fiber backhaul.<sup>3</sup> Additional requests for services subsequently came in from other cellular carriers who also wanted to lease space on the co-op’s poles and utilize the co-op’s dark fiber for backhaul. In 2009, Blue Ridge Energy formed RidgeLink, LLC, a for-profit, telecommunications subsidiary, to service the growing number of requests. In the decade that has passed, RidgeLink has expanded its fiber network and built small and macrocell sites to meet the needs of major, global carriers.

In contrast to almost all of the prior case studies in this NRECA broadband series, RidgeLink does not offer retail broadband services. Instead, it is a fiber infrastructure business, providing dark fiber capacity and co-location services to cellular providers, municipalities, health care systems, educational institutions, and local telcos in North Carolina and Tennessee. Its current contracts number in the hundreds, not thousands, and its risk and reward profile varies materially from the more common, retail broadband model of fiber-to-the-home (FTTH) being adopted by many electric cooperatives nationwide.

## Business Drivers of the Broadband Investment

The initial impetus for Blue Ridge Energy’s fiber-optic network was the need for greater communications bandwidth and data transfer speeds required for enhanced electric operations. In addition to providing the communications links between headquarters and the district offices, fiber is also used for data backhaul for the co-op’s advanced metering infrastructure (AMI) and meter data management (MDM) system, and to communicate with automated devices on the distribution system (commonly known as downline automation). Blue Ridge Energy is also considering a possible, new RF-based AMI solution, for which its fiber-optic backbone would play a central role.

Not all of the 110,000 strand-miles of fiber on the 450 route-miles Blue Ridge Energy has deployed are needed by these business applications, however. To the co-op’s management and the board, it made sense to lease fiber not being used. RidgeLink became the co-op’s vehicle for creating value for its members with this excess fiber capacity. Community support is also an active part of the co-op’s plan. Expanding the fiber infrastructure helps improve cellular service within the co-op’s mountainous territory and improves information exchange and Internet access for health care providers, educational facilities, and government agencies. And, according to Blue Ridge Energy, “It also helps our area be positioned for the future, as it makes us be more competitive for jobs, in addition to improving quality of life.”<sup>4</sup>

---

<sup>2</sup> Supervisory Control and Data Acquisition, a technology system which enables control of the electric power system.

<sup>3</sup> oDAS is a network of small antennas mounted on poles that creates wireless cellular service in an area.

<sup>4</sup> Blue Ridge Energy 2017 Annual Report, p. 3. [https://brenergy.s3.amazonaws.com/files/1/company/annual-report/AnnualReport\\_2017.pdf](https://brenergy.s3.amazonaws.com/files/1/company/annual-report/AnnualReport_2017.pdf)

## Project Overview and Deployment Approach

Brad Shields, who serves in the dual roles of chief technology officer of Blue Ridge Energy and chief operating officer of RidgeLink, offers a straightforward explanation for how the fiber-optic network expands and the business operates. “We see our use of excess fiber capacity as a way to more fully use the assets we have and to reduce the cost of providing electric energy.” Although many of RidgeLink’s customers have approached the company for dark fiber and co-location services, RidgeLink’s approach is not strictly opportunistic. Identification of potential, new fiber routes in North Carolina and neighboring Tennessee (see Figure 2 for a current network map) considers many factors, including potential demand for services, ruggedness of terrain and physical obstacles like rivers that must be crossed, estimated construction costs, projected revenue streams, ability to acquire easements and, needless to say, where Blue Ridge Energy’s transmission and distribution assets and RidgeLink’s existing fiber routes are located.



**Figure 2.** Blue Ridge Energy / RidgeLink fiber-optic network map.

## Broadband Business Case

RidgeLink has thus far received no grants toward construction of its fiber-optic network.<sup>5</sup> Instead, the company’s fiber route additions are guaranteed by multi-year leases (monthly leases lasting 3 to 5 years with automatic renewal) with its customers. Early cellular construction and infeasible-right-of-use contracts (IRUs — 20 to 25 year agreements that cannot be undone) created rapid growth and infusions of cash for network construction.<sup>6</sup> Many of RidgeLink’s customers also periodically request site upgrades, for which the company recovers additional construction costs. Many of its contracts come with cash paid upfront for future maintenance of the facilities.

<sup>5</sup> Blue Ridge Energy has in the past submitted grant applications under the federal Broadband Technology Opportunities Program (BTOP) and Connect America Fund (CAF) but found that it lacks the key Census blocks to qualify.

<sup>6</sup> IRU fees are paid in a single, lump sum payment at the time of contract execution.

Because the business has highly predictable revenue streams, investment decision making is straightforward in many instances. As a competitive business, RidgeLink does not share publicly the capital cost of its fiber-optic network; however, the company currently has assets valued at \$16 million. What about ROI? Shields reports that RidgeLink looks for investments that will produce a return in five years or less. He notes that “All our builds have been paid for with cash. RidgeLink has no debt.” Compared with the retail broadband services business model many electric cooperatives have adopted, RidgeLink’s level of financial uncertainty is much lower. This is an important consideration for such a cash-intensive business — fiber construction costs range from \$25,000 per mile for overhead to as high as \$100,000 per mile for underground and optical ground wire (OPGW — see discussion under Network Architecture).

## Broadband Business Model

RidgeLink is a wholly owned, for-profit subsidiary of Blue Ridge Energy that provides business-to-business fiber broadband services. The subsidiary has no employees. Instead, Blue Ridge Energy personnel handle the work of RidgeLink either on a job and task basis (line personnel), charging their time based on hours spent, or on an allocated-time basis (managers and executives). The co-op’s Communications and Operations departments supply the personnel. Who owns the fiber network? Blue Ridge Energy owns the fiber assets within its electric service area, while RidgeLink owns the assets outside the electric co-op’s footprint. Within the electric service area, RidgeLink leases fiber from its parent through an operating agreement and then leases it to third parties. The entire fiber network is operated by Blue Ridge Energy employees who charge their time to the subsidiary.

## Network Architecture

RidgeLink builds, operates, and maintains macrocell co-location sites and smaller scale oDAS installations, both of which are connected to the company’s fiber-optic network. To date, RidgeLink has installed about 80 small cells (for Verizon, American Tower, AT&T Mobility and Carolina West Wireless) and approximately 15 macrocell sites (for AT&T Wireless, T-Mobile and Carolina West Wireless). The network provides dark fiber capacity to all of RidgeLink customers.

## Cellular and Wireless

Macrocell sites that RidgeLink offers include towers as high as 150 feet able to accommodate multiple carriers using 2G, 3G, and 4G technologies. In some locations this is accomplished via an electric transmission tower at the top of a mountain with backhaul fiber hung along transmission lines, and at other locations by a custom-build structure on RidgeLink’s own fiber network. High-powered macrocell sites provide much wider coverage than small cell sites, as described below. Figure 3 shows one of RidgeLink’s macrocell installations.



**Figure 3. Macrocell site installation.**  
Photo courtesy of RidgeLink, LLC.



RidgeLink’s small cell, or oDAS, installations typically use Blue Ridge Energy’s distribution poles for mounting of cellular equipment, each of which can cover a radius of about a tenth of a mile. Equipment the size of a pizza box is mounted on poles every few blocks to create this localized, cellular coverage and to fill gaps in existing coverage without the need for permitting and building a new cell tower (see Figure 4).



**Figure 4. Small cell and outdoor DAS installations.** Photos courtesy of RidgeLink, LLC.

## Dark Fiber

The fiber-optic network itself uses a combination of OPGW and all-dielectric self-supporting (ADSS) technologies, depending on location.<sup>7</sup>

- OPGW is placed in the secure, topmost position of the transmission line, replacing the static ground wire and providing protection against the effects of lightning strikes. It costs as much as \$5.00 per foot.
- ADSS fiber is ideal for installation in distribution as well as transmission environments, even when live-line installations are required. Its cost range is \$1.60 to \$3.50 per foot.

---

<sup>7</sup> With OPGW, the fiber-optic cable replaces the static ground wire and provides protection against the effects of lightning strikes. For an discussion of OPGW and ADSS technologies, see: <https://www.thefoa.org/tech/ref/appln/ElecUtil.html>

Ninety-five percent (95%) of RidgeLink’s fiber-optic network is overhead and 5% underground. Burying fiber-optic cable in the mountainous area where the company operates is generally too expensive and time-consuming. Shields puts it simply, “there’s way too much rock.” Gigabit passive optical network (GPON) technology, favored by the majority of electric cooperatives building FTTH networks that have been featured in this NRECA series, is not applicable to RidgeLink’s business model of providing dark fiber capacity to a limited number of major customers. Fiber radials, as opposed to fiber rings, connect most of Blue Ridge Energy’s substations, enabling a host of system monitoring and control, as well as data acquisition applications.

## Market Setting

According to Shields, RidgeLink “does not play in the retail broadband market, because there are a number of well-established, broadband service providers in our area.”<sup>8</sup> Because it is a fiber infrastructure company, the nature of RidgeLink’s competitive environment is significantly different than that of an electric cooperative offering FTTH retail broadband services. RidgeLink’s customers include cellular carriers and Internet Service Providers, not mass-market, retail customers. Quite simply put, the greater the number of major carriers present in the area, the better for RidgeLink. Shields expresses his openness to co-location and revenue-sharing by saying, “Opening up your assets to co-location makes it easy to do business. We do all the permitting, build the sites, put in larger poles when asked — the whole job.” When asked how he finds new customers, he replies, “I attend fiber conferences at least once a year. We’re the only business owned and operated by an electric cooperative there. I meet the major carriers.” Partnering and revenue-sharing are active elements of the company’s business strategy. For example, RidgeLink offers business Internet in partnership with an ISP. There is burgeoning competition in dark fiber, however. According to Shields, “With dark fiber currently being a hot commodity, other providers are pushing into our area to serve the big data centers. We just have to compete for the business like every other company.”

## Regulatory and Legislative Issues

Easement acquisition has sometimes been a challenge for RidgeLink where key trunk lines and North Carolina Department of Transportation rights-of-way are involved. However, the North Carolina legislature passed a law in May of 2019 that removed barriers and clarified electric cooperatives’ ability to expand broadband access in the state. The new law:

- Helps offset the up-front costs of providing broadband by allowing electric cooperatives to access federal funds, including U.S. Department of Agriculture Rural Broadband funding, and providing greater flexibility to electric cooperatives when structuring partnership/lease terms with broadband partners and subsidiaries.
- Clarifies that it is permissible to use existing electric cooperative fiber deployed primarily for electrical purposes for the secondary purpose of providing broadband services.

---

<sup>8</sup> These include: Charter, Skyline Telephone, CenturyLink, AT&T, and ACTV.

- Limits electric cooperatives' exposure to liability when they make dual-use of their fiber to provide broadband services.<sup>9</sup>

## Community Support

RidgeLink provides fiber infrastructure support to a host of community anchor institutions — schools and hospitals in particular. The company provides dark fiber to several ISPs serving hospitals and has been contracted to build fiber to schools taking advantage of the Federal Communications Commission's E-Rate program.<sup>10</sup>

## Lessons Learned

Shields offers the following advice to his peers at other electric cooperatives, based on his own, direct experience running a fiber infrastructure business:

- Use existing employees to do the work, with labor and other costs properly allocated between the businesses. This can help the cooperative achieve economies of scale.
- Do not build fiber on a promise from a customer. Insist on a signed contract before starting construction.
- Build your fiber network first and foremost to support electric operations.
- Get an excellent attorney experienced with telecommunications in general and fiber-optic contracts in particular.
- Have your easement review completed before launching the fiber business.
- Make sure you are open to having small cells on your distribution system.

## Why is this Case Important?

The great majority of NRECA member cooperatives that have entered the broadband business to date, and almost all of those featured in this case study series, appear to have adopted a retail model of broadband services. The case of Blue Ridge Energy and its subsidiary RidgeLink, LLC offer a sharp contrast and an alternative for consideration. Instead of retail broadband services, this cooperative and its subsidiary have focused on dark fiber and related infrastructure, including co-location facilities. Instead of having to sign up thousands of small subscribers, RidgeLink contracts with a much smaller number of major carriers, ISPs, and community institutions. Financial risk is reduced due to the high predictability of revenue streams associated with long-term contracts. Moreover, immediate cash inflow is created by the types of contracts the company signs. RidgeLink has no employees of its own, choosing instead to rely on the

---

<sup>9</sup> <https://www.ncelectriccooperatives.com/who-we-are/spotlight/new-state-law-to-help-n-c-electric-cooperatives-provide-expanded-rural-broadband-access/>

<sup>10</sup> For an explanation and example of how the E-Rate program works, see: "Broadband Case Study: Guadalupe Valley Electric Cooperative," Business and Technology Advisory, NRECA, September 2019, pp.5-6. <https://www.cooperative.com/programs-services/bts/Documents/Advisories/Advisory-Broadband-Case-Study-GVEC-September-2019.pdf>

cooperative's personnel, thereby helping to underwrite the cost of their employment. For cooperatives thinking about launching a broadband business, Blue Ridge Energy's business structure and RidgeLink's service model are both worth considering.

**For additional information, contact:**

**Brad Shields**

Senior VP and Chief Technology Officer  
Blue Ridge Energy  
[bshields@blueridgeenergy.com](mailto:bshields@blueridgeenergy.com)  
Ph: 828.758.2383

**Paul Breakman**

Senior Director, Cooperative Organizational  
Development  
NRECA Business and Technology Strategies  
[Paul.Breakman@nreca.coop](mailto:Paul.Breakman@nreca.coop)  
Ph: 703.907.5844

This case was researched and written by Eric Cody, Cody Energy Group: [CodyEnergyGroup@gmail.com](mailto:CodyEnergyGroup@gmail.com)