

Broadband Case Study: Valley Electric Association



Cooperative Profile

Valley Electric Association, Inc. (VEA) supplies electricity to a population of 45,000 in southern Nevada, with a small footprint in neighboring California. The cooperative's 18,500 members are spread out over 6,800 square miles as shown in Figure 1. VEA's headquarters is in the town of Pahrump, Nevada which, according to Wikipedia, had no telephone service until the 1960s except a radio transmitter in a phone booth next to the small market. At that time, there were also no paved roads in or out of the Pahrump Valley.¹ Thanks to economic growth radiating outward from Las Vegas, the area now boasts a healthy level of new construction – and, thanks to VEA's culture of community support and forward-thinking employees, the membership area is also now in the midst of an ambitious project to deploy broadband Internet access, digital TV, and telephone service. Since its launch in 2015, Valley Communications Association (VCA), a wholly owned VEA subsidiary, has built a wireless network as an interim broadband solution while it deploys an area-wide fiber broadband network. Some 8,800 VEA members, about half of the co-op's total membership, already have broadband Internet access with access speeds of 25 megabits per second (Mbps). Coming in the future are fiber-optic connections that will deliver speeds of 50 Mbps for basic service and up to 1 Gigabit per second (1 Gbps, or 1,000 Mbps). In the process, the town of Beatty became the first all-fiber community in the state of Nevada and VCA won the prestigious Cornerstone Award, which recognizes the most notable deployments of the fiber-to-the-home in the U.S. and abroad.

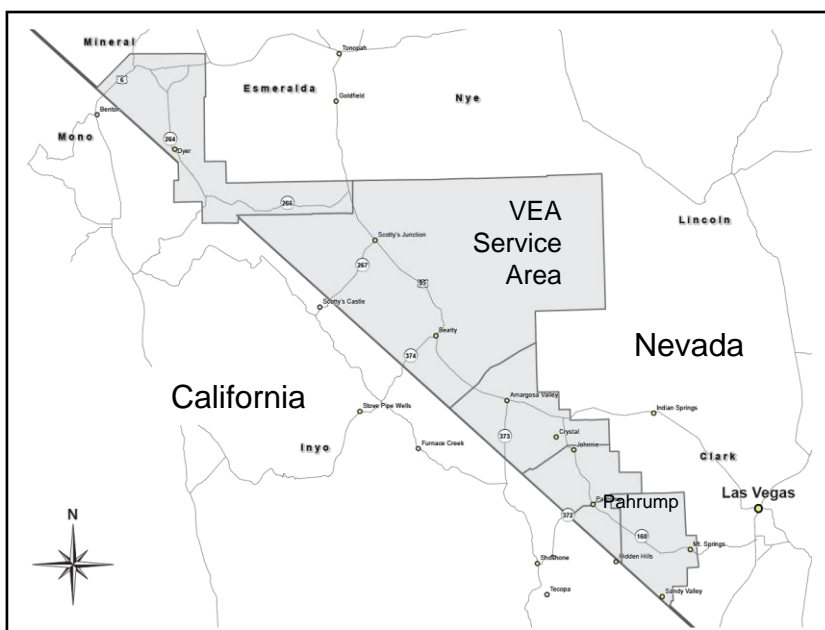


Figure 1.
Valley Electric Association's
Electric Membership
Area

¹ https://en.wikipedia.org/wiki/Pahrump,_Nevada

Business Drivers of the Broadband Investment

As part of a 230-kilovolt transmission line VEA was building in 2012, a fiber-optic communication system was deployed in the static wire (Optical Ground Wire or OPGW)² for the purpose of substation and protection system communications. For VEA, this begged the question: What else can we do with fiber? According to VP of Broadband Nate Johnson, Internet service in Pahrump had been very poor for years. Johnson notes, “VEA began to consider using its fiber network as a backhaul for the local Telco and wireless providers to help increase their capacity.” At about the same time, VEA was involved in a pole attachment agreement and build for a federal Broadband Technology Opportunities Grant-funded, long-haul fiber connection between Las Vegas and Reno, approximately half of which would pass through the co-op’s service territory. VEA turned to studying whether to become a provider of broadband services throughout its service area.

CEO Angela Evans attributes the idea of building a 100 percent fiber-to-the-home (FTTH) system to VEA employees, saying “Our corporate culture encourages staff to come up with creative ideas — we like to take on innovative projects.” But, building a fiber broadband network takes time and money — lots of it. So, to meet the immediate needs of members while the FTTH system was being deployed, the co-op’s new subsidiary, VCA, designed and deployed a fixed-wireless solution in a relatively short period of time to serve the majority of its members. Tower construction began at the end of 2015 with subscriber installations beginning in July of 2016. The goal was to sign up 8,000 subscribers (approximately half of VEA members). Installations were ongoing while towers were being constructed and fiber backhaul was being deployed, with 7,500 subscribers being connected within eighteen months. By October 2018, VCA had reached 8,813 subscribers. Evans emphasizes that the investment is not just for members needing better Internet access. “With the advanced meters we now have in place, and with our broadband communication network, we are planning for next generation analytics that will greatly enhance service reliability and the member experience.” VEA’s fiber network is being used for SCADA (Supervisory Control and Data Acquisition) system communications, and the cooperative is looking at new Smart Grid capabilities to unlock now that high-speed, low-latency communications are in place.



Figure 2. Running underground fiber



Figure 3. Installing a fiber drop

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² Optical Ground Wire is a dual functioning cable, meaning it serves two purposes. It is designed to replace traditional static / shield / earth wires on overhead transmission lines with the added benefit of containing optical fibers which can be used for telecommunications purposes. Source: <https://www.aflglobal.com/Products/Fiber-Optic-Cable/Aerial/OPGW.aspx>

Project Overview and Deployment Approach

VCA is pursuing an expedient approach to deploying broadband — building a wireless broadband network first as an interim, stopgap measure to satisfy members’ hunger for better Internet access, telephone, and TV services, to be followed by a multi-year deployment of fiber infrastructure as the long-term solution. VCA began providing wireless broadband service in July 2016, and within a year and a half had completed its WiMAX tower deployment. Wireless broadband currently covers approximately 95 percent of Pahrump and five other Nevada towns, as well as a small penetration in two towns outside VEA’s service area. Deployment of the fiber broadband network focused initially on Pahrump, the largest town in VEA’s electric service territory, due to its density. Coverage is being extended to smaller, more rural districts as licensing and regulatory hurdles are overcome, moving from north to south. Contractors building new homes have crowded into VCA meetings to learn how to expedite installation of fiber drops. The fiber backbone is already in place.

“To meet the need for broadband more quickly, we began flooding our service territory with wireless connectivity while continuing to methodically build our fiber optic network.”

Nate Johnson, Executive VP of Broadband
Valley Communications Association

Broadband Business Case

The capital cost of currently deployed broadband infrastructure (wireless and fiber combined) is approximately \$46.5 million with an expected annual operating cost of \$6.25 million. According to Evans, the broadband network is being financed through normal co-op financing channels and without the help of grants. The parent company provides the funding for VCA, assisted by growing cash flow from the broadband business itself. Monthly recurring revenues are currently \$510,000. Additional business benefits come from digital service offerings, IPTV and VoIP,³ and access to the long-haul DWDM network.⁴ Payback on the investment is expected in seven years. Financial benefits accruing to VEA from its use of the broadband network for internal, operational requirements have not yet been fully quantified.

Broadband Business Model

VCA is a wholly owned broadband communications subsidiary of VEA and co-op members receive patronage capital in VCA revenues. VCA owns and operates the broadband network and has the ability to provide services beyond VEA’s traditional electric service territory, although this aspect of broadband operations is minimal so far. Intercompany agreements define boundaries between the communications and electrical infrastructures. Some thirty personnel are dedicated to the broadband business, while other resources are shared. VEA’s move into broadband services resulted in a 15 percent increase in staff from

³ Internet Protocol TV and Voice over Internet Protocol, digital versions of services previously delivered over wire or cable.

⁴ Dense Wavelength Division Multiplexing (DWDM) is an optical multiplexing technology used to increase bandwidth over existing fiber networks. Source: <https://www.advaoptical.com/en/products/technology/dwdm>

142 to 163. All departments have been impacted by the move into broadband services due to increased workload.

Network Architecture

VCA's broadband network combines fixed wireless and fiber-optic technologies. The core wireless network is by Nokia, with Nokia network gear on towers. Last mile equipment is supplied by Radwin. Use of Radwin's JET PtMP Beamforming solution enabled VCA to roll out its wireless network and connect 6,000 members in just one year.⁵ As noted earlier, backhaul to the core network is fiber. The wireless network enables 25 Megabits per second (Mbps) symmetrical service. Evans notes that VCA will be conducting a test of Internet speeds that may lead to better Internet service for its wireless consumers. "We have found the 25/25 Mbps download/upload ratio to be inefficient, since most consumers download far more content than they upload. Increasing one while decreasing the other should improve the service."

Wireless Network Project Highlights

VCA has deployed to-date:

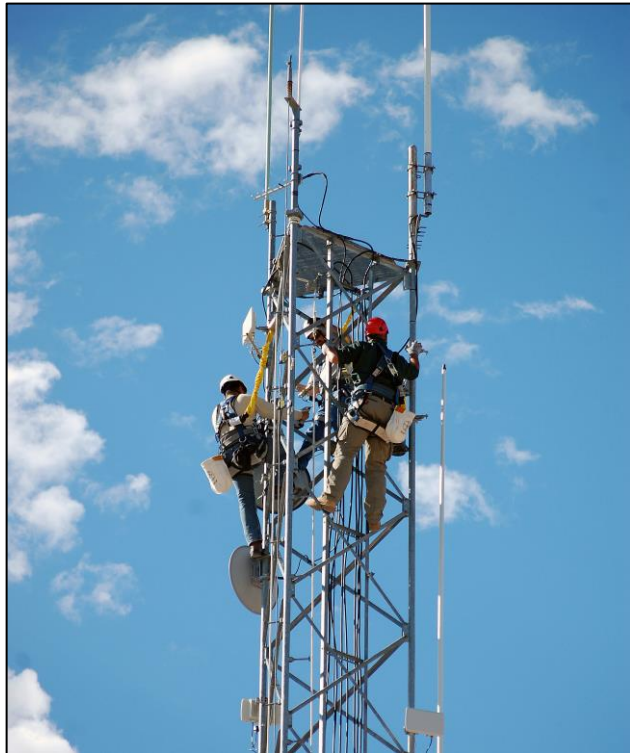
- Hundreds of RADWIN JET PRO 750 Mbps base stations with Bi-Beam Beamforming antenna.
- Thousands of subscriber units - 25 Mbps, 50 Mbps and 100 Mbps.
- Service area - 6,800 sq. miles along the Nevada-California border.
- Spectrum band: 5 GHz.
- Service package offered: 25 Mbps symmetrical.
- JET provides high-speed broadband to over 6,000 business and residential customers, with a forecast of serving over 20,000 customers with JET.
- JET delivers high-speed, reliable broadband even with high over-subscription rates.

--Table courtesy of RADWIN Ltd.

⁵ A case study on VCA's use of Radwin's technology solution is available for download at: <https://www.radwin.com/utilities/>

Figure 4.
Working on a tower
during deployment of the
wireless network.

Photo courtesy of
Valley Communications
Association. ©2018.
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Regulatory and Tax Issues

Because VCA is a subsidiary of VEA, there are no limitations on pole attachments, at least from a regulatory standpoint. However, the electric system required a significant amount of make-ready work to accommodate pole attachments due to its age and clearance issues, some of which were created by pre-existing pole attachments by other communication companies. CEO Evans reports that engineering of VEA's poles must now take into consideration the combined weight of multiple communications carriers co-locating their equipment. She adds that the cooperative is very conscious of continuing to meet the 85/15 income rule to maintain its tax exempt status.

“One component of our system out of the norm involves our use of the electric infrastructure to directly support the broadband deployment. Not only were pole attachments needed for the fiber backhaul between towers, but existing electric poles were changed out with 70’ poles to support the WiMAX radio equipment above the power lines, thus creating many towers. This allowed VCA to deploy several towers in any given geographic area giving subscribers line-of-sight to several towers for the best signal and bandwidth. The replacement poles were paid for by VCA as part of the project, using in-house labor reduced costs, and the ongoing pole attachment revenue is paid to VEA by VCA through intercompany agreements.”

Nate Johnson, Executive VP of Broadband
Valley Electric Association

Market Setting

Competition among broadband service providers exists in VCA's target areas; however, VCA believes the speed and bandwidth it offers are superior to that offered by others, whose speed in some cases is less than 5 Mbps. VCA offers Internet access speed of 25 Mbps through its current wireless network and up to 1 Gbps (Gigabit per second) as fiber connections become available. VCA management believes that the trust VEA members have with the electric co-op is also a factor in the high adoption rate VCA has achieved to date. Alternative providers of Internet access and digital services in the area include AT&T (fiber, DSL and fixed wireless), CenturyLink (DSL and fiber), Frontier (DSL and fiber) and Spectrum (cable). Satellite providers HughesNet, Exede and Viasat also operate locally.

Why is this Case Important?

VEA has adopted an innovative approach to rolling out broadband services to its members. Recognizing that deployment of a fiber-optic network will take years and cost many millions of dollars, the co-op built a fixed wireless network in near-record time using existing poles strategically to maintain signal strength throughout its target areas. This enabled more than 8,000 early subscribers to the co-op's new broadband service and produced monthly cash flows that help cover cost outlays—a new twist on “pay-as-you-go.” Fiber connectivity is the future for Valley Electric Association and its new broadband subsidiary, but high-speed wireless Internet access is paving the way.

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