

Broadband Case Study: North Alabama Electric Cooperative

Cooperative Profile

North Alabama Electric Cooperative (NAEC) serves 18,200 members in Jackson and Marshall Counties. This is a part of rural Alabama that has been hit hard economically over the past twenty years as industrial plants have closed down. According to NAEC General Manager Bruce Purdy, as much as 75 percent of NAEC's electric load was industrial in 2002. In the following decade however, the two counties lost all but one of their large industrial customers and employment took a correspondingly dramatic hit.



Purdy serves on the Jackson County Economic Development Board, and in that role, he became painfully aware that the area would need to make up lost ground. He concluded that without broadband Internet access, out-of-work residents would be severely disadvantaged in their search for new jobs. A large part of NAEC's service area was unserved by broadband Internet providers. This recognition led NAEC to conduct feasibility studies for deploying a high-speed communications network. Early cost estimates were astronomical and the investment appeared out of reach for an electric cooperative. Enactment of the federal American Recovery and Reinvestment Act (ARRA) in 2009, however, instilled hope and created a potential funding opportunity. A detailed review of ARRA's requirements and emphasis on rural broadband suggested to Purdy and his team that the rural area served by NAEC was a very good fit.

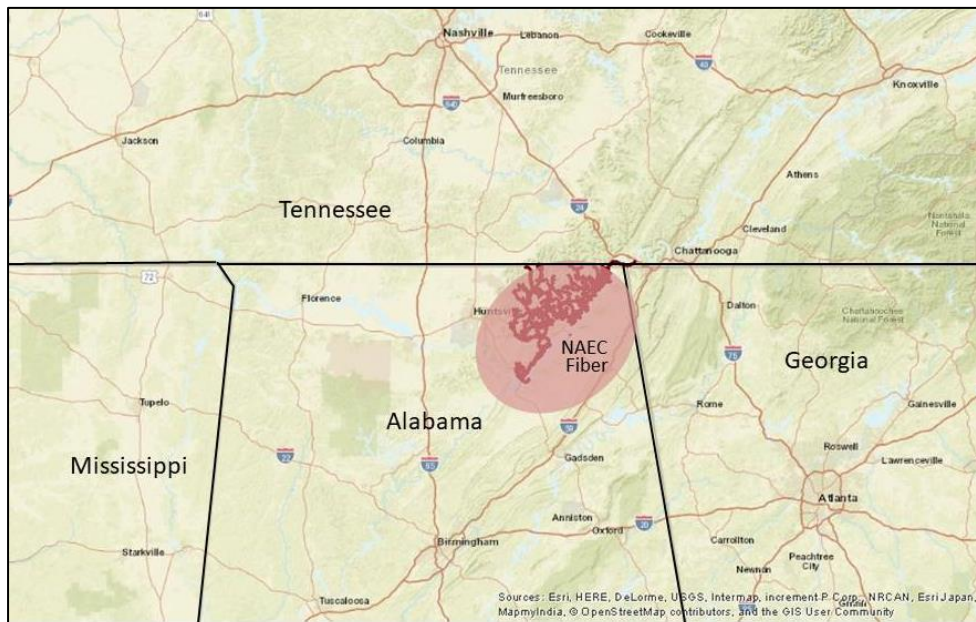


Figure 1.
North Alabama Electric
Cooperative Fiber Coverage.

After submitting a funding application that embodied months of intensive effort by Purdy and his managers, the cooperative was awarded a rural broadband grant of \$19.6 million in 2010. This launched the co-op's fiber network project. In just three years, NAEC covered virtually its entire electric service territory with a fiber-to-the-home (FTTH) network, passing some 14,000 meters with 1,250 miles of fiber, as shown in Figure 1.¹ NaFiber, the brand name for NAEC's fiber broadband services business, has a staff of eleven dedicated employees and had reached 4,300 active "fiber members" as of mid-2018. NaFiber activates an average of twenty new subscribers each week and receives a comparable number of new service requests. Gigabit (1,000 megabits-per-second speed or Mbps) Internet service has reached the hills and valleys of northeastern Alabama, and it is a growth business.

Business Drivers of Broadband Investment

Regional economic development was the primary driver behind NAEC's fiber broadband initiative. More specifically, the cooperative saw high-speed Internet access as an economic lifeline for residents and businesses in the communities it serves. Out-of-work residents are being helped. Schools and hospitals are also being helped. The possible benefits to the community appear almost unlimited in an era where many activities have become "virtual." The co-op is using its new fiber-optic network extensively for electric operations as well. Because NAEC receives its electricity from the Tennessee Valley Authority (TVA), its distribution rates have trended toward being time-differentiated. An advanced metering infrastructure (AMI) was needed to enable time-of-use (TOU) rates and load management programs. 100 percent of NAEC members now have advanced meters in place. The recently installed fiber network provides the data communication system for NAEC's AMI system. It does more than backhaul TOU data from NAEC's advanced meters though. Purdy says that NAEC cannot afford a supervisory control and data acquisition (SCADA) system, but that AMI with fiber backhaul of feeder and substation data gives his operations staff vastly improved visibility over what's taking place across the system in near-real-time.

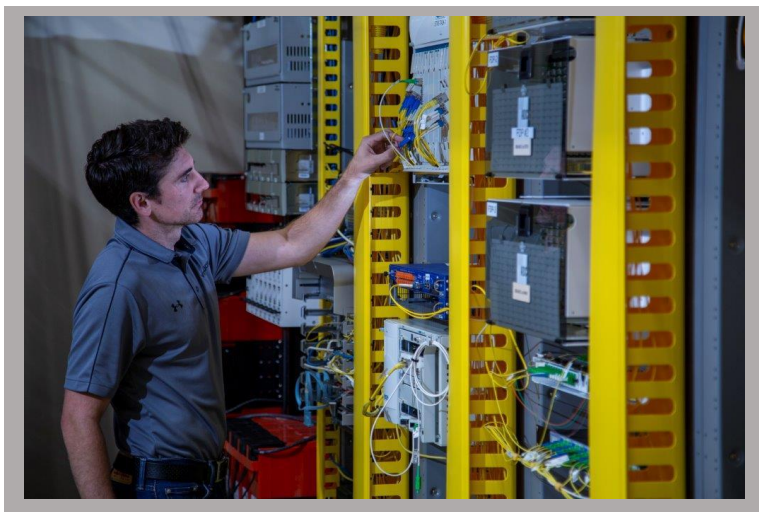


Figure 2 (above). Fiber Network Operating Center
 Figure 3 (right). Installing a fiber drop
 Photos courtesy of North Alabama Electric Cooperative

¹ One location in Marshall County was excluded from the fiber network buildout as it has been served for decades by the New Hope Telephone Cooperative, which now also offers broadband Internet access.

Project Overview and Deployment Approach

Field work, engineering and design of NAEC's fiber network commenced immediately upon notification of the grant award, and construction of the network began before final designs were even "dry on the paper." Under the grant rules, any part of the grant money not spent within three years would be converted to a loan. NAEC fully completed installation of its fiber network between 2011 and 2014. Completing the project in three years was no mean feat. As Purdy puts it, "In northern Alabama you're either crossing water or climbing a mountain." Not surprisingly, 95 percent of the fiber is strung overhead on poles. One secret to NAEC's success? NAEC partnered with FiberRise, a firm specializing in all aspects of fiber infrastructure, to enable it to complete the network within its budget and tight timeframe.² According to Purdy, "The character of FiberRise employees meshed perfectly with our team on the project and their experience was invaluable." FiberRise's mission statement reads, "*To empower electric utilities by uniting fiber with innovation, with a servant's heart, positively transforming the lives and communities of those we serve.*" Sounds like a cooperative.

Broadband Business Case

The ARRA grant covered 80 percent of the \$24.5 million capital cost of NAEC's 1,250-mile fiber network, significantly shortening the payback period of the cooperative's broadband investment. While NAEC has not forecasted annual costs and revenues, the ongoing balance between fiber connections and new service requests bodes well for growth in cash flow to cover expanding operations. The take-rate among NAEC's members has been surprisingly strong and this also lends strength to the underlying business case. Purdy explains with a chuckle that his early estimates of potential subscribers among the counties' aging population turned out to be conservative. "I didn't think that many of our older members would be signing up for high-speed Internet access," he observes, "but, many of them have told me that their grandchildren won't spend the night with them unless they do!" NAEC has not yet spent any money on advertising.

Broadband Business Model

NaFiber is an operating division within NAEC, not a subsidiary or spin-off company. It takes advantage of existing, back-office functions, such as finance, accounting, billing, and payroll. However, to remain in full compliance with regulatory requirements established by TVA, NAEC takes great care to ensure that no fiber-related business activities are improperly subsidized by electric ratepayers/members. NaFiber has dedicated installers who work on the fiber network and install member drops. Growth in fiber broadband staffing has not leveled off yet — the number of dedicated personnel went from 8 to 11 between April and July of 2018. The majority of new hires to date have been outside contractors working onsite, so NAEC already has a good sense of their performance before making offers of employment. NAEC's electric and broadband service areas coincide. Pricing for fiber broadband services to homes currently runs from \$29.95 for 50 megabits per second (Mbps) to \$79.95 for 1 gigabit per second speed.³ Digital voice and digital TV are priced separately.

² <http://www.fiber-rise.com/>

³ For offer details, see: <https://www.naecoop.com/fiber/>

Network Architecture

As with other electric cooperatives profiled in this series, NAEC's FTTH network is a GPON architecture.⁴ GM Purdy points out that his fiber network uses "distributed (or multi-stage) splitting"⁵ in rural, low density areas. Centralized (or single-stage) splitting is used in more densely populated areas.

Regulatory Issues

No significant regulatory or tax issues have emerged since NAEC began deployment of its fiber broadband network. Alabama state law allows electric cooperatives to enter the broadband communications business. Pole attachments, according to Purdy, "are an ongoing issue."

Market Setting

The cooperative maintains 2,200 miles of electrical lines with about 8½ customers served per mile. This low population density has worked against the region's ability to attract broadband Internet service providers. Purdy estimates that major broadband communications providers operating in his part of Alabama require a minimum of between 18 and 22 customers per mile of fiber for profitability reasons. As a result, the area was historically underserved and, in some locations, unserved for high-speed Internet access. AT&T is the largest incumbent provider of voice services in the area, also providing high-speed Internet to a small number of customers; Charter Spectrum offers cable Internet access in several towns served by NAEC; and CenturyLink (operating locally as CenturyTel) serves a small cluster of towns.

Why is this Case Important?

North Alabama Electric Cooperative has followed what may be the most direct and conventional path to delivering broadband communications services to members in rural areas that are at a competitive disadvantage — their population densities are too low to entice major, national broadband providers into making the needed network investments. Recognizing this reality, NAEC has expanded its business operations to include fiber broadband services, maintains a single service territory for electric and fiber services, shares administrative services to minimize overhead costs, and utilizes its newfound communications bandwidth and speed to enhance electric operations in ways it could otherwise not afford to do. While NAEC may not have developed a formal business plan for its entry into broadband communications services, all indications are that the co-op's new business can stand on its own two feet financially. The fact that NAEC was able to obtain a federal grant covering 80 percent of the network's capital cost was significant. Hopefully that door will remain open for other electric cooperatives seeking to follow suit.

⁴ 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

⁵ For those interested in a technical explanation of this form of PON, refer to: <https://community.fs.com/blog/centralized-splitting-vs-distributed-splitting-in-pon-based-ftth-networks.html>

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