Building Community Connections For the Virginia Commonwealth

Virginia utility Craig-Botetourt Rural Electric Cooperative (CBEC) deploys a fiber-to-the-premises network to improve rural broadband across the Virginia Commonwealth.

By Anthony Bednarczyk / *Fujitsu Network Communications*

As remote working and online learning skyrocketed during the pandemic, in-home data use increased by 18 percent, and internet connectivity became vital. Yet many underserved rural communities across the U.S. continue to struggle with subpar access to broadband for essential work, telemedicine, distance learning, and community services.

Roughly 25 percent of rural communities lack reliable broadband access, according to the FCC. Although the FCC and other governmental and private organizations have highlighted the need to close the digital divide, achieving this is easier said than done. Nevertheless, many utilities and municipalities have at their disposal some of the required resources, such as an installed customer base and existing rights of way, needed to build out high-speed broadband networks in small towns and rural communities – the service areas large internet service providers (ISPs) most often overlook because of low population density.

For example, although Virginia currently ranks as the 10th most connected state in the U.S., at least 12 percent of its people live in rural areas that still lack broadband access. The best hope for these residents to get faster connectivity is through local electric cooperatives.

FOR THE COMMON GOOD

In a rural area of southwestern Virginia, Craig-Botetourt Rural Electric Cooperative (CBEC) has been serving the local community reliably for 85 years, delivering electric service to residents, small businesses and family farms. CBEC also happens to be the smallest electric cooperative in Virginia.

Spanning parts of seven counties across heavily forested, mountainous terrain – much of which state or federal forestry services own – CBEC's service area has an average population density of fewer than six homes per mile. A lack of ISP service options meant that many residents and businesses were trying to manage with subpar DSL and dial-up connections that have average download speeds of 3 Mbps or less.

When CBEC recognized its members' need for essential, high-speed internet access, the utility resolved to deploy a new fiber-to-the-premises (FTTP) broadband network. But without an existing dark fiber network in place, the cooperative determined it needed a partner to help its staff of 25 build out a greenfield fiber-optic network.

CBEC selected Fujitsu as its prime broadband network and integration partner, responsible for the network design and buildout, multivendor equipment and software procurement, network and systems integration, testing and service turnup. After Fujitsu developed a broadband deployment plan for the cooperative, the next step was for CBEC to establish a subsidiary to administer the Bee Online Advantage Internet Service, as required by the State Corporation Commission of Virginia.

New Castle, VA, is home to Craig-Botetourt Rural Electric Cooperative's headquarters. Much of CBEC's service area is heavily forested and mountainous, with an average population density of fewer than six homes per mile. (Photo courtesy Wikimedia Commons)

MIND THE GAPS

Deployment began in February 2020, starting with installing the core fiber network and plans for a phased FTTP rollout. CBEC received support from the Botetourt County government to apply for grant money from the Virginia Telecommunication Initiative (VATI) program, which aims to achieve universal broadband access in Virginia by 2024.

CBEC and Fujitsu selected gigabit passive optical network (GPON) technology for the new network, with aerial all-dielectric self-supporting (ADSS) fiber cable installed on CBEC's existing utility poles. The aerial fiber simplified deployment, and only a small percentage of the poles needed to be replaced. But a broadband network deployment in rugged, mountainous terrain presents logistical challenges even under the best circumstances – and 2020 turned out to be anything but typical.

During the COVID-19 pandemic, as the cooperative members' need for essential internet access became ever more critical, CBEC board members and the local county government quickly decided to extend the project beyond its original scope. In October 2020, the rollout footprint was expanded and the time frame for deployment was expedited to meet the end-of-the-year deadline to qualify for CARES Act funding.

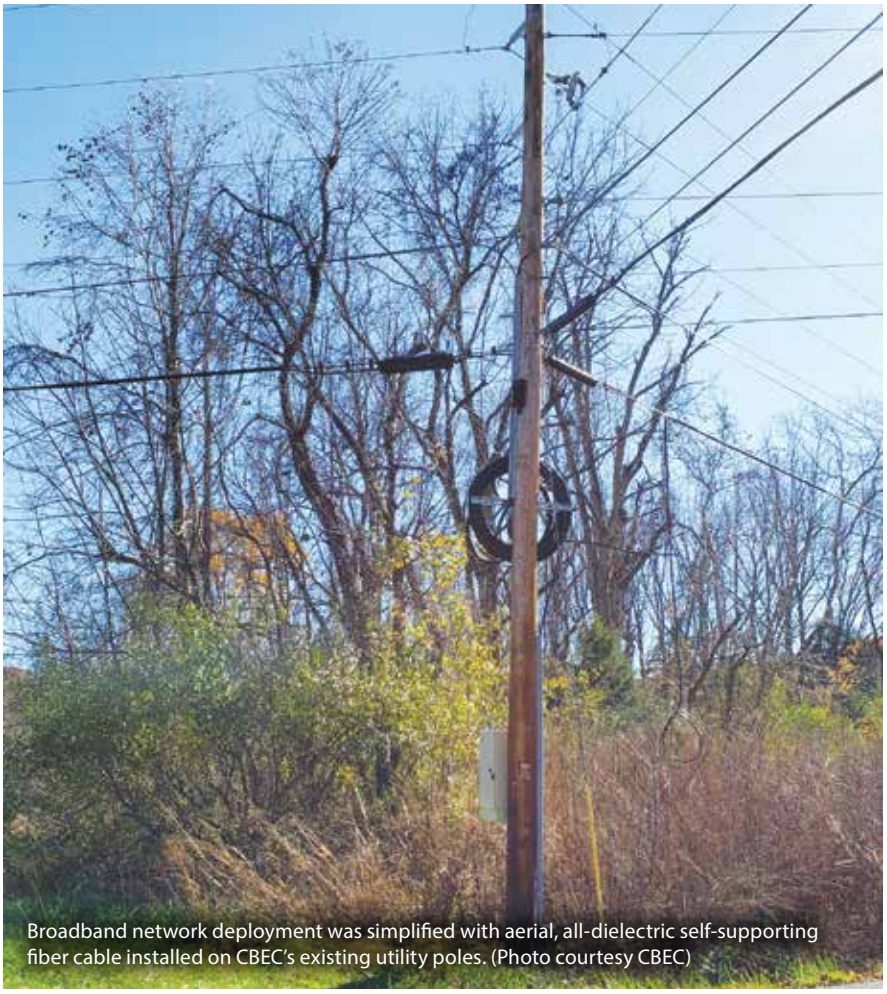
With less than eight weeks to complete phase two of the network buildout, project managers needed to mobilize resources and synchronize project elements quickly. However, the tight timeline for deployment was further compounded by the ripple effects of the ongoing pandemic.

"The pandemic has impacted not only our global supply chain but also the resource availability of many of our partners," said Greg Manganello, senior vice president and head of wireless and service solutions of Fujitsu Network Communications, Inc. "When customers select Fujitsu, in addition to getting our digital transformation experts, they also get access to our supply chain professionals. In this case, they teamed extremely closely with our ecosystem partners to secure the right components, materials and delivery time frames. Then our in-house program managers aligned deliveries with our resource plans to complete the network deployment and integration within the accelerated timeframe."

CHANGING THE TRAJECTORY

Despite the challenges of geography and a broken supply chain, the first two phases of the new CBEC broadband network, covering 53 miles, were completed by the end of 2020. The new FTTP service offers speeds up to 300 Mbps, passing nearly 750 homes and small businesses. About 10 months after the service became available, the cooperative had achieved a 42 percent subscription take rate for its internet and digital voice over IP services, and the subsidiary had become self-sufficient.

"We have achieved a great milestone within the first year, and the delivery of



Broadband network deployment was simplified with aerial, all-dielectric self-supporting fiber cable installed on CBEC's existing utility poles. (Photo courtesy CBEC)

The fiber optic cable is split in the fiber distribution hub (pictured) to allocate broadband service for each home or business. (Photo courtesy CBEC)

improved broadband is a driving force for future economic development in our community," said Jeff Ahearn, CEO of CBEC. "The main challenge was not the demographics in our area, but rather having the economies of scale."

Fujitsu worked closely with CBEC to help train CBEC's technical support staff to manage and troubleshoot a fiber optic network and to set up new subscribers before transitioning network management entirely to CBEC. In one instance, a CBEC technician was able to gain hands-on learning by shadowing several Fujitsu engineers as they investigated and repaired some initial issues in the field.

"We were up against a pretty tight deadline to complete the network and turn up subscribers, but once we got past the growing pains, it became second nature," said Ahearn. "We were able to cross-train existing staff, and now we feel comfortable with our current processes."

Since turning up their network, CBEC has heard from several of its cooperative members about the impact of broadband connectivity in their community. For example, a homeowner who had been planning to sell chose to stay now that broadband service is available.

A teacher trying to teach from home during the pandemic found that posting assignments and conducting online classes over virtual video and audio platforms was nearly impossible because of latency issues and unstable connectivity. In fact, before gaining access to broadband at home, she had to go to school to access the internet.

"We have numerous testimonials from small business owners who were not able to start their businesses until they had our service," commented Ahearn. "We're also hearing from realtors that there's strong potential for future business and residential development in the area that didn't exist before."

"High-speed broadband service changes the trajectory of a community's economic prosperity," said Manganello. "CBEC members can now get online; work, study and shop remotely; and participate equally in the benefits of the digital economy while staying at home."

Based on the improvements it has delivered to the community so far, CBEC is looking forward to planning and implementing phase three of its broadband network to reach nearly 20 percent of its service territory. However, even now, the smallest cooperative in Virginia already has made a significant impact. ❖

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