



THE CO-OP'S BROADBAND PLAN FOR SUCCESS

COMMUNITY BROADBAND SNAPSHOT REPORT™

By Craig Settles, President, CJ Speaks

Introduction

In the battle to deploy broadband, cooperatives (co-ops) can be a decisive force to cover the rural flanks in states with aggressive broadband adoption goals such as California, New York, and Minnesota. In the more rural states, or ones without stated commitments to broadband, co-ops may have to carry the lion's share of responsibility if their rural communities are to have a hope for broadband.

This report will help you make the business case for your local co-ops building broadband networks. It doesn't give you all the answers, but it does point you in the right direction with some questions you need to answer.

Co-ops ultimately exist to meet members' needs, and currently there's a burning need for broadband within communities across the nation. There are two ways for co-ops to address the need for better, faster community-owned broadband networks: the problem-solving approach and the creation-oriented approach. Both can work. But the latter may give you more return on your investment.

People use the problem-solving approach often, when they want something to go away. "Make my taxes go away." "Unemployment is too high!" "Can we close the digital divide?" Things can get contentious. The problem might not even get fixed. Or the original problem comes back when the money runs out.

When it comes to broadband, the problem-solving approach sometimes fosters a mindset of "just build it (fix the problem) and they will come." Build 'x' number of towers, lay so many miles of fiber, or give large incumbents truckloads of tax dollars and they will somehow magically generate residential customers.

On the other hand, with a creation-oriented approach, you bring something new into being. There's a lot of energy you can get through group brainstorming. Or an approach similar to President John F. Kennedy's in the 60's, who presented the vision of going to the moon in 10 years, and challenged those around him to create the best way to make it happen. You create an incredible vision with lots of people contributing to it because they can be a part of the dream.

Rural Danville, Virginia in 2006 had two problems:

unemployment was 19% and the available broadband options were dismal. They could have deployed some fiber and solved the problem of lack of adequate broadband. But they went further and leveraged the network to draw new industries to town. They retrained tobacco industry employees. They networked area medical facilities and physicians into a medical community that attracted companies and people. And they lowered unemployment to 9%.

Many communities probably differ from Danville, but the various co-op and community leaders interviewed in this report would agree that having the network is essential, and it solves a problem. But what their communities create with the network is how they'll achieve maximum return on the infrastructure investments.

With a creation-oriented approach, a broadband-driven solution such as telemedicine services, may motivate and drive support more than a goal built around a gig speed. It's great to have fast speed when all you have currently is dial-up. But more people will support – and fund – a community asset that creates more education opportunities, improved access to healthcare, facilitates innovation or fuels start-ups.

The following pages help move you down the path to creating a vital community asset. Even if all the community desires is a faster, affordable network, then the ideas, insights, and tips presented here will help you do that as well.

I. Identify the Need, Identify Revenue / Funding

This report is targeted to both those who build broadband infrastructure and to those who use the broadband infrastructure, its applications, services, and technologies to build business— everything you do with the finished network to make it a community asset. Some of the same people carry out both roles.

Nonprofit organizations dedicated to serving membership's needs, electric and telephone co-ops can amortize buildout costs for 20 or 30 years, and are not driven by the "shareholder profits" mindset. This is a key reason co-ops can offer members affordable and fast broadband services.

That said, co-ops should want to have every individual, business, and organization possible using their broadband services in order to build revenue streams. This helps fulfill their mission of serving all of their members, plus it isn't cheap building broadband infrastructure, especially in sparsely populated areas. It is probably a safe bet that Federal agencies won't provide broadband stimulus grants as they did eight years ago.

Whether co-ops and other community stakeholders create network needs assessments, business plans, or marketing plans, it is helpful to divide a community's broadband needs into four categories. It is assumed that many co-ops also have, or will need, broadband infrastructure to meet their own data and voice communication needs. The categories are:

1. Increasing the efficiency and reach of local government services while decreasing data and voice communication costs
2. Improving local economic development
3. Boosting the gains made from education technology investments
4. Facilitating telemedicine and healthcare delivery

When constituents from each of these categories come together and explore the potential impact that unlimited affordable bandwidth can have, the process of assessing needs or planning should improve. Expect brainstorming to produce far-reaching lists of ideas, tasks, network applications, innovations, or solutions to problems resulting from a lack of affordable Internet access.

These categories also represent avenues to money. As constituents gather ways they can benefit thanks to faster broadband, they rack up more reasons to buy services from the co-op's network. Each time members create broadband innovations, that's another group of pre-sold network subscribers. The co-op advances its mission of serving members and recruiting additional members while generating revenue.

Furthermore, government agencies, foundations, philanthropic groups, research institutions, corporations, even wealthy people who want to give back to the community, will fund innovative applications. There are a number of examples, some of which include the FCC which has grants for broadband-driven rural healthcare. The Department of Transportation funds innovative traffic solutions. Corning Glassware underwrote broadband infrastructure in rural upstate New York. John Deere has supported community networks because so much of their farming equipment is Internet- and Wi-Fi-enabled.

As you assemble constituencies from the four categories,

the primary questions you want general constituents to answer are:

1. What kind of broadband service do they have currently?
2. Are these services meeting constituents' needs?
3. How will meeting these needs impact constituents quantitatively and qualitatively?
4. What would they do with better broadband?

You can have multiple brainstorming sessions hosted by various stakeholders. The following are examples from various co-ops of their approach to building and implementing broadband use, many of which may inspire ideas.

Local Government

Local governments typically have pressing communication and business operations needs that community-run networks can address more effectively than the giant telecom companies can. This makes government a strong potential customer on the network, adding significantly to the financial sustainability of the network. This Gigabit Nation, one-on-one radio interview¹, with Christopher Mitchell, a director with the Institute for Local Self Reliance offers a valuable breakdown of the various ways local governments are valuable stakeholders.

Local governments can open doors to grants from various Federal and state agencies to pay for broadband construction. The city of Columbus, Ohio, received a grant from the DOT for almost \$8 million to replace its aging, proprietary traffic signal systems with a more flexible system built on the backbone of fiber optic cable and wireless communications technologies. The city contributed \$750,000. That means its IT department has fiber running to every traffic light in the city – fiber IT could not otherwise have afforded.

Also, many of these agencies have been executing "dig once" rules that facilitate laying fiber conduits for any project in which they have to open the ground. Coordinating with local government and co-ops could lead to significant savings since trenching can be the biggest cost in deploying networks.

There is a strong case for local government partnering with co-ops, especially if the cities or counties own the public utilities. Local governments have dozens of rules and regulations that project teams have to navigate, avoid, comply with and leverage in order to finish the network buildout and maximize the technology. If you partner with the government, or provide discounted services, streamlining or eliminating some of these rules may become possible

Anza Electric Cooperative has a 550 square-mile service area that takes in a large part of Riverside County in Southern California. The county is undertaking a massive broadband buildout that includes a couple of dozen cities. "Anza has partnered with the county by providing dark fiber services countywide," says co-op General Manager Kevin Short. "In addition, Anza will provide broadband services to county government properties, its transportation systems, emergency communications systems, and other county operations."

The City of Niles, Michigan built its own backend infrastructure in 2012. "Our purpose was to hook up all of our city buildings to the network," says Jeff Dunlap, City Utilities Manager. "After doing a needs assessment, we determined it was too costly for us to build fiber to the doorstep of the businesses in our industrial park. So we looked to Midwest Energy Cooperative."



"We gave Midwest some property in one of our substations and they agreed to light up the industrial park. We don't charge them pole attachment fees and they in turn provide the connections to the businesses in the industrial park that we couldn't afford to do."

The City's population density works out for Midwest. There are 11,000 people in the city and 20 industrial park customers. The city never desired to be an Internet provider. They preferred running fiber to city premises and then leasing the lines to the co-op while letting Midwest provide the Internet connection.

In addition to the fiber loop, Niles has its own electric distribution system. The combined infrastructure was more reliable than the incumbents' original T1 communications infrastructure. Later the city decided to drop its POTs (plain old telephone) lines and use Midwest Voice over IP (VoIP) services.

Because Midwest supported the local industrial park with high-speed Internet access, the city was able to keep the businesses in town. Dunlap says, "The fact that you own an existing electric business doesn't matter very much if you're continually losing the number of people who work and live in the area."

Dunlap feels that, because the city already had fiber in place, it made it easier for Midwest to provide Internet services. "They have an obligation to serve members first, so we are mindful of Midwest's requirements and specifications when we build our part of the network. Since we own an electric utility, we speak the same language and have the same experiences."

If co-ops in general look at a working relationship with local cities and smaller towns, the mutual effort can facilitate making the high costs attributed to more sparsely populated areas become more affordable in the overall project. A city like Niles can have 40 houses per block and co-ops can have two or three subscribers per mile.

Economic Development

When determining the potential economic development impact of broadband, there are six possible outcomes to justify the cost of broadband buildout. Some return on investment is tangible and quantifiable, while ROI for things such as increased family time are qualitative and hard to measure. There are:

- Attracting new companies and organizations to your community
- Making current businesses more competitive
- Reviving depressed business districts
- Increasing home-based businesses
- Improving personal economic situations
- Reviving distressed or depressed residential communities

It helps to have neat categories in which certain concepts are spelled out or defined, goals established and work tasks assigned. When it comes to economic development outcomes that foundations, corporations, associations and public agencies will fund, these are effective categories.

Some of these outcomes will matter more than others in rural areas. Improving the competitiveness of your existing businesses and increasing home-based businesses seems to ring true for co-ops, as does using broadband to help individual economic status. However, these outcomes mean something different in rural areas as opposed to in an urban economy.

Size matters - but not how you think.

Many in the economic development profession are judged by how effectively they attract midsize and large companies. However, a co-op's first concern is about their existing members. "We have a lot of people that have home businesses. According to our survey, 20% of the 3,000 homes in the first phase of our buildout have home offices," reports Michael Keyser, CEO BARC Electric Cooperative. "They have to drive into town and set up their laptop at a café in order to work."

Some communities think big when they consider using broadband to generate economic outcomes. For example, they try to entice large companies into the area, looking to emulate the success of mid-sized cities such as Lafayette, LA and Chattanooga, TN that respectively got a large call center and Amazon to come calling. Three Lakes, WI, however, thought small. Three Lakes has about 2,200 full-time residents (10,000 at the height of summer tourist season).

Former Town Chairman Don Sidlowsky states, “We decided the best strategy to boost our economy was to use broadband to turn home offices into global operations.” He believes many broadband policymakers live in large metropolitan areas and this shapes their perceptions that the main outcomes should produce hundreds of jobs. For a town his size, a business bringing three or four new jobs into the community is a big deal economically.

His research supported Sidlowsky’s assumptions. The town’s seasonal population included a fair number of executives with annual salaries in the \$100,000 range. The committee calculated that one such individual moving to Three Lakes and spending money all year would be significant.

“Every dollar they spend might exchange hands in town eight or nine times,” Sidlowsky says. Furthermore, a high-level executive or department director could decide to set up a small satellite operation and hire several local people as support. “So we set a goal of getting five-to-ten such individuals to move here and telecommute.” This increase of satellite offices drives the need to attract or grow locally serviced businesses. Long term, this leads to a strong local economy.

Kit Carson Electric Cooperative in New Mexico, which has 29,000 members, shares Three Lakes’ economic development philosophy. CEO Luis Reyes says, “We also want to attract businesses that can be eight or ten people. This represents a noticeable impact on a small-town job market. However, if there is a downturn in the market and a few businesses lay off people or go out of business, it’s not nearly as bad as when a single huge company leaves town.”



Kit Carson started building out its network in 1999, and since then has constructed 3,000 miles of infrastructure that covers all of its members. The bulk of the buildout occurred after the co-op received a \$64 million broadband stimulus grant in 2011 to cover Taos (where Kit Carson is located), Colfax and Rio Arriba counties.

The co-op is now working with the cities and the counties to determine how it will take advantage of the economic development benefits of fiber. Kit Carson recently partnered with a ski corporation that also builds golf courses and owns a couple of hotels. “We work with another organization to offer gigabit bandwidth from a central location for the guests of the ski lodge, golf courses, etc.,” says Reyes. “This allows us to target people who want to work or play here for some amount of time, and be assured that they can stay connected to their offices.

“Some of these visitors will be candidates for a second home and telecommute from northern New Mexico. We are encouraging them to establish small and home-based businesses that support bigger businesses in California, Texas, and Colorado. Besides top-level management, we are targeting young engineers, software developers, and other professions who can work from anywhere as long as they have a strong Internet connection.”

Broadband is how ya keep them on the farm (after they’ve seen Paris).

As much as people talk about economic development in rural areas, we don’t seem to hear too much about the impact networks have on farms. Yet farming contributes significantly to local economies in rural communities. Are these observers aware how much new technologies drive farming profitability and productivity, or how much broadband access enhances that technology?

“The great majority of farms in our area of Minnesota are not served very well,” says Mark Erickson, Economic Development Administration Director of the City of Winthrop. “They rely on satellite, cell phone coverage with high cost data plans, crappy DSL with low speeds and fixed wireless that suffers from lack of access to fiber, and so the speeds are unimpressive. Less than 3 Mbps down and way under 1 Mbps up is the general rule. Some are still on dial up.”

If there is a digital divide between rural and urban communities, the gap is twice as bad when you consider broadband resources available to farmers. Mark Mrla, Business Unit Manager at Finley Engineering Company believes, “More and more innovative technology is playing a key role as farming operations get bigger. It doesn’t matter if we’re talking field crop operations, how to apply fertilizers, or raising livestock. One Minnesota farmer paid somewhere between \$15,000 and \$20,000 to have fiber run a mile onto his property.”

Michael Burrow, President/CEO of NineStar Connect knows a farmer who has a planter equipped with various digital connections. “He could tell me how many seeds

per foot he planted or which parts of the field is nitrogen sufficient, and overlays this status with data gathered during the fall that shows how many bushels of produce he's getting. Every year there is data layered on top of data that over time makes him more efficient." Without broadband, this isn't possible.

"Rieke Farms Inc. is still very much a family farm that dates back to 1862," says Jake Rieke. "My dad, my wife, and I manage the day-to-day operations along with a contract employee we recently hired to help with the hogs. My uncle still helps during planting and harvest."

This Minnesota farming operation has about 900 tillable acres and they manage 7,000 finishing hogs, meaning they get them at 50 pounds and grow them to about 285 pounds. Jake and his family are heavy technology users.

"Mapping software is one of the apps that's accessible from the cloud, and this lets us determine the state of planting and harvesting crops. I can download the maps from the cloud to another iPad or my desktop, or I can view the maps in a Web browser using the cloud storage. During harvest and planting, data is being collected continuously using the cell network and these maps are backed up to the cloud. Using a second iPad, we can log into the planter or combine, and view a live stream of what's happening at that moment."

Rieke Farms is one of 2,500 farms covered by, a co-op formed specifically to meet the communication needs of its members. In a two-part broadband buildout, all the members receive fixed-wireless service at 25 Mbps symmetrical (the same upload and download speeds). In the second phase, members including the farms get fiber.



Erickson, who was one of the driving forces behind RS Fiber in Minnesota, says, "The project will help farmers with their precision ag needs for sure. But long-term benefits go to kids who can do homework online, as well as residents who can take advantage of telemedicine, multimedia communication, and entertainment. Parity in bandwidth allows rural people to keep pace with their city cousins. Rural areas won't lose Internet or TV signals when the weather turns bad."

Broadband in Education

One thing about broadband and its impact on education is that it's an easy to understand and a meaningful benefit most everyone agrees on. Even for people who don't have kids in school, they understand that high-speed Internet is critical for successful learning as well as teaching. If

you reach out to various types of potential investors, you'll find some of them could be especially interested in broadband for educational objectives.

Broadband-assisted education can be a main feature that attracts new companies or retains businesses, no matter what size the company. Parents and future parents want to know there will be quality education in town. Business owners want to ensure students graduating from high school or college are well prepared to come into a global workforce. Broadband also facilitates distance learning so management and workers have access to training and education, potentially leading to improved operations and performance on the job.

Play the E-Rate card.

One vital piece of information that every needs assessment should cover is what Federal, state, nonprofit, and foundation-sponsored education grants are available that can facilitate deploying networks. These grants may be specifically for broadband, or grants that you can repurpose for broadband in the same way the Department of Transportation funded Columbus' fiber for their traffic lights.

A surprising number of stakeholders may not be aware if their school districts are eligible for the FCC's E-Rate program. The program refunds providers up to 90% for broadband build apps that serve libraries and K-12 public schools. The FCC reformed the program so that communities can access the networks when school isn't in session. New FCC E-Rate reforms were expected to open up eligibility of municipal and public utility networks even further, but it's hard to know what this current Administration will do.

Stakeholders need to learn about E-Rate, whether or not your town currently receives the funds, and if there are similar or complementary state grant programs. Learn if your state makes it easy or difficult to get the type of certifications the FCC requires of E-Rate recipients. Obtaining E-Rate eligibility is an extensive process, with some cities saying it requires a year. You'll want to begin working on eligibility even before you start putting fiber into the ground.

Because the rate requires infrastructure built with this money only serves schools, Danville (Danville, Virginia's public network) created a "mini" network for the school district within the utility's network by segregating fiber strands within the conduit that just served the schools. Broadband teams can do the same thing with libraries.

Bridging the homework gap.

Virginia Harman, VP of Member Relations at Delta-Montrose Electric Association highlights a Catch-22 faced

by schools and parents. "On one hand, we are focused on getting the fastest possible broadband speed to the school. But on the other hand, the efforts to give students the latest technology, software and multimedia-enabled course material get thrown off balance by the fact kids don't have good broadband at home."

"There are many state and national education groups that are constantly asking, 'how can our students obtain affordable high-speed Internet at home?'" says Kathy Johnson, Director of Broadband Development Office for the State of Alabama. "These organizations enhanced their question with research and found that student access outside of the schools and libraries through broadband in their homes and the community has improved student performance." Incorporate research data such as this to strengthen the case for broadband.

The Appomattox County School District in Virginia built its own fiber network for \$150,000 with E-Rate grants and saves millions of dollars in leasing fees over five years. Then they installed municipality-financed Wi-Fi radios onto the network to reach un-served homes with free service after 4:00 PM when the network is either not needed at all, or very little.



Brette Arbogast, Director of Technology for the District, determined that the logic and economics makes sense. Students use state-of-the-art laptops and tablets running on high-speed network in the schools, but 49% either

have no Internet access at home, or parents can't afford whatever service may be in the area.

Arbogast's research determined ISPs would charge anywhere from \$300,000 to over \$1 million for the buildout. The Wi-Fi radios are relatively inexpensive and the county's network doesn't charge for the Internet connection since the fiber is already paid for.

Originally, allowing ISPs to lease fiber to schools was an incentive for ISPs to complete last mile buildouts. But this thinking is obsolete. Fiber infrastructure has decreased a lot in cost. "Schools need to seek out ways to cut the on-going leasing of fiber in favor of buying fiber and completing buildouts," says Arbogast. "Imagine how much money you can save by eliminating leases." As a bonus, use E-Rate funding to leverage funds from various sources such as state agencies, banks and philanthropic foundations.

By providing broadband via wireless, the community now benefits from what they have already paid for with their taxes. If a co-op becomes eligible to receive E-Rate, that money stays in the community. Furthermore, this

addresses a barrier to broadband adoption, which is constituents not seeing the need for broadband or the benefit.

Broadband and education – a life-long partnership.

Sometimes the discussion about broadband and the impact on education only focuses on K-12 learning. Theoretically you never "finish" your education. Subsequently, it's advantageous to design your network and its services to facilitate constituents' life-long pursuit of education.

Broadband improves access to resources and peers, essentially supplementing university professors' teaching and students' learning; making college affordable for students via online and in-person curriculum; and enabling students and professors to reduce travel costs. College isn't for everyone, but broadband enables opportunities to access information and training, instilling skills and knowledge that facilitate and augment post-high school education so students are prepared for good-paying jobs.

The dream of life-long education becomes reality when communities create a collaborative environment for broadband, schools, colleges, libraries, training facilities, and economic development professionals to benefit rural areas. On-going professional development, career transitions and learning-for-fun can become part of the adult experience.

Education and economic development issues both correlate to declining rural population as a potential business crisis. It's hard to maintain revenue flow when your paying customers move away because of layoffs, fewer replacement industries, or horrible broadband.

Dan Speer, former Executive Director of the Pulaski-Giles County Economic Development Council in rural Tennessee has some thoughts on the role of broadband and training. "First, you make it available where adult education occurs, which for us is in career centers and technology centers. They offer a great deal of this type of training. When a plant closed, there was a direct pitch to these workers to take the courses. If you have the broadband to support it, this can be done effectively online either from libraries or home."

Speer felt that this training is key to success of economic development, so the leadership in a community has to explore ways to make these kinds of services inexpensive. By delivering computer-based training over a broadband network to the schools, there becomes unlimited potential for teachers to incorporate technology for adult education as well as for students. Speer said, "Some people can't seem to grasp this concept, but it's very

very important. Technology can deliver this if it's harnessed and used in a correct manner."

When the many facets of broadband-assisted education are part of network planning (re-training is just one), the resulting infrastructure is better designed, provides more value to various constituents, and possibly attracts greater funding. Broadband as an education facilitator could justify more expansive infrastructure deployment. The network adds to the communities' quality of life and boosts local economies.

Telemedicine & Healthcare Delivery

Although a great many telemedicine solutions are in testing labs and digital drawing boards, broadband can make a difference now. "We don't expect to attract new hospitals into the area," says Reyes. "But we do use broadband to help the clinics we currently have to stay and expand their services. A few were ready to shut down a couple of years ago because of lack of broadband. Our main hospital is making all of their records electronic. Because we have gig service between this location and hospitals in Albuquerque, the hospital can transfer files quickly."

"We definitely realize that we're bringing medicine not even to the future, but to today," says Harman. "Especially in these rural areas, they historically do not have access to great healthcare, the big hospitals. Telemedicine definitely enables that and enables people of a certain age or certain health needs to live in rural areas where previously it was difficult to get adequate medical care."

Kevin Short shares her sentiment, "Telemedicine is the new frontier. I know several people who have to monitor their health. High-speed access is critical to their wellbeing and we are enabling that on a daily basis. Unfortunately, there seems to be no movement or entity that is bringing things together in some directed fashion."

Hospitals are benefiting from software solutions such as electronic medical record (EMR). But a broadband foundation is needed for the array of software, medical treatments, devices, telemedicine technologies and patient management processes waiting for changes in government policies, insurance reform and medical professionals adopting technologies.

Dr. Nizan Friedman is CEO and Co-Founder of Flint Rehab that manufactures devices that assist stroke patients. He believes broadband has great value in small rural communities because it bridges the gap to knowledge; medical or otherwise. "If your broadband is sufficient, you can access and use online applications such as ours," he says. "Patients also can tap the expertise of professionals

at leading medical facilities in the country who use our devices. Furthermore, with sites such as Twitter and Facebook, patients can collaborate and motivate each other. It all helps the healing."

Broadband creates rural medical hubs.

A blog post by Sherie Sanders of eCivis ² highlights the dire state of rural hospitals. "According to the National Rural Health Association ³ more than 75 rural hospitals have closed since 2010, with 673 at risk of meeting the same fate. That could leave up to 11.7 million people with nowhere to turn. Not only will patients be in jeopardy, but regional economies may suffer as well. Their absence will not only result in direct job loss, but potential employers may be reluctant to relocate to areas without adequate health care."

Loma Linda, CA is a small town with about 23,000 people, although it technically might not qualify as rural with this population density of 3,094.3 people per square mile. With long-range planning and gig infrastructure, small towns of similar size populations in rural areas could emulate Loma Linda and become medical hubs to increase the quality medical care typically lacking in rural areas.

Loma Linda's network helped: 1) improve the financial health of existing medical facilities, 2) increase the number of healthcare facilities AND professionals, and 3) attract hospitality facilities for out-of-town guests visiting sick relatives. The town's healthcare institutions now have over 30,000 employees, which is a 20% increase since 2009, and there's a hospital bed for every house in Loma Linda. The gig network creates a virtual universe of medical knowledge and talent.

The Danville (Virginia) Regional Medical Center is one of the town's largest employers. They have several clinics around town that move a lot of data among the facilities. The high-speed network produces a quality and quantity of medical services that make Danville Regional a major draw for businesses looking to re-locate to the town. It opened a new facility and partnered with the Virginia College of Osteopathic Medicine for its residency program. This subsequently draws a notable number of younger professionals to the area who hopefully will stay and open their own practices.

A co-op can take the raw ingredients of a high-speed network, virtual reality, streaming video and audio, telemedicine applications, and healthcare professionals to create the infrastructure for a medical hub that rivals Loma Linda and Danville. This is good for broadband adoption, new-company recruiting, employment, a

healthier community, and stabilizing or increasing rural population. Additional broadband funding could come through government grants and philanthropic organizations.

The FCC's Healthcare Connect subsidizes health care providers in rural areas for high-speed broadband connectivity, telecommunication services, and new construction. "Communities can create a consortium of libraries, schools and hospitals using FCC funds to create a broadband network, and you have the beginnings of an infrastructure that the rest of the community can expand," observes Justin Volker, an industry expert who spent three years managing the E-Rate program for a rural K-12 school district.

"The municipal, library, school district and healthcare facility IT departments should scope out a multi-year technology plan that describes a complete, concrete vision of the technology future of these anchor institutions," states Richard Frank, an IT consultant that has been involved with many projects over the years. It really gets you the biggest bang for your buck by allowing you to squeeze the most out of your bandwidth investment.

Medical research can be another funding source.

Conducting a Yahoo search for "foundation funding for medical technology" turned up several pages of results, including a page produced by the National Institutes of Health. It lists dozens of links to federal agencies, foundations and other organizations that offer grants for various types of medical research. Here are several samples.

"The Agency for Healthcare Research and Quality (AHRQ)... interested in funding a diverse set of projects that develop, test and evaluate various simulation approaches for the purpose of improving safe delivery of health care."

"National Institutes of Health... the purpose of this funding opportunity announcement is to encourage collaborations between the life and physical sciences that apply a multidisciplinary bioengineering approach to the solution of a biomedical problem."

"The Josiah Macy Jr. Foundation is dedicated to improving the health of the public by advancing the education and training of health professionals. Our grant making is focused primarily [to] demonstrate or encourage interprofessional education and teamwork among health care professionals, and improve education for the care of underserved populations."

"The Colorado Trust is a health foundation dedicated to ending inequalities that affect racial, ethnic, low-income

and other vulnerable populations."

Of course, you'll have to do a lot of hunting through these various organizations' descriptions and grant parameters to create your shortlist of potential winners. Here are a couple tips for how to justify the inclusion of the cost for broadband infrastructure in these proposals.

A number of these grants involve gathering, sorting correlating and delivering data to the granting organization. There's nothing like broadband for moving mountains of data. The stakeholders running a network called OpenCape in Cape Cod, MA, had considered applying for a grant that was being offered for a \$100 million data-intensive project. The deadline for the grant passed before the network was completed, but winning such a large grant could have provided leverage for financing the network.

Medical research often includes simulation, 3-D printing, laser optics or intensive if-then analysis, which requires access to bandwidth to execute. Consider a presentation with potential grant makers or investors in which you layout a credible picture of using broadband, commercial real estate, nearby colleges and appropriate technologies to make your community a research center.

Are there geographical, environmental, or demographic considerations that make your community a potential research test bed if you can build broadband to facilitate data gathering? For example, does climate change impact the community's health? Does increased communication with relatives in other locations improve local seniors' health? Do geography and environmental conditions improve or hinder recovery after accidents or heart attacks?

There are grants available for researching just about every health issue. However, as with many of the tactics presented in this report, this is not a "get rich quick" scheme. If you have a funding source that will write you a check for the entire network build out, that might be your preferred option. But if you don't have a lot of options, or the powers-that-be only have eyes for generating business customers for your network, then using broadband to facilitate medical research as a way to fire up potential funders makes sense.

What about the need to simply be connected?

Some communities find that their needs can't fit neatly into a category, such as education or broadband-assisted healthcare. For other communities, their economic development goal consists of maintaining the status quo. Sebewaing, MI is one of those towns. Their public utility, Sebewaing Light and Water (SLW), built a gigabit network for the community.

SLW Superintendent Melanie McCoy says theirs is a developed community of 1,800 residents and they feel they have everything needed in terms of businesses. Building a network, however, retains local companies. McCoy likes to joke that her town is very boring, they don't have grand visions of being the next Chattanooga.

Some communities believe connectivity at fast speeds is its own just reward. But that begs the question, how do you find investors if you're not embarking on broadband to meet a popular need? Maybe you have to turn to the everyday people of the community to be your funders.

In Vermont, 23 town governments created ECFiber, an LLC nonprofit corporation. No tax dollars went into ECFiber. Instead, ECFiber offered tax-exempt 15-year \$2,500 promissory notes that effectively earn constituents six percent interest. The approximately 50,000 people in these towns raised over \$900,000 in 2011 to begin an initial buildout covering 26 miles. To finish the network and bring connections to people's doorsteps, ECFiber did additional fundraising rounds. For example, the town of Barnard with 386 households generated \$350,000 to continue building out the network in their area.

Several co-ops such as Delta-Montrose have turned to their members to determine marketing direction. Harman says, "We developed our financial and our build model based on getting a take-rate that is largely residential. We are fine with providing services to cities and counties, the local government facilities, the hospitals, but it is just as important to serve the individuals. This is rooted in the co-op philosophy that we are here to serve all of the members equally."

The co-op's service area is predominately major cities in Montrose County, Colorado and several smaller cities in and around the county. There are 32,000 electric meters, 4,000 miles of line, a little less than 10 meters per mile of line. "We divided our service area into 49 zones and each zone has its own pre-registration goals," says Harman. "Once the zone reaches its goal, we begin construction. The build out becomes very dependent upon our members' goals. If the zone wants to get people to sign up faster, they have to motivate members."

Delta-Montrose currently anticipates a five-year buildout. Looking at the map of their coverage area you see some zones that have barely started toward their goals and those who have 100% sign up. This helps the co-op's marketing team know where to put more of their time. Crowd-sourcing of the demand helps them justify where

to build so it's not arbitrary.

"You'll still have complaints because everybody wants their neighborhood hooked up right now," concedes Harmam. "But more of the onus is on members. Businesses and organizations can register on our website the same as residents and the same rules apply. However, if a business comes to us and says they want to get service today and they're willing to pay for it, we will negotiate."

II. Maintaining Financial Sustainability

"At least a couple dozen co-ops have started to work on their own projects, so we see they're gathering traction," says Michael Keyser, CEO & General Manager of BARC Electric Cooperative. "The early successes of several high-profile pilot projects definitely helped. These pilots demonstrated to other co-ops that building networks wasn't as hard as they imagined."

One of the first things a co-op's leaders do if they're interested in broadband is to survey their members and conduct a feasibility study. Keyser reports that, "Every survey that I've known about shows 60% or more members saying that if their co-op offered it, they would take broadband services. This is compelling when you consider that our mission is to serve the underserved needs of our members."

Co-ops that have built networks list several reasons they can run successful broadband businesses and still make the services affordable.

- Co-ops are not for-profit organization
- Co-ops can spread the upfront buildout costs over 20 or 30 years
- Typical co-ops start with needed resources on hand: bucket trucks, expertise, rights of way, polls, customer relationships
- There is often cash on hand because co-ops are conservatively managed
- Some already have broadband infrastructure in place supporting substations, metering systems, SCADA systems, other operations
- It's less expensive to expand broadband then to start from scratch

Short reports Anza's population density is about six meters per mile. "We are pretty standard. Besides our typical co-op edge, a big advantage being the dominant electric utility is that we have a built-in customer base. We've been able to build out connections to each individual customer for under \$2,000, but every co-op



is unique. 95% of our system is aerial and many of the members' homes are located relatively close to our facilities, so building from our poles isn't that expensive and it's relatively quick."

"It's been a mixed bag with some co-ops sitting on fence," says Drew Clark, President of the Rural Telecom Congress. "But a lot of co-ops are getting tired of waiting for others to take action, and they're taking the initiative. When I worked in Illinois during the broadband stimulus, plenty of co-ops were building middle mile fiber." Mark is seeing a lot more last-mile projects.

Grab your partner, do-si-do.

Co-ops can do themselves a favor, both politically and financially, by forming a subsidiary entity. The entity can build the network similar to what Delta-Montrose Electric Association did with their Elevate Fiber company. Or an electrical co-op could form a joint venture with a telephone co-op, a city or county, another nonprofit or a private entity. A third option is to create a co-op specifically for broadband such as RS Fiber in Minnesota.

The new entity should be free from some of the restrictions imposed on political jurisdictions. Additionally, forming these partnerships could increase availability of capital resources and perhaps more favorable treatment by financial institutions. Just be sure that all parties employ confident and diligent legal counsel to study the partnership and the applicable Federal and state laws.

In January 1, 2011, Hancock Telecom and Central Indiana Power merged the cooperatives into NineStar™ Connect. "After the merger, which took about 18 months to complete, we fielded an entire team of people who have experience operating a telephone business," says Burrow. That's a long time for the prelims, but co-ops may find that this approach had long-term advantages.

Finley's Mark Mrla believes, "You can make just about any combination work if you get the right players together and they are willing to work together. You have to be creative at times. Partnering with a jurisdiction might get you into situations that restrict your freedom. There are reporting requirements, or new leaders get elected in the middle of the project and they have to see things differently."

But keep in mind that partnering with local government can also open the door to grant money, Mrla observes that, "The state of Minnesota has been giving grants away for the last two or three years, and they can be won by any entity including a co-op, an incumbent, or regional ISP as long as it serves un-served or underserved areas."

Some might ask why communities just don't build a co-op devoted to broadband, either to work alone or in partnerships with other entities. Clark observes, "The trick with forming new co-ops is that there are very stringent rules that are in place. It's more restrictive in its legal structure, with issues of geography and who can be a member. It may make more sense to create a plain nonprofit entity."

Financing then and now.

After Kit Carson received its \$64 million grant, they borrowed additional money to complete the network. At this point they have members share in the on-going costs. "Now we might say the network hookup cost is \$300. If the homeowner puts in \$150, we will match that, or if we put up the full \$300 you have to commit to taking our service for two years. We can't sell stocks or bonds."

It's not likely to be broadband stimulus from the current Administration. Reyes would advise a co-op today to pick one or two communities, based on where you expect to get the most pre sign-ups, and build out that community so you don't have to borrow as much money. Add the electronics that enable you to expand to other communities. "When you get to the take-rates you want, move to the next community," says Reyes. "You're not going to exceed what your members want because your business plan is member-driven. If your members sign long-term contracts, use the contracts to borrow more money if needed."

It is advisable to do your needs assessment or business planning for all of your constituencies in your proposed broadband service area. You can always update these documents later. But you don't have to buildout all of the network all at once. Kit Carson isn't the only co-op that feels this way. "Initially, our buildout is just in Rockbridge County as a 400-mile fiber project," says Keyser. "But we plan to expand the network to our entire territory which covers about 2,500 square miles."

Co-ops can now use tech advances and new entrepreneurs in the market to control costs. In the previous decade, providing video services was one of the most daunting expenses. Contracts with movie studios, networks and other video content is expensive and time-consuming. Equipment such as head-ins was expensive.

These days, Kit Carson serves as a middleman providing access to their fiber and bandwidth to whatever companies are in the video content business. Companies are making deals so they can offer cable packages of 100 or 200 channels to Amazon Prime. Roku or Amazon are making deals with ISPs to replace set-top boxes, often

at no charge to customers. The triple play data, voice, and video is still necessary, but co-ops don't have to carry the high overhead costs to remain competitive with Dish and Direct TV.

Connect America Fund's (CAF) rules made it difficult for Anza to take advantage of Federal government grants. However, getting 60% of the buildout cost from a California state grant was a big deal. They would not have been able to do the project without that grant. They don't have the deep-pocket funding that the investor-owned utilities do.

Gene Metz, Vice-Chair on the board from Lismore Co-op Telephone Company, agrees. "It's possible to get loans through the RUS (Rural Utilities Service) but the conditions and requirements make it almost impossible for small providers to meet the guidelines. It's possible that you can be creative with finding financing, but it's not easy."

Policy makers and legislators need to consider a financing model allowing cities and counties to take advantage of investing in last mile for their communities. "I wouldn't close the door on tax credits to build out broadband," says Clark. "That may be more doable given the current administration. A group in Congress has offered legislation to change some RUS rules, the New Deal Broadband Act, which expands access to the Internet in rural counties by offering broadband grants in addition to loans guarantees.

III. Evolving Technology Options

Even before a cursory examination of a community's needs, we can find minds already made up which technology they should use. "We need a gig." "Fiber is the only way to go." "Google has jumped ship. Now it's wireless or nothing."

When communities put the cart (technology) before the horse (needs), they likely will spend more money than needed to accomplish less than they want and usually take longer than they expect. Don't let the shiny technology cause you to lose focus. Understand that the average customer does not really care how their data arrives as long as it is affordable, fast enough, secure, and reliable.

Mrla believes that, in the absence of another broadband stimulus program, we might see more wireless technology because it's cheaper and faster to build, and some rural areas feel they don't have any other choice. He predicts, "We'll see more creative solutions with wireless as an intermediate step, and in some cases, fixed wireless may be their only option. This may buy them four or five years

until maybe another administration comes in and starts funding broadband with federal or state dollars."

Roanoke Electric Cooperative covers five counties in rural North Carolina, and serves as few as six or seven homes per square mile. They currently have a \$4 million fiber ring project known as Roanoke Connect. Their primary goal is to enhance the co-op's electricity operations. Their substations will be able to communicate better with each other, predict and manage outages, protect equipment from vandalism or theft, and proactively communicate with members.



Roanoke started a pilot project to determine the potential success in providing broadband to individual and business members. "We are assessing if a hybrid wireless/

wired infrastructure will improve the financials of our operations over the next few years," says Curtis Wynn, the co-op's CEO and also Secretary-Treasurer of the National Rural Electric Cooperative Association (NRECA).

It may not make economic sense to provide fiber to sparsely populated areas. "As we learn more about wireless technologies that potentially can deliver half a gig or more, this interests us because deploying fixed wireless is faster," remarks Wynn. High definition (HD) video is taking off and providers of all sizes are racing to keep up with the resulting customer demand for more speed.

He feels that wireless infrastructure gives them more flexibility. The fiber ring is necessary, but the new wireless speeds give co-op members fast Internet access now and for some interim period if the co-op decides to add fiber later. However, it is likely that they will partner with a provider to deliver wireless if they go in that direction. "As we do the pilot, we are looking at WISPs, traditional carriers and some broadband technology companies that some might not think of as capable of delivering wireless services," says Wynn.

In Minnesota, Finley Engineering originally did a broadband feasibility study for Nobles County, MN. Lismore analyzed the study and then asked Finley to help them with a Minnesota grant application to implement one of the scenarios presented in the study, which is a combination fiber and fixed wireless broadband network. Lismore got the grant and Finley is overseeing the network buildout. The county matched the grant dollar for dollar, although the grant money was not used for the wireless equipment.

Lismore's original ILEC territory included about 320 subscribers. With their aggressive growth tactics, they expanded outside of their territory, and they have added around 500 additional fixed wireless broadband subscribers. To build the 80-fiber ring to feed several small towns and wireless powers it cost \$20,000 a mile to install the fiber and the other necessary equipment. In some parts of Lismore territory there may be just one person per mile.

Metz believes they should recoup their infrastructure costs in six months. "The fiber has allowed us to offer more powerful wireless and unlimited data, but the payback is maybe three years," he says. "That only touches members close to the ring. To do an all-fiber network would have taken a long time to show any ROI.

This is where the state grant money would have come in handy."

RS Fiber is a more aggressive version of Lismore's strategy. It involves ten Minnesota towns in Renville and Sibley Counties, ranging in populations from 2,305 down to 504, over a dozen townships and 2,500 farms. The ISP, Hiawatha Broadband Communications, split the \$70 million project into a fiber ring that links towns and townships; fixed wireless across the entire service territory six months delivering 25 Mbps symmetrical; and a fiber buildout to the premise for the entire area. One of the major benefits of this strategy is that RS Fiber collects \$50,000-\$100,000 in monthly revenue and started retiring the debt because residents received services soon after the project started.

For additional reading on wireless, see the author's Snapshot [Report from earlier this year](#) regarding hybrid fiber and wireless networks:

1. <http://www.blogtalkradio.com/gigabitnation/2012/12/18/broadbands-financial-impact-local-government-heal-thyself>
2. <http://blog.ecivis.com/grants-for-rural-hospitals-expanding-outreach>
3. <https://www.ruralhealthweb.org/advocate/save-rural-hospitals>

ABOUT THE AUTHOR:

Mr. Settles' website is overflowing with broadband knowledge: over 200 hours of interviews, a couple of hundred blog posts, in-depth reports on hot broadband topics, a link to his book, "Building The Gigabit City" and other resources. Check out the [complete list on his website](#).

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