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Broadband Case Study:

Cooperative Profile

Central Virginia Electric Cooperative (CVEC) serves about 32,000 electric members in portions of fourteen counties in central Virginia (see Figure 1) between Charlottesville and Lynchburg. Its service area runs from the foothills of the Blue Ridge Mountains, through rolling hills and forests, to the flatlands along the James River. With a density of about eight electric meters per mile, CVEC is fairly typical of NRECA cooperatives nationwide.

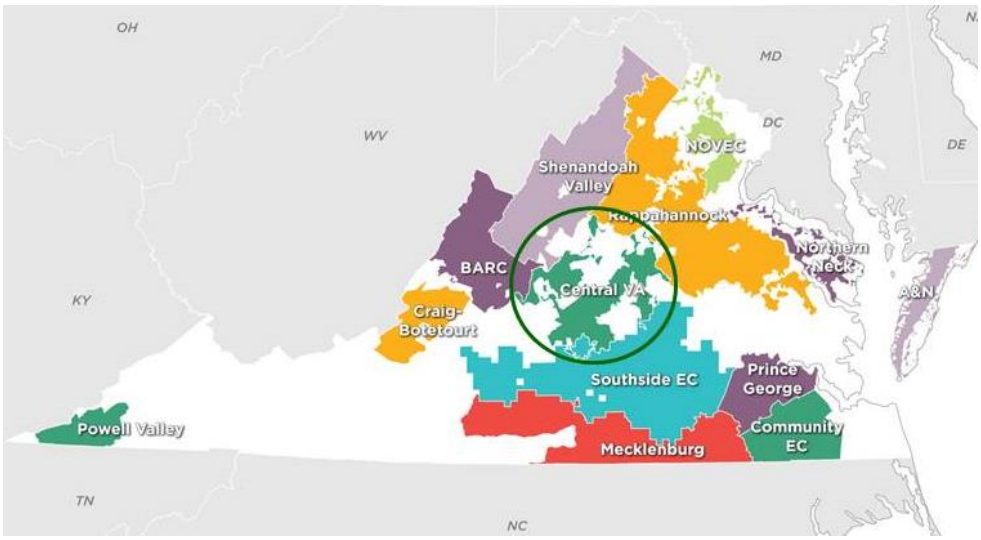

Figure 1. Location of Central Virginia Electric Cooperative.

CVEC has been in the communications business since 1997, operating a subsidiary called Central Virginia Services, Inc. (CVSI).[1] In the early days, CVSI offered dial-up Internet service in response to the lack of local Internet options available to CVEC's members. The service garnered more than 2,500 customers, about 10 percent of the electric membership. However, by 2004, CVEC recognized the need for faster Internet service and allowed Alabama-based IBEC to offer higher speed Internet access using a broadband-over-powerline (BPL) solution over CVEC's electric system. Unfortunately, problems with the technology caused IBEC to close its doors and cease operations at the end of 2010.

[1] CVEC was instrumental in gaining passage of the 1996 Virginia statute that allows electric cooperatives to have subsidiaries.

With IBEC withdrawing, the cooperative began looking for "anyone who is committed to serving rural space for broadband," in the words of Greg Kelly, CVEC's member services manager at the time. This included waiving pole attachment fees for any company that would extend broadband Internet access to the co-op's entire membership, as several other co-ops in this NRECA series have done. But, by 2017, it began to appear inevitable that the co-op would have to address the problem of unserved and underserved members by itself.

A Request for Information (RFI) was issued by the co-op in search of a company willing to provide broadband communications in support of CVEC's electric operations, but the outreach produced no viable responses. That same year, a fiber feasibility study was commissioned by CVEC. Study results painted the fiber investment fundamentals as "marginal" with seven years to positive cash flow and eleven years to break-even. Nevertheless, CVEC's board gave the go-ahead for a one-year pilot program to pin down construction costs and member interest. Firefly Fiber Broadband was born.[2] Given the limited nature of the board's authorization, CVEC's managers went on the hunt for what they refer to as "alternative financing" — a portfolio of grants, low-interest loans, donations-in-kind, and anything else that might help improve the investment economics.

The rest is history. In late 2018, CVEC landed $28.6 million in the form of a ten-year grant under the Federal Communications Commission's Connect America Fund (CAF-II) reverse auction.[3] Further financial support was received in the form of $1.6 million in Virginia tobacco settlement funds (combination of 2018 and 2019 grants), $943,745 from the Virginia Telecommunication Initiative (VATI)[4], along with funding and tax waivers or refunds from multiple counties in which CVEC operates. A $66 million Smart Grid loan from the U.S. Department of Agriculture's Rural Utilities Service provided the remainder of the needed investment capital to get the project started. Nelson County even agreed to transfer ownership of 75 miles of 144-count fiber to the cooperative. CVEC's original estimate of seven years to cash-flow-positive operations improved substantially as a result. The co-op now projects that milestone could be reached as early as 2020, a short two years into the deployment of its fiber network. Total expected cost of the fiber network is $110 million, by far the largest project the co-op has ever undertaken. It will take up to five years to string the 4,700 miles of fiber-optic cable needed to reach all of CVEC's 32,000 members.

Business Drivers of the Broadband Investment

CVEC's recognition that its members needed faster and more reliable Internet access coincided with a desire to ramp up communications for electric grid operations. As CVEC's president and CEO Gary Wood puts it, "We decided we needed high-speed communications for enhanced electric operations. That need merged with the problem of lack of adequate Internet access by our members." The new fiber network will enable CVEC to better incorporate smart grid technology into its daily operations, improve the integration of distributed energy resources, and help lower power costs through interactive energy

[2] Firefly Fiber Broadband is CVSI's doing business as (dba) or trade name for marketing purposes.

[3] https://www.fcc.gov/auction/903

[4] CVEC received two VATI grants in 2019 totaling $943,735, in partnership with Albemarle and Fluvanna counties. https://www.governor.virginia.gov/newsroom/all-releases/2019/march/headline-839788-en.html

management programs. High-speed, near-real-time communication with reclosers on the system will reduce outages and improve outage response. CVEC's interaction with smart thermostats and other smart devices in members' homes over its fiber network offers load relief on peak demand days. More generally, increased bandwidth for communications within CVEC's system will improve efficiency, increase reliability, and expand security. A quick look at CVEC's existing communications infrastructure bears this out. Single-channel radio systems, as well as leased lines, are still in use at some substations. According to Wood, radio has not always been reliable in the foothills and leased lines are not 100 percent dependable. He expects fiber broadband to fully resolve these issues.

Project Overview and Deployment Approach

CVEC has embarked on a fast-tracked fiber deployment, scheduled for completion within five years. Early phase fiber construction is shown in Figure 2. The initial phase of the buildout, which involved one substation and began in September 2018, totaled 167 fiber-miles passing 1,650 members. About 700 have already subscribed and are connected. The co-op is currently underway on its second substation, which will have 400 miles of fiber and pass 3,400 homes, with almost 1,300 signed up for service already. CVEC has built about 290 miles of the backbone for the second substation. Between the first substation area and the second substation area backbone, about 450 miles of fiber is currently in place. Appomattox County is the first stop in the deployment schedule, as 50 percent of residents currently are reportedly underserved for Internet access and CVEC received its first grant to build in this location. The co-op's phasing plan prioritizes areas that are the densest and have the lowest cost to serve, in order for CVSI to generate revenue as quickly as possible.

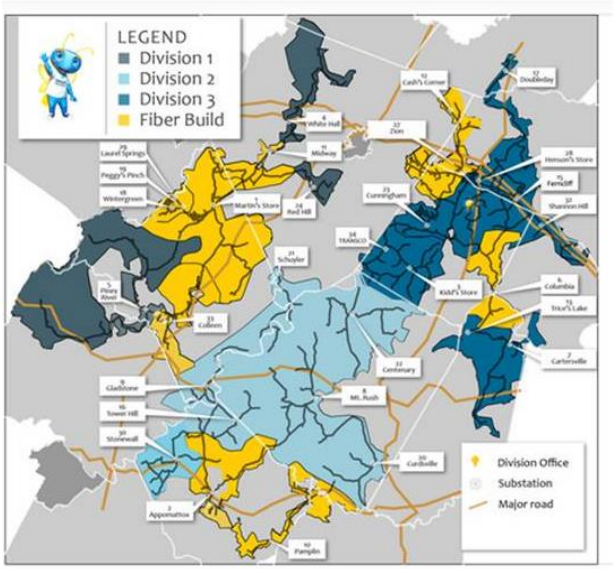

Figure 2. CVEC's planned buildout through summer of 2020.

Broadband Business Case

Undertaking a massive, $110 million fiber network project required CVEC to create a financing portfolio that included the $66 million Smart Grid loan, the $28.6 million CAF-II grant and subsidies, grants, tax incentives, and in-kind donations amounting to another $10 million. And, as noted earlier, the co-op is

intent upon sequencing the network rollout in a way that enables Firefly Fiber Broadband to generate subsantial revenues early on. About $30 million had been spent by mid-2019. Thanks largely to the positive effect of the CAF-II grant, positive cash flow is now expected sometime in 2020, just two years after the project launched. Take rates have been quite favorable — on two of the first three circuits in Appomattox County to which fiber was added, more than 50 percent of members signed up. On the third circuit, which covered an area with a Digital Subscriber Line (DSL) provider, the take rate still exceeded 40 percent.

Broadband Business Model

CVSI, dba Firefly Fiber Broadband, is a wholly owned, for-profit subsidiary of CVEC. Net profits from the fiber broadband business, when they occur, will be returned to CVEC members. There are clearly defined lines of asset ownership and equally well-defined business relationships. CVEC owns the fiber network as an integral part of its electric distribution infrastructure, and leases it to its subsidiary CVSI, which in turn operates the network and provides communication services to CVEC and collects a service fee.

As far as staffing, Wood serves as the CEO of both CVEC and CVSI; however, the subsidiary has its own general manager. CVSI also has its own dedicated manager of customer service, network engineering manager, and a fiber operations manager, plus its own customer service representatives and installers. The current CVSI staffing level is 15 and that is expected to climb to about two dozen over time. Wood notes that personnel of the subsidiary and the parent cooperative are not allowed to share customer information under Virginia regulations, as that might create an unfair, competitive advantage. Accordingly, firewalls protect customer information and prevent the cooperative from sharing sales leads.

What about shared services? Shared services are acceptable under state regulations, as long as the subsidiary fully reimburses the cooperative for the services received. CVEC provides marketing support as well as human resources, IT support, and back-office services to CVSI, for which it charges the subsidiary. Figure 3 indicates the level of creativity being applied to marketing the new, retail broadband services.

Figure 3. “Flash the Firefly,” one indication of CVSI’s innovative marketing approach.

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Much of the work associated with the fiber network deployment is being handled by outside contractors. According to Wood, the co-op contracts out as much as possible "to move at speed" with its deployment. Conexon is CVEC's design partner and the project manager for fiber construction and make-ready (necessary preparation) work.[5] Several local electrical contractors handle the make-ready work itself. S&N Communications is the lead fiber contractor.[6] In contrast with many other co-ops' approaches, make-ready engineering and material management for the project are also contracted out.

Network Architecture

CVEC's broadband network is 100 percent fiber-to-the-home, with a Gigabit Passive Optical Network (GPON) architecture using the Calix platform, similar to many of the other cooperatives featured in this NRECA broadband series.[7] Fiber-optic cable is strung overhead or underground, following how CVEC's electric lines run. The majority of fiber will be overhead. CVEC is placing the fiber in the electrical space on its poles, 10 to 24 inches below the system neutral, rather than in a separate space reserved for communications equipment. Wood reports that this approach costs much less than building in a separate space further down the pole.

Market Setting

When CVEC decided to undertake a fiber broadband pilot program in 2018, only about 900 of its members had access to fiber broadband service, despite the presence of several major, Internet service providers. Verizon (fiber, DSL, or wireless, depending on location) and CenturyLink (cable) operate in parts of the service area, as does Viasat (satellite). DirecTV (satellite) also has a local presence.

Wood points out that it was not solely lack of access that precipitated CVEC's decision to launch its broadband service, "It wasn't that homes, businesses, and public facilities like schools and libraries weren't connected. Many who were connected paid what we consider to be exorbitant prices for the luxury of broadband access. Our fiber broadband offerings bring those prices down by orders of magnitude, especially when one considers the often dramatic increase in download speed and reliability that comes with fiber. Price savings that facility managers have been able to realize are very compelling to the counties we operate in."

CVSI/Firefly Fiber Broadband offers Internet access with speeds from 100 Mbps (Megabits per second, symmetrical upload/download) to 1 Gbps (Gigabit per second, with 100 Mbps upload) and VoIP telephone service, either bundled with Internet access or separately. The business does not offer video programming as management views this as the service with "the lowest margins and the most complaints." Wood emphasizes that "we are continuously telling our members about over-the-top programming (OTT) that enables video streaming from the Internet in order to raise their level of awareness."

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[5] https://www.conexon.us/

[6] http://www.sncomm.com/

[7] https://www.telecompetitor.com/central-virginia-electric-cooperative-isp-subsidiary-to-launch-broadband-on-calix-platform/

Measurable Community Impacts

CVEC's broadband initiative promises to drive down costs at county facilities by a significant amount. Buckingham County Public Schools, for example, has been paying $78,600 per year for 100 Mbps service. The new service from CVSI/Firefly Fiber Broadband is significantly faster at a fraction of the cost. The fact that county budgets around central Virginia will all benefit from the coming broadband has made county authorities receptive to CVEC's requests for financial support and/or tax relief, as noted earlier. Educational systems are affected in other ways as well.

According to Melissa Gay, CVEC's Communications and Member Services Manager, it is a case of "past tense versus present tense." She observes, "Teachers can now do their lesson plans at home. Students who have school-issued Chromebooks can finally use them at home. Beyond education, people who used to have to drive an hour to a clinic can now receive medical attention remotely through telemedicine. Small business owners can stop renting office space simply to get good Internet service. Businesses and retail stores that might have considered moving out because they could not compete without high-speed Internet service now have an affordable option. Fiber broadband has wide ranging and positive impacts throughout the community."

The economic development effects of fiber broadband have not gone unnoticed either. Wood says, "Realtors are among the first to pay attention when you announce you are bringing in broadband Internet service. It makes properties more valuable when selling time comes and more attractive to rent. High-speed Internet is a critical differentiator for Airbnb and other online property rentals.

Lessons Learned

What is Wood's advice to his fellow co-op CEOs? "Get a good night's sleep before you start a large-scale broadband deployment and open a broadband services business. Think carefully about the future, especially if you have hesitations, and don't jump into it. There will be tough decisions, and success takes time." He quickly adds, "But, the rewards are reminiscent of what happened with rural electrification in the 1930s."

Why is this Case Important?

Taking on the largest, most expensive project in the history of your electric co-op is not for the faint of heart, especially when external financing has not yet been lined up to help underwrite the capital cost of a new, fiber broadband network. Yet, that is exactly what CVEC did. With nothing but a projected revenue stream for the new business, along with operational cost savings and improved member programs, CVEC's board approved the initial, one-year phase of a system-wide fiber network and challenged the staff to find revenues or cost savings that would move the business case from one with a marginally acceptable payback to being a secure investment for the members.

Within a year, Wood and his managers successfully landed enough outside funding in the forms of grants, loans, and other subsidies to make full-scale deployment financially viable. Is the pipeline of federal grant money for rural broadband open-ended? Probably not. But, CVEC's experience suggests that a portfolio of alternative financing sources can go a long way toward building the business case for broadband.

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