

RS Fiber: Fertile Fields for New Rural Internet Cooperative

Written by Scott Carlson and Christopher Mitchell

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April 2016

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We wish to acknowledge the many people who contributed to this report. Thank you to the people who were interviewed for this report and who unselfishly gave their time to share the exciting story of RS Fiber. A special note of thanks to Mark Erickson, city of Winthrop economic development director, who provided valuable information and insights to our many questions.

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For ongoing information about RS Fiber and similar efforts, be sure to read MuniNetworks.org and sign up for the weekly newsletter. Next Century Cities also maintains a [blog with related stories](#).

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Executive Summary

In south central Minnesota, 17 townships and 10 cities are forging a historic path to bring high speed Internet access to their communities by forming a new telecommunications cooperative.

RS Fiber Cooperative, named after Renville and Sibley Counties, is building an estimated \$45 million telecommunications network to serve more than 6,000 households, farms, and other businesses in a 700+ square-mile area with both wireless and universal fiber-optic service.

This co-op offers both inspiration and instruction to rural communities across the U.S. where existing providers have decided not to improve Internet access.

To attract funding, the cities created an unusual financing mechanism. Ten cities bonded for more than half the \$15 million phase 1 cost. The bond proceeds were loaned to the cooperative and that loan was made subordinate to additional loans. Thus local governments would be repaid last if the network failed to meet financial targets. This structure was instrumental in attracting additional financing from local banks.

The cooperative partnered with Hiawatha Broadband Communications (HBC), a growing Internet Service Provider in southeast Minnesota, to operate the network. Without HBC's guidance and support, RS Fiber might not have succeeded.

HBC provides telephone, television, and Internet access services across the RS Fiber network. Internet capacity ranges from 50 Mbps to 1,000 Mbps on the fiber network. Prices range from \$50 to \$130 per month for those connections. Unlike DSL and cable, these connections are just as fast on the upload side as download. Anyone who

takes service from the network becomes a member-owner of the co-op.

Because the participating cities had slow broadband at best and many farms had no broadband access, the first step was to build a fiber ring that connected 11 towers to provide a high quality wireless service, at 25 Mbps for \$40 per month. That wireless service offers households an immediate higher quality option while also allowing the co-op to begin collecting revenues that will be re-invested to expand the fiber network.

At publication, the project is in the middle of phase 1, which involved building the wireless towers and will end when the 10 cities involved each have Fiber-to-the-Home access. This is expected to be accomplished by the end of 2017. Phase 2, which will cost \$30 million, will extend fiber-to-the-farm in each of the 17 townships that has elected to join the project.

RS Fiber was able to overcome numerous obstacles in its more than 5-year odyssey, due in large part to the grassroots marketing committee. A group of volunteers led more than 100 local meetings and over 14,000 mailings while coordinating newspaper advertisements and a door-to-door campaign to educate the public.

RS Fiber offers a working model for any rural region looking to establish a new fiber-optic cooperative to deliver high quality Internet access to every household. ■



Introduction

In south central Minnesota, 17 townships and 10 cities are forging a new path as they bring high speed Internet access to their communities by forming a new telecommunications cooperative.

RS Fiber, named after Renville and Sibley Counties, is building an estimated \$45 million network to serve more than 6,000 households, farms, and other businesses in a 700+ square-mile area. Winona-based telecommunications company Hiawatha Broadband Communications (HBC) provides telephone, television, and Internet access over the network.

“It is unique that a cooperative was created out of the thin air to own the network,” said Mark Erickson, the former Winthrop city manager who played a pivotal role in helping launch RS Fiber. “It’s not every day that a new cooperative, much less a telecommunications cooperative, is formed.”

It’s not every day, too, that 27 cities and townships work together to create an infrastructure cooperative for a fiber-optic network. In fact, they seem to be the first. The RS Fiber project was seven years in the making, built from the vision of local leaders and scores of resident volunteers who spearheaded an intense grassroots marketing campaign that included more than 100 informational meetings.

Their story included overcoming the opposition of private for-profit telecom companies, which saw the project as a threat, and evolving the project from its original conception as a publicly owned municipal network into a community-based co-op.

“One of the things I’m most proud of is the fact that 10 city councils from very small rural communities saw the importance of the project right off the bat and stuck with it for really seven years,” said Erickson, now director of Winthrop’s Economic Development Authority. “The other aspect that people find interesting is the fact that 17 very rural, conservative, skeptical and cautious township boards also ‘got it’ and voted to put their constituents’ tax dollars on the line to make it happen.”

The co-op’s funding model is also noteworthy. Because few investors were willing to fund a newly created fiber co-op, the local governments bonded for seed funding to loan the co-op that became subordinate to other private investors, including local banks. As long as the network hits its financial targets, no taxpayer dollars will be used. The co-op will repay its loans to the local governments with revenues from the network, but local taxes will make up the difference if it falls short.

RS Fiber is a promising model for the vast majority of rural communities stuck with slow and unreliable Internet access. Without that access, they have fewer prospects for economic development, educational advancement, and health care.

Though the subject of this report is a rural network, many of the lessons are applicable more broadly to any local government considering local investments to improve Internet access. The first half of this case study discusses the key details around the co-op. The second half of the paper is a deeper history for those who want more information. ■

RS Fiber at a Glance

What



A rural telecommunications cooperative formed to bring high-speed Internet access to 27 cities and townships in south central Minnesota.

Cost	Number of Households	Service Area
\$45 million	> 6,000	700+ sq miles

RS Fiber Communities

At completion, the RS Fiber network is expected to serve most of Sibley County and portions of Renville, Nicollet, and McLeod Counties.

Sibley County cities:

Green Isle, Gibbon, Winthrop, New Auburn and Gaylord.

Renville County cities:

Fairfax and Buffalo Lake

McLeod County cities:

Brownnton and Stewart

Nicollet County cities:

Lafayette.

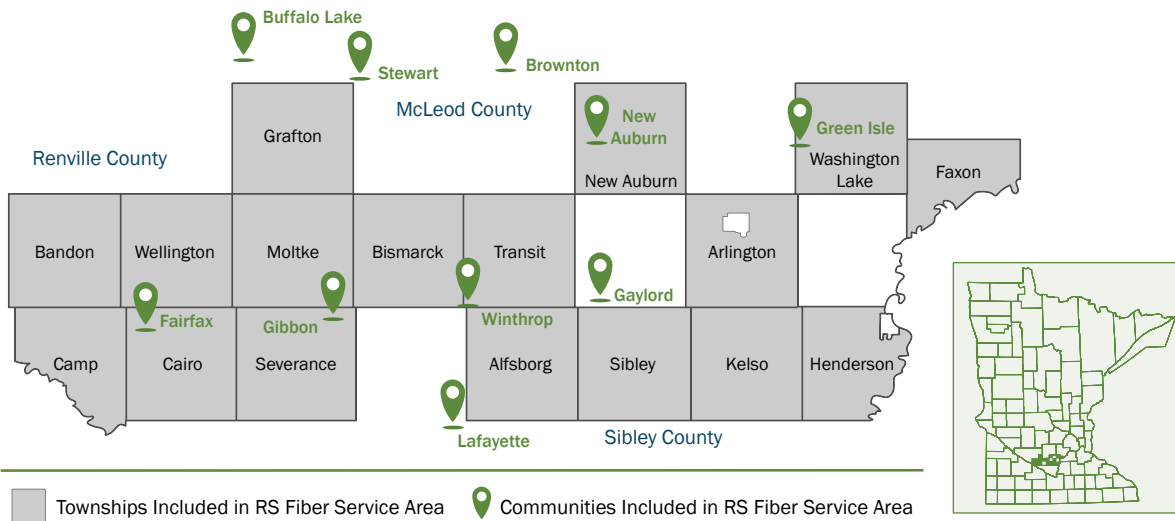
Sibley County townships:

Alfsborg, Arlington, Bismarck, Faxon, Grafton, Henderson, Kelso, Moltke, New Auburn, Severance, Sibley, Transit, and Washington Lake.

Renville County townships:

Bandon, Cairo, Camp and Wellington.

Broadband Fiber to the Farm, Home, and Business to Select Communities and Townships in Your Area



Dire Need for Speed

RS Fiber Cooperative's territory encompasses much of Sibley County and parts of Renville, McLeod and Nicollet counties. Small cities and rural townships are the norm with access to DSL from phone companies and slow cable connections. The lack of high speed Internet access created the demand for the co-op.

Where DSL and/or cable connectivity was available, the fastest Internet speeds typically topped out around 3 to 4 Mbps (megabits per second) download (data moving from the Internet to a home or business) and less than 1 Mbps upload (data moving from the home or business to the Internet). By today's Federal Communications Commission (FCC) standard, which defines broadband as at least 25 Mbps down and 3 Mbps up, most of the region did not have broadband access prior to the launch of RS Fiber.

This dearth of high-speed Internet access has been a serious problem for residents and businesses, including farmers who increasingly rely on Internet connectivity to carry out their work. Farmers had been among the least connected because they are located far from population centers.

The Kramer family from Moltke Township (pop. 330) in Renville County illustrates the point. In 2011, Linda Kramer reported her family's DSL connection was far too slow for her husband, a soybean and wheat farmer, to upload reports to his business partners. In DSL networks, the upload speed is a fraction of the download capacity. Her husband would often attempt to send out his reports in the evening only to awake in the morning to discover they were still transmitting or the connection had failed during the night.¹

The lack of widespread, high-speed Internet access worried the head of the Gibbon-Fairfax-Winthrop (GWF) School District who feared that her students would be left along the roadside of the educational

superhighway. In the spring of 2010, the district's School Board approved a "one-of-a-kind technology initiative" by allocating \$335,000 to buy all of its high school students Apple iPads, the first district in the nation to do so.²



Fiber optics gives us infinite possibilities

Fiber optics gives us infinite possibilities to improve human life-environment through the technological super highway.

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We need to be proactive about enabling changes.

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Ronald Winch,
President
First National Bank
of Fairfax

One of many ads from the marketing committee.

But GFW Superintendent Tami Martin indicated it has been difficult for many students in her district to make the most of this technology. Even in 2015, more than 50 percent of the students had Internet connectivity problems when they left school, Martin estimated.

"I think the ability to utilize our iPads to the extent we want has been greatly limited," Martin said. "We do not do much of the flipped classroom design, because so many of our students cannot access the Internet to complete their lessons off site. We have some of our students who sit outside of the public libraries and the schools after hours and in the evenings to get wireless access. As you know, Minnesota is not a climate that this can happen most of the year." (The "flipped" classroom is where teachers video tape their lectures and have students watch the lesson the evening before. Then during

class the next day, the students do their work, a practice that maximizes engagement with their teachers.)

Martin said she will be thrilled when the RS Fiber network is fully deployed. Until then, the spotty connectivity will continue to put many students at a disadvantage to those with high-speed Internet access.

Those concerns deeply resonated with Jacob Rieke, a fifth-generation family grain farmer from Fairfax (pop. 1,180) who has two pre-school aged daughters. “Am I actually putting them at a disadvantage with their peers in the cities?” Rieke asked. “It does make you wonder, ‘Should I find a different place to live where there is better access? ... That was probably one of my strongest motivations for continuing with the project, at least just to level the playing field.’”

One family worried its fifth-generation family farm with poor Internet access could harm their young daughters: “Am I actually putting them at a disadvantage with their peers in the cities?”

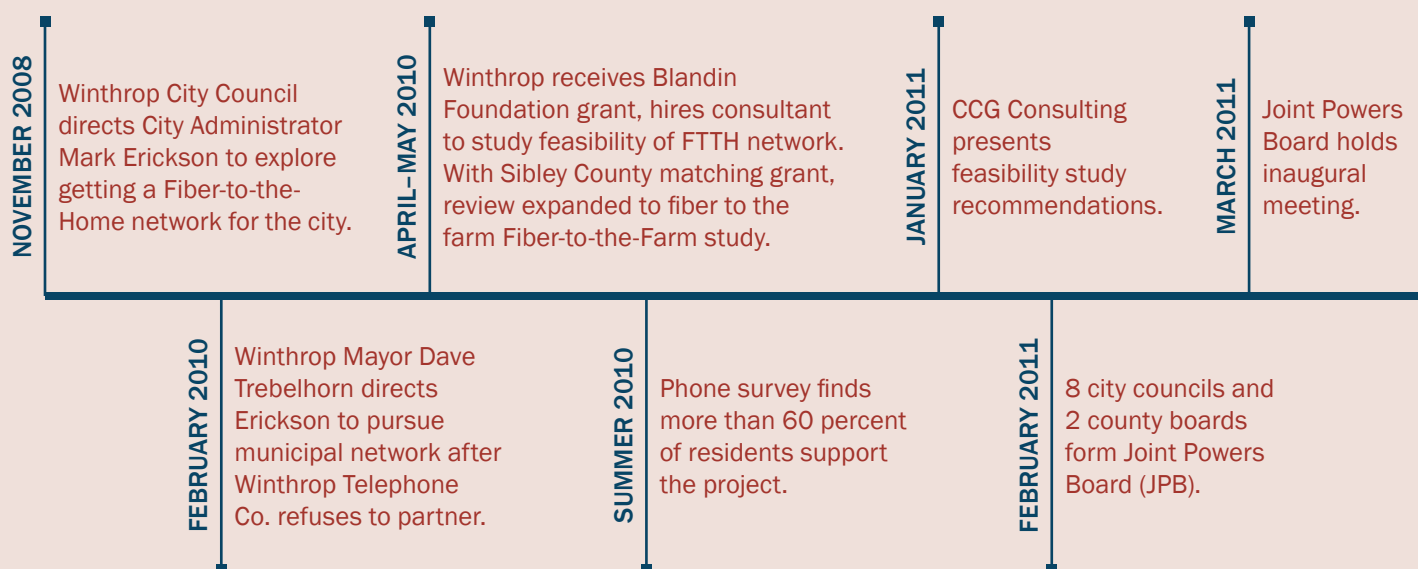
A New Hope: The Co-op Awakens

Co-ops are self-governing, member-owned associations of people who voluntarily band together for mutual social, economic, and cultural benefit. They are democratically run and make decisions based on the best interest of members. Unlike a private company, where a single person or family

could decide to sell a locally owned fiber network to an out-of-state company, co-ops are structurally resistant to losing local oversight because they are rooted in and democratically accountable to their communities.³

Anyone who takes services from RS Fiber is a member of the cooperative and can vote at its annual meeting. The co-op’s structure allows the network’s supporters to raise equity because non-patron members (i.e. equity investors) can participate in its ownership.⁴ These equity members

RS Fiber Timeline



invest in the project and have voting rights but do not take services from the cooperative. Those that have loaned funds to the co-op do not have voting rights. The Board of Directors has 17 members comprised of co-op members, none of which are elected officials to avoid a conflict of interest.

As discussed below in greater detail, the local governments in the RS Fiber territory sold general obligation tax abatement bonds to raise funds that were loaned to the cooperative as seed funding. These funds helped to unlock additional investment and funding opportunities.

The network began construction in July 2015. By the start of 2016, RS Fiber had laid 96 miles of fiber-optic cable, serving as the network backbone to connect eleven wireless towers and offer Fiber-to-the-Home (FTTH) access to residents of Gaylord and Winthrop. This work has made FTTH available to 877 passings (homes and businesses) in Gaylord and 638 in Winthrop. They can choose from 3

symmetrical (same download as upload speed) tiers, 50 Mbps, 100 Mbps, or a gigabit (1,000 Mbps).

At publication, 85 percent of the co-op's service territory should have access to its wireless service, called Air Broadband.⁵ Located on municipal water towers and other structures such as grain elevators, the wireless service provides a 25 Mbps service for those who have to wait for the fiber to pass their premises. It will also generate revenues that the co-op will use to pay its debt and future fiber expansion. Premises located within 5–7 miles of the RS Fiber territory may also subscribe if the service reaches them.

Total phase 1 costs are estimated at \$16 million for building out the fiber backbone connecting the 10 cities, the fiber network connecting homes and businesses in those cities, and the wireless service. Though some already have access, the rest of the first phase is expected to be completed by the end of 2017.



RS Fiber Service at a Glance

Individual Service

Internet Options (Download/Upload)

50 Mbps/50 Mbps	\$49.95/mo
-----------------	------------

100 Mbps/100 Mbps	\$69.95/mo
-------------------	------------

1 Gbps/1 Gbps	\$129.95/mo
---------------	-------------

RS Air Broadband Wireless Internet Service Internet Options (Download/Upload)

25 Mbps/25 Mbps	\$54.95/mo*
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* Price includes fixed wireless equipment rental

Packages

Basic 3 Service Package Internet + Basic Video + Phone

Basic video includes 80+ channels with HD and a DVR.

Phone has unlimited long distance.

50 Mbps Internet service	\$89/mo
--------------------------	---------

100 Mbps Internet service	\$104/mo
---------------------------	----------

1 Gbps Internet service	\$149/mo
-------------------------	----------

Most Premium 3 Service Package Internet + Expanded Digital Video + Phone

100 Mbps service	\$199/mo
------------------	----------

In phase 2, the cooperative plans to spend about \$30 million to build out of the rest of the fiber-optic network to the 17 rural townships, bringing the network to the area's many farms. The original plan was to build to every farm in the county, but when the Sibley County Board backed out of the project, each township had to decide for itself whether to join the project. That work is scheduled to start in 2018 and end by 2021.

Network financing began with the cities providing an initial loan to the co-op. The 10 cities raised \$8.67 million, mostly through 20 year general obligation taxable tax abatement bonds at a 4.5 percent interest rate. One city opted to lend funds it had available rather than bond. The co-op then raised the balance of funds needed from various other loans, a grant, and New Market Tax Credits. In phase 2, the townships will loan the co-op funds just as the cities did in phase 1. We describe the network's financing in greater detail below.

RS Fiber's Deep Impact

"The demand from people in the towns and rural (areas) has been tremendous," said Toby Brummer, RS Fiber Co-op general manager for HBC, which is designing, building, and managing the high-speed network. "We have walk-in customers wondering 'When is service ready?' People in the country [asking], 'When can we get hooked up?' The demand is definitely there, and it's really turning into quite a big deal because people are really excited to get the service."

RS Fiber is providing a dramatic upgrade in Internet speeds. Where available, cable modem speeds pre-RS Fiber were 20 Mbps down and 1 Mbps, according to Erickson. And pre-RS Fiber Internet speeds via DSL were only as fast as 2 to 3 Mbps download, according to local officials.⁶ The co-op's wireless service is far faster and the fiber even more so, despite being priced similarly.

Rieke, the Fairfax farmer and an RS Fiber beta tester, now gets Internet speeds of 25 to 30 Mbps from the

symmetrical Air Broadband wireless service. That's enough for him to share reams of business-related data with his advisers. Together they determine via email where best to plant seeds based on soil conditions and topography.

Cindy Gerholz, vice-chairperson of the RS Fiber Co-op board, noted these faster Internet speeds are vital for rural agriculture. "There is a need for that speed; it is not a wish list," she said.

One of the common sources of enthusiasm centers on cost savings and a simple, easy-to-understand pricing model.

"Cable and satellite companies charge all over the place and have all kinds of promotions going on," Erickson said. "Right now if you are a new Mediacom customer (and I understand they are offering it to customers who want to switch to RS Fiber) you can get voice, video and data for \$30 a month plus fees."

One reason why the city of Brownton (pop. 743) joined the RS Fiber project was to have more choice. For example, Erickson said that in nearby Hutchinson (pop. 15,000), where a lot of Brownton people work, Mediacom had a service package that was \$40 to \$50 a month less than the one in Brownton.

When a Mediacom representative was asked to explain the difference in pricing between the two cities at a Brownton city council meeting, Erickson said he answered "it's because there is no competition in Brownton for cable. There is competition in Hutchinson as the local phone company offers IPTV."

As for his personal experience, Erickson noted, "When I had Mediacom, they started me low and raised the price. I started out paying \$70 a month for a decent package on DISH and

within two years it was \$120. So I switched to DirectTV and followed the same formula. RS Fiber doesn't play that game because HBC doesn't play that game. One price. No contract. No special introductory deals. It is what it is."

Less than a year after kickoff, the RS Fiber network has already sparked new economic development. The Minnesota College of Osteopathic Medicine (MNCOM) announced plans in May, 2015 to set up

services in a former school building in Gaylord. Officials with the osteopathic college credit the arrival of the RS Fiber network for providing the necessary technological infrastructure.⁷

"Without the RS Fiber Cooperative project, the city of Gaylord would not have even

known about the opportunity to attract the proposed medical school," said Phil Keithahn, Chief Financial Officer of the proposed college. "Higher educational institutions require gigabit internet access. Without this access, Gaylord would have had no chance of attracting the school to south Central Minnesota."

Erickson agreed. "We have that opportunity because of the FTTH network," he said. "Without it, no medical school."

The business community in the Renville-Sibley region believes high-speed Internet access will have benefits across the community:

"A high-speed, affordable, accessible, and reliable gigabit internet network, such as that provided by RS Fiber Cooperative, is not only essential for economic development, it is also essential for education, health care, and attracting and retaining people who want to live in the area," said Keithahn, also the owner, CEO and president of ProGrowth Bank in Gaylord and the chief financial advisor to the RS Fiber Cooperative. "While it is difficult to forecast how much development will be generated, Internet

"We have walk-in customers wondering 'When is service ready?' People in the country [asking], 'When can we get hooked up?' The demand is definitely there, and it's really turning into quite a big deal because people are really excited to get the service."

access will increasingly become a 'differentiator' for economic and housing development."

He went on to detail the benefits for ProGrowth Bank, which has locations in Gaylord, Nicollet, and Mankato. Though some locations have higher capacity connections, the data connection between the Gaylord and Nicollet locations currently consists of bonded T1 lines (3 Mbps). The slow connectivity has limited the productivity of bank employees because the banking industry has transitioned to electronic documents and online banking for internal and external use.

ProGrowth Bank anticipates that RS Fiber services will enable all locations to have much higher capacity, with download speeds going from 100 to 500 Mbps and upload speeds from 10 Mbps to 500 Mbps. Despite the much improved service, it expects its costs to

fall dramatically, from \$1,700 per month to \$400 per month.

The Farms Stay in the Picture

Expanding a fiber-optic network to the many rural townships and distant farms is a significant financial challenge. The build-out cost to the farms is estimated to average \$10,000 per premise passed, four times the estimated \$2,500 per pass in the

cities. Some of the rural builds were estimated at \$15,000 plus, Erickson said. However, much the enthusiasm for the network came from those areas because they had the worst Internet access.

The cost disparity prompted some people to push for the farmers to pay more.

Erickson recalled that at one public meeting, an older gentleman insisted "if it cost more to build out to the farmers, then the farmers should pay more." He added that the farmers had plenty of money and didn't need to be subsidized any further.

"At the time, I believe, corn was up over \$5 a bushel and land values were skyrocketing. Farmers were flush with cash," Erickson continued. "I asked the gentleman if there was an elevator [grain] in his community. He said there was. I asked him if he used the elevator. He said no. I then asked him if he thought it was fair that the elevator was 'subsidizing' the city folks by paying property taxes for 100 years yet no one in the city used the elevator? He didn't have a reply. The answer was plain. We need one another in order to make this rural lifestyle work."

Early on, the communities jointly agreed to average the costs, balancing the high cost of the rural build out versus the much lower construction costs in the cities. This decision is reminiscent of the policies that built the nationwide telephone network, in

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Rural MN can't sit back while others move ahead!

Providing high speed internet to rural families and community members will open up more possibilities of connecting and being aware of the world around us.

The people in our communities will be able to compete with anyone throughout the world, while staying in our area. Rural Minnesota can't sit back while others move ahead.

I encourage folks to learn about the RS Fiber project and what it can do for our families and communities.

Jeff Bertrang
GFW High School Principal

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One of many ads from the marketing committee.

which lower cost urban areas subsidized higher cost rural areas.

“The city councils decided to treat everyone equal,” Erickson added. “City and rural residents have a symbiotic relationship. The cities are here because of the farms and the farms need the cities for trade.”

Seeding the Cooperative

From late-2014 through mid-2015, Keithahn’s firm Sterling Capital Advisors was retained by the cooperative to explore construction arrangements and potential sources of financing for RS Fiber.

Rural homes with fiber access today are usually members of rural telephone cooperatives or small companies that have received loans from the Rural Utility Service (RUS) of the US Department of Agriculture—the descendant of the Rural Electrification Administration. They were initially created decades ago with the security of a monopoly service territory.

Building a new fiber co-op that would have to compete with established networks today, some of which are owned by large telephone companies, was unprecedented. Though those firms offer slow connections on last-generation networks, they can do it at a very low price when faced with competition. As such, Keithahn recognized that securing financing would be challenging.

And the RUS loans were unavailable because at least one telephone company in the footprint had an outstanding telecommunications loan. The rules did not allow for a competing loan per program rules at the time. Keithahn was forced to get creative.

He ultimately found that local government bonds could unlock other sources of capital. Local governments did not have the capacity to provide

all the capital RS Fiber Cooperative needed, but they could provide a substantial fraction. The cities would bond to raise funds and make an economic development loan to the co-op. The trick was making the loan subordinate to future debt, which made senior loans to the co-op more appealing to other investors.

However, if the co-op could not repay all of its debts, the cities would be repaid last. Given this structure, the cities had to issue general obligation bonds, meaning that local taxes would have to make up any difference if the co-op could not make the full payment. Because the network is expected to improve property values, they issued tax abatement bonds, which is similar to tax-increment financing.⁸

They issued taxable bonds rather than tax-exempt because the purpose of the funds, to build a network owned by a co-op, does not fall within tax-exempt rules. The co-op is considered a private entity even

though it is open to anyone taking service. As a result, rather than having an interest rate close to 2 percent, it is approximately 4.5 percent.

Prior to creating the co-op, the local governments had formed a Joint Powers Board

(JPB) to explore their regional options for a fiber network. The JPB became the vehicle for organizing the bond sale and then the loan to the co-op. Rather than dealing with 10 loans, one from each local government, the co-op has one loan from the JPB.

Each local government had to come up with its share of the project in proportion with its population.

Risky Business

“Without the general tax obligation, the RS Fiber project would not have started,” Keithahn said. “In this case, the customers for RS Fiber Cooperative are generally the same as the taxpayers who

“The city councils decided to treat everyone equal,” Erickson added. “City and rural residents have a symbiotic relationship. The cities are here because of the farms and the farms need the cities for trade.”

provided the financial support through the issuance of the bond funding. And as customers, they are also the member stockholders of RS Fiber. As long as the taxpayers also sign up for RS Fiber services as customers of the cooperative, the likelihood that the bond will require an assessment on taxpayers is reduced significantly.”

It also means that those who have no interest in the fiber cooperative may have to pay higher taxes in the event it struggles financially. However, the other benefits to the area—increased property values, more economic development, etc.—may justify this risk. For example, a 2015 study by the Fiber to the Home (FTTH) Council found that access to fiber may increase a home’s value by up to 3.1 percent. Per their analysis, that increase amounts to about \$5,400 from a property of \$175,000, roughly the equivalent to adding a fireplace or half a bathroom to a house.⁹

In the worst case scenario, if the network cannot pay back its loan and taxes would have to cover the bonds, the average cost will be \$10 to \$15 per

month per property.¹⁰ That is a scenario in which the network generates zero revenue and no asset could be liquidated, an all-but-impossible result. If RS Fiber does struggle financially, it will most likely still be able to make partial payments and the benefits from the network would almost certainly outweigh any tax subsidy to cover the rest of the payments.

RS Fiber officials are confident there will be plenty of RS Fiber subscribers given that community surveys showed 55 percent or more of respondents pledged to participate in the network.

For phase 1, the RS Fiber Cooperative received a loan of \$8.67 million raised from the cities. Nine of the cities used general obligation tax abatement bonds whereas Buffalo Lake used existing funds split between the local government and economic development authority. Both the bonds and loan are for a term of 20 years and an interest rate of 4.5 percent.

In phase 2 financing to bring the fiber-optic network to the 17 rural townships, the Joint Powers Board is

Summary of Financing for Phase 1*

Phase 1 project costs	\$16,100,000
SOURCES OF FUNDS	
Joint Powers Board Loan from 9 cities via General Obligation Bond for Economic Development	\$8,065,000
City of Buffalo Lake Loan	\$612,000
Construction Loans from Banks & Individuals	\$3,750,000
Term Loan from Rural Electric Economic Development, Inc. (REED)	\$1,500,000
Term Loan from Renville-Sibley Electric Cooperative (REDL)**	\$1,000,000
Term Loan from Renville-Sibley Electric Cooperative (REDG)**	\$300,000
New Market Tax Credits (estimated net proceeds)	\$3,200,000
State of Minnesota Broadband Development Grant	\$1,000,000
Initial Investors—Phase 1	\$330,100
TOTAL FUNDING SOURCES (not all are required for Phase 1)	\$19,757,100

Source: Sterling Capital Advisors
 *All numbers are rounded to the nearest thousand (000s).
 **Rural Economic Development Loan (REDL) - <http://www.rd.usda.gov/files/fact-sheet/RD-FactSheet-RBS-REDLG.pdf>.

expected to make a second loan to the Cooperative in the amount of \$4.9 million. The 17 townships will issue bonds to supply those funds. Additional funds may come from economic development loan programs at USDA.

Other People's Money

Several local investors and banks, including ProGrowth Bank, The First National Bank of Fairfax, CornerStone Bank and MidCountry Bank, chipped in for RS Fiber, providing \$3.75 million in senior secured construction loans for Phase 1.

Rural Electric Economic Development, Inc. (REED) is also providing \$1.5 million in term loan financing to RS Fiber. REED is a South Dakota-based non-profit organization whose geographic reach includes Minnesota rural electric cooperatives.

In addition, Renville-Sibley Cooperative Power Association has applied to the U.S. Department of Agriculture for two loans totaling \$1.3 million as part of the Rural Electric Development and Grant Loan Program, according to Keithahn.

The local banks, REED, and the Renville-Sibley Electric Cooperative are RS Fiber's secured lenders, which are entitled to the first claim of loan repayment from operating cash flow or liquidation of RS Fiber assets. "The secured lenders will be repaid in full before all other funding provided by lenders or investors," Keithahn said.

The First National Bank of Fairfax made a construction loan to the RS Fiber Cooperative of up to \$500,000.

"We are involved in the community," said Ron Winch, president of the First National Bank of Fairfax, explaining why his bank is supporting RS Fiber. "We believe we need [RS Fiber] for people

"This project is as important to me as when Fairfax brought in rural electricity and natural gas."
-Ron Winch, First National Bank of Fairfax

We just can't let this slip past us!




The opportunity for the RS Fiber project to bring benefit to area ag producers is something we just can't slip past us.

The high speed internet alone will let producers get more information on not just inputs and markets but online auctions and general news and information from a variety of sources, including online videos and information from the University of Minnesota.

I urge everyone to support this project by turning in a pledge card.

Charlie Woehler
Arlington



Community Owned and Community Driven!
www.rsfiber.com - info@rsfiber.com - 1-800-628-1754

One of many ads from the marketing committee.

in our community. This project is as important to me as when Fairfax brought in rural electricity and natural gas."

Besides its construction loan, the First National Bank of Fairfax plans to make an equity investment of \$50,000 in RS Fiber under the "public investment welfare authority" provisions of the federal Office of Comptroller of the Currency (OCC—regulator of banks with a federal charter).

The federal agency gave the Fairfax bank permission to make that investment in 2015. This dispensation can allow local banks to better support essential local projects.

Under the OCC authority, a national bank may undertake investments that promote the public welfare, allowing those financial institutions to make investments not otherwise permitted. These investments must primarily benefit low- and moderate-income individuals (LMI), LMI areas, or

other areas targeted by a governmental entity for redevelopment, or receive consideration as a “qualified investment” under the Community Reinvestment Act. Qualifying areas may also include distressed or underserved non-metropolitan middle-income areas, according to Tim Herwig, an OCC community affairs officer.

“This is especially important to rural fiber-optic networks, as there are limited LMI areas in rural America,” he said. Herwig believes the First National Bank of Fairfax is the first community bank in the nation to apply the public welfare authority for this purpose. Banks supervised by the Federal Deposit Insurance Corporation (FDIC) and the Federal Reserve Banks may also apply to their regulators for permission to make similar investments in fiber-optic networks that meet the public welfare definition, he said. RS Fiber has set a precedent that allows local banks in rural areas to better invest in their communities. Due to the high cost of building these networks, developing a new tool for local banks to invest in needed projects is a welcome development.

RS Fiber also received a financial boost from the state of Minnesota. It was awarded a \$1 million grant from the state Office of Broadband Development to expand service in unserved areas, which it will do in phase 1 by connecting homes close to the fiber running between cities and wireless access points.¹¹

The Cooperative also expects to receive more than \$3 million from New Market Tax Credits, part of a federal community development tax initiative program administered by the U.S. Department of the Treasury. The program is designed to provide investors, such as banks, with credits against federal income tax in return for new investments made in eligible businesses and commercial projects in low-income areas.¹²

Finally, the RS Fiber project also originally benefited from a Blandin Foundation matching grant that originally allowed the communities to begin studying the project (details below).

The financing for RS Fiber Cooperative is a testament to a dedicated group of people that were determined to fund the infrastructure their communities needed to thrive in the digital economy. It fundamentally rests on the capacity of local governments to issue general obligation bonds, subordinate their stake to other investors, and thereby take the vast majority of the financial risk from the project.

One other element greatly helped the project get started. Rather than building fiber out to everyone immediately, the co-op built fiber to the areas with the most density—where it would get the fastest return on its investment. Simultaneously, it built the wireless service to immediately offer needed service to the townships that otherwise had little or nothing in the way of access. Not only did this give the township residents better access, it immediately began generating revenue that can be used to finance the phase 2 fiber expansion to every premise. This business plan also gave investors more faith in the project’s viability.

Grassroots Marketing, Unchained

One of the most interesting aspects of the RS Fiber approach has been its commitment to grassroots outreach. Early on, supporters formed a citizens’ marketing committee to educate the public about the technology and the details behind the business and financial plans. They created one of the most successful educational efforts of any community network. The marketing committee traveled the region, conducting as many as three meetings a day in a single location (morning, afternoon, and evening to maximize educational opportunities), more than 100 between 2010 and 2014. Over the course of the project, approximately 85 people were involved with the committee.

The marketing committee members also went door-to-door to inform and promote the RS Fiber project. Community response was enthusiastic with one woman saying the project was “the biggest no-brainer” while offering to take pledge cards door-to-door in Green Isle (pop. 514).



Another key activity involved mailing out 14,400 copies of a publication called “[What Fiber Broadband Can Do For Your Community](#),” a 30-page booklet more commonly called the FTTH Primer.¹³ It offers basic facts on fiber-optic networks, how they work, the case for fiber, and examples of success stories. The mailings, which each household received twice, were done in two batches of 7,200 copies with one copy sent out in the summer of 2011 and the second one distributed a year later.

Many people read the FTTH Primer and organizers claimed it was among the most effective tools for raising public awareness and education about the project. The trade publication “Broadband Communities” is one of the publishers of the primer and sent bulk shipments at no charge or for the price of shipping if expedited shipping was necessary.

The marketing committee also engaged in other public relations including Facebook, a dedicated website, billboards, county fair booths, and advertising in several local community newspapers that totaled more than \$20,000, Erickson said. The newspaper ads included meeting announcements and testimonials for RS from a variety of community leaders.

This marketing was essential in the face of strong opposition from the existing telephone companies. Some of the opposition is discussed in greater detail below. But as Erickson noted on multiple occasions, it provided a big challenge because people tend to trust “Ma Bell.” Erickson himself heard rumors that he would be personally profiting from the network, not the only whopper he confronted.

The marketing committee from RS Fiber should serve as a model for any community seeking to educate its businesses and residents. They readily acknowledged the risks involved with their approach but the community overwhelmingly decided the risks of doing nothing were far greater. ■



Once Upon a Time in Greater Minnesota

Now a deeper look at the history of RS Fiber.

Mark Erickson left Hiawatha Broadband Communications (HBC), a successful provider of cable television, telephone, and high-speed Internet access to several southeastern Minnesota communities, to become city manager of Winthrop (pop. 1,400), Minnesota. At the time, he expected to be far removed from the world of telecommunications.

Erickson expected the biggest challenges in his new job in Winthrop would be dealing with “barking dogs and unshoveled sidewalks.”¹⁴

In fact, during his interview for the Winthrop manager’s job, no one asked Erickson about telecommunications.¹⁵ Little did he know he would spearhead an ambitious and trailblazing effort to bring the latest in connectivity speeds to the region.

“The whole project, I believe, was serendipitous,” Erickson said. “I came to Winthrop on a bit of a lark and the mayor of the town had a vision for technology for his community. I had the background and the town had the desire. If you tried to make that happen it wouldn’t have worked.”

Shortly after Erickson arrived in Winthrop, the City Council, led by Mayor Dave Trebelhorn, directed him to see if the community could get better Internet access.

“The council said they wanted competition to Mediacom,” Erickson recalled. “They (Mediacom) were the only broadband provider at the time. Winthrop Telephone [the small private telephone

incumbent] offered .256/.128 Mbps (down/up) Internet for \$50 a month and .512/.128 for \$100 a month. I didn’t consider it broadband at all.”

For his part, Trebelhorn said, “I figured there’s got to be a better way. I didn’t know much about fiber until I was talking to Mark [Erickson]. Mediacom didn’t have it. They had their coax [cable]. The Winthrop telephone company has got their regular copper. What’s the next best thing? Let’s see if we can have something better.”

During 2009, Erickson contacted Winthrop Telephone Co. to see if it would build a network or partner with the city to carry out such a project. (Originally a small family-owned company with a service area within Winthrop’s city limits, it is now absentee-owned.)

Initially, Winthrop Telephone expressed interest. But the company eventually declined, contending that such a project would be too expensive and needed more customers to make it financially feasible. Other ISPs (CenturyLink, Frontier and Mediacom) also declined to partner with the city to build a fiber-optic network.¹⁶

Despite this initial setback, Erickson and other Winthrop leaders were undeterred. They knew something needed to be done as inadequate Internet speeds from incumbent providers were a problem for people in the community.

Mayor Trebelhorn then suggested that Winthrop look into doing a FTTH municipal project on its own.

Aggregating Demand

Erickson knew it wasn't practical for his town to take on the Internet deficiency problem by themselves because Winthrop (pop. 1,400) did not have a large enough population to handle the expense of going solo to build its own fiber-optic network.

Erickson then contacted neighboring communities to see if they wanted to pool resources to build a FTTH network. When nearby Gaylord (pop. 2,305) expressed interest, the two cities collaborated and soon gained other municipal allies for the venture. The group included the cities of Arlington, Gibbon, Green Isle, Henderson and New Auburn in Sibley County and Fairfax on the eastern edge of Renville County.¹⁷

"We included the city of Fairfax and the surrounding four townships in the original project area because of the GFW (Gibbon Fairfax Winthrop) school district," Erickson said. "It didn't make sense to include Gibbon and Winthrop and exclude Fairfax."

"The Blandin Foundation and their Director of Public Policy and Engagement Bernadine Joselyn, and her staff, have been our fiercest and most loyal supporters ... No Bernadine and Blandin, no RS Fiber project."

- Mark Erickson

In May of 2010, the Blandin Foundation awarded a \$40,000 matching grant toward a feasibility study to look at creating a fiber-optic network for the cities of Arlington, Fairfax, Gaylord, Green Isle, Henderson, New Auburn and Winthrop. Tim Dolan, executive director of the Sibley County Economic Development Commission, suggested the study also include rural farms. The Sibley County Board, which was representing the interests of people not living in the cities in this case, provided the \$40,000 grant match for the study because it included the rural areas.¹⁸

Besides its initial \$40,000 grant, the Blandin Foundation also provided unsolicited another \$30,000 in grant funds during RS Fiber's first four years, Erickson said. "The Blandin Foundation and

their Director of Public Policy and Engagement Bernadine Joselyn, and her staff, have been our fiercest and most loyal supporters," he said. "No Bernadine and Blandin, no RS Fiber project."

Dial Yes For Feasibility

In mid-2010, the consortium of cities conducted a telephone survey to gauge public interest in a FTTH network for their region.

In the survey, 70 percent of respondents answered "Yes" when asked, "Should the local governments partner with a commercial provider to offer quality cable TV, telephone and data service at a lower price." In another survey question, 63 percent of respondents said "Yes" when asked "Should the

local governments consider directly offering cable TV, telephone and data service to households and businesses?"

By January, 2011; the several cities and Sibley County received the feasibility study report from CCG Consulting, a Louisiana-based firm. The report offered two options

for its clients to consider. First, a triple-play fiber network (cable TV, Internet access, and telephone service) for \$100 a month only to premises within the cities.¹⁹

Under this scenario, CCG Consulting said the cities would need to borrow \$33.7 million; it predicted the network could achieve break-even status within its first five years of operation if it had very strong uptake from residents.²⁰

The consultant's second option was to extend the FTTH network to all farmers in Sibley County plus everyone within the Fairfax telephone exchange in Renville County. Given the same service and subscriber assumptions as option one, the alliance of cities and townships would need to borrow

\$63 million; it was projected to break even in the seventh year.²¹

The Joint Powers Board Rises

The Joint Powers Board held its first official meeting in March, 2011 with all of its representatives from Renville and Sibley counties and the eight cities then participating—Fairfax, Gibbon, Winthrop, Henderson, Gaylord, Arlington, Green Isle and New Auburn.²²

“The cities formed the Joint Powers Board because we needed a workable structure to put the project together,” Erickson explained. “The JPB acted on behalf of the city councils. If we would have had to go back to each city council for every little decision, it [RS Fiber network] would never have happened. We originally envisioned the JPB [on behalf of and with the acquiescence of the participating city councils] selling a revenue bond for tens of millions of dollars. In order to do that and have the authority to enter into contracts and hire an operator and such, we needed a governance structure that allowed it all to happen.”

The Joint Powers agreement enabled the small group of local governments to fund start-up office operations and engage in marketing. Participants in the Joint Powers partnership agreed to fund the entity on a per capita population basis of \$10.50 per resident. That provided the Joint Powers Board with a start-up budget of about \$180,000. Sibley County represented the townships and paid their costs. Renville County also took on a similar plan for four of its townships.

Still, Erickson would still encourage companies like Frontier to consider partnering, saying the JPB could finance it and let Frontier or others operate it in their territories. But the telephone companies had no interest.

In October, 2011, the JPB hired Hiawatha Broadband Communications to design, build, and operate the planned RS Fiber network. HBC was a logical choice for the job given its expertise and experience as a service provider that had managed multiple FTTH networks. It had previously operated a municipal FTTH network in a partnership with the city of Monticello, Minnesota, and HBC sought more control over the RS Fiber network to remedy its perceived problems with that arrangement.²³

To Kill a Competitor

While there was strong public backing and an active grassroots support for a municipal-supported FTTH, a few companies, including Frontier and CenturyLink, strongly opposed the idea as did the Minnesota Telecom Alliance (MTA), an industry trade group.²⁴

They urged the cities and counties to withdraw from the joint powers consortium, contending the public would foot the entire bill for the RS Fiber network when it would inevitably fail. Frontier, CenturyLink, and the MTA have long argued that their services are adequate and new networks are unnecessary.

To the extent they acknowledge any need for more investment, they tend to argue for government programs to subsidize their own efforts to the exclusion of new entrants.

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At a December 14, 2011 meeting of the Sibley County Board, Frontier General Manager Todd VanEpps claimed their copper infrastructure could compete with fiber. “We have had copper in the ground for many years and it is paid for already,” he insisted. “What we can do is provide the same speed of service as fiber can provide.”²⁵ However, the facts don’t support that claim; fiber-optics can offer far greater capacity and a range of other benefits that copper DSL networks cannot. DSL is particularly limited in rural settings because available capacity declines rapidly with longer distances.

Frontier also warned the Sibley Board that “the County could write itself into quite a debt” and questioned the projections and cost analysis from the feasibility study. Erickson, the Winthrop city manager, indicated this barrage of constant, opposition was a major reason why the RS Fiber officials never presented the spreadsheet behind their feasibility study at a public meeting or the underlying assumptions behind the results.

The phone company’s and Mediacom’s opposition to RS Fiber was disappointing and somewhat confusing because members of the JPB had offered to have the local governments find a way to finance and build the network and hand it over to each of them in their particular footprints if they would work collaboratively with the JPB, Erickson said. They all rejected the offers, he said.

In January, 2012, four more communities voted to join the RS Fiber project, helping give it more density and reaching more people. The cities were Brownton (pop. 735) and Stewart (pop. 555) in McLeod County, Buffalo Lake (pop. 700) in Renville County, and Lafayette (pop. 495) in Nicollet County. These additions increased the Joint Powers Board to 14 members.

While the RS Fiber project was gathering support, there were some political bumps along the road.

The Concerns of Sibley County

In March, 2012, the Sibley County Board suspended a vote in favor of the RS Fiber project, asking JPB officials to collect 1,000 more signatures from residents supporting the project before they would vote to back it. The Sibley commissioners also asked the project backers to “poll” the townships in Sibley County to reaffirm their stand on the project.²⁶ As Sibley County was representing the townships,

a county withdrawal would make it far harder financially to raise the funds to build to everyone.

The Sibley commissioners’ vote inspired marketing committee volunteers to lead a new charge for the proposed network. They went door knocking and made phone calls to round up more support.

Within a month, the group obtained another 800 pledges in addition to the 3,500 it had already garnered for the project. In the rural areas, more than 62 percent of residents supported the

project.²⁷ The Sibley Board voted in late April to back the project in its next phase, financing.

However, the cities of Arlington and Henderson dropped out of the JPB, in part due to anti-government

sentiment of some mixed with the strong opposition of the telephone companies.

Erickson blamed incumbent providers’ strong opposition to RS Fiber for scaring away some local governments from joining the joint group effort.

“One of the most powerful ones for me that just scared the hell out of me was when we had that township meeting,” Erickson recalled about the scene at one public gathering. “We have 115 people in the room and the regional manager of CenturyLink, stood up and said, ‘When are you going to quit lying to these people, Mark? This is going to fail. There’s 100 percent chance of failure. Their taxes are going up. When are you going to quit lying to them?’ How do you answer that without saying, for me, without it blowing up? People just have a tendency to believe Ma Bell. The phone company is saying that.”

A recurring claim from industry opponents that Erickson had to respond to was that the nearby municipal fiber network, WindomNet, was a financial failure. Opponents were frequently citing that it

Losing money in the early years is the nature of all FTTH investments because nearly all the costs come before revenues are generated—one has to build most of the network before signing anyone up.

had lost a lot of money in its early years, which was true and anticipated by the business plan. Losing money in the early years is the nature of all FTTH investments because nearly all the costs come before revenues are generated—one has to build most of the network before signing anyone up. But as ILSR demonstrated in a case study on WindomNet, the network has led to significant job creation, hundreds of thousands of dollars of savings in a small community, and some of the best Internet access available in the state, including the metro areas.²⁸

On October 23, 2012, the Sibley Board reversed course and withdrew its support from the project. Many were frustrated with the County Commissioners because their withdrawal would seriously complicate the financing needed to connect the farms. And in another twist, two other municipal revenue bond projects elsewhere in Minnesota [one in Vadnais Heights involving a public sports arena; the other in Monticello on revenue bonds issued for its broadband network] encountered problems, causing losses for bondholders.²⁹ RS Fiber had been considering issuing revenue bonds that would not be backed at the full faith and credit of taxpayers, but that market had just become very skittish.

The Cooperative Redemption

Without such a determined group of supporters, the RS Fiber project might have folded after the Sibley County Board's withdrawal and the opposition of incumbent service providers. But RS Fiber's staunch backers had come too far to let their project get plowed under like a fall harvest.

The county's withdrawal left many farmers and citizens who had attended that meeting livid and

feeling betrayed. Cindy Gerholz, one of the stalwarts behind the marketing committee, was among the most vocal supporters who would not let the RS Fiber project die. "We were not going to be left out in the cold," she said.

Within 24 hours of the Sibley County Board's vote to withdraw from the project, several farmers and other RS proponents met with Jeff Nielsen, general manager of the local United Farmers' Cooperative (UFC), to see what they could do to keep the momentum going for the FTTH project.

Nielsen facilitated an organizational meeting to form a rural telecommunications cooperative. Besides being a long-respected community institution that had just celebrated its 100th anniversary, UFC

helped get the fledgling RS Fiber Cooperative off the ground. UFC's support included \$20,000 in seed money and free legal assistance from its general counsel Joel Dahlgren, Erickson said.

"In the nearly two years since the new business plan, Joel has provided hundreds of hours of legal support and

attending dozens of meetings all at no charge to the fiber cooperative," Erickson said of Dahlgren, a 30-year legal veteran of co-op law.

Cooperatives are very familiar in rural America, particularly in the upper Midwest. The Renville-Sibley county region has scores of cooperatives. In Winthrop alone there are four agricultural-based cooperatives, with Dairy Farmers of America and Land O'Lakes being two of the largest U.S. dairy cooperatives in the nation.

The original RS Fiber Co-op board was comprised of people living in the townships that were involved in the fiber project. "They weren't elected but just asked to join," Erickson said. "There was no criteria

Within 24 hours of the Sibley County Board's vote to withdraw from the project, several farmers and other RS proponents met with Jeff Nielsen, general manager of the local United Farmers' Cooperative (UFC), to see what they could do to keep the momentum going for the FTTH project.

other than interest and enthusiasm to see the project succeed.”

Reflecting on organizing for the new cooperative, Gerholz noted, “We knew the city folks were going to continue with this project one way or another. But we also knew that the rural area construction cost was going to run in the neighborhood of \$30 million to build out. We realized in the rural area that we needed to form a co-op to find a way to get the money and actually perhaps buy our services from the city.”

Without the county involved, individual townships had to discuss whether to join the JPB in order for their residents to be part of the co-op. Most have voted to join and will have to bond in a few years to seed the second phase. Over time, it will be interesting to compare changes between townships based on wireless and/or fiber access.

Though the county withdrawal was clearly disappointing, there was also a sense that the county would have been a reluctant partner that opponents of the network would have continued to lobby. Without the county, only the supportive townships joined, resulting in a more positive group. Of the 21 townships asked to join the project, 17 did.

Two years later, the project would hit a turning point. In between, network organizers were considering every option available to finance the network.

Saving RS Fiber

In August of 2013, during a conversation about how to move the project forward, JPB financial advisor Shannon Sweeney, an associate at David Drown & Associates, came up with what would ultimately prove to be a winning idea. Sweeney suggested the JPB sell a general obligation tax abatement bond and loan the proceeds to the fiber cooperative as an economic development loan, in essence providing a down payment for construction of the project.

The JPB and cooperative boards liked the idea and turned execution of the financial plan over to Phil Keithahn and Dan Pecarina, CEO of HBC.

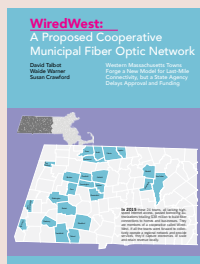
For Keithahn, the turning point in advancing the RS Fiber project came on Sept. 11, 2014. “That was the day where it [RS Fiber] got divided from one massive project into two phases,” Keithahn said and credited Pecarina with the breakthrough. During the next

60 days, Keithahn, Pecarina, and Sweeney worked with Doug Dawson (of CCG Consulting) to revamp the RS Fiber project. This action made a lot of sense—and cents—for one major reason:

“The concentration of people [residential hook-ups] and the cost to connect households and businesses is much more cost-efficient in a community than in rural areas,” Keithahn said. “By hooking up the cities first, the revenues and cash flows provide additional financial support to cover the more

“In the two years that I was at most of the board meetings, I can’t say that there was a single board meeting where at least one person didn’t have their stomach churning about ‘Is this going to work out and are we doing the right thing?’”

—Denny Schultz



A recent paper from the Berkman Center describes the WiredWest project in rural western Massachusetts, where a group of small towns have formed a broadband cooperative using a different model. The report details their approach, including the logistics of forming the cooperative, funding procurement, finding consultants, and the various challenges they have faced. The report also describes the political challenges facing WiredWest as it transitions from an idea into a functioning network.

expensive hookup costs for rural farm sites and agribusinesses” in the second phase. They could raise a more manageable \$16 million to get the project started before moving on to the higher cost areas.

From November, 2014 through the first five months of 2015, Keithahn explored several potential sources of financing for RS Fiber.³⁰ The tool that played a vital role to get RS Fiber off the ground was the general obligation bonds.

In the spring of 2015, the 10 cities supporting the RS Fiber network united to raise a combined \$8.67 million from the sale of the general obligation tax abatement bonds. Each participating local unit of government held public hearings before taking their vote that authorized community participation in the bond sale, through the JPB. The cooperative broke ground in July.

Since making the loan to the cooperative; the JPB has receded into the background, serving primarily in an oversight capacity. It now meets quarterly to hear progress reports from the RS Fiber Co-op board on such things as funding levels, loan compliance status, and progress on user subscriptions numbers.

“In the two years that I was at most of the board meetings, I can’t say that there was a single board meeting where at least one person didn’t have their stomach churning about ‘Is this going to work out and are we doing the right thing?’” recalled Denny Schultz, a co-op Board member who is a farmer from south of Arlington (pop. 2,179). ■



Fin

RS Fiber offers several important lessons for those seeking to improve Internet access locally.

The most important lesson is that these networks can require considerable organizing. RS Fiber advocates spent years educating the community using a variety of strategies. They gave people many opportunities to learn about the project and question those putting it together. Perhaps most importantly, they helped to keep enthusiasm high despite numerous setbacks that could have derailed the project.

Another key lesson is that the community could use its local government capacity to issue bonds to provide seed funding to the co-op. Because the loan from local governments to the co-op is subordinate to other investors, local banks and other entities had very little risk for their investment. This allowed the co-op to raise enough capital to start the project.

Another important takeaway is the combination of wireless and fiber. Most people immediately had an option that was much faster than anything they could get previously and the network began generating revenues that could be reinvested. Some feared that a wireless network might be seen as sufficient and the fiber would not be expanded. But because everyone taking service has a vote, they can demand that the fiber be extended.

And finally, the power of locally rooted solutions cannot be understated. This co-op is democratically accountable to the community. In the decades to come, the co-op will remain motivated to keep prices reasonable, invest in new technologies, and otherwise ensure the region can thrive. That is a long term solution the community can bank on. ■



Broadband Glossary

The world of broadband is filled with its own language. Here's an overview of the most commonly-used appearing terms and what they mean:

Coaxial cable

A shielded copper cable typically used by cable TV companies to connect homes and businesses. Subscribers are on a loop, where all local bandwidth is shared between 200–1000 premises typically.

Fiber-Optic

A system that uses glass to carry light that's used to transmit information. Typically, each side of the fiber is attached to a laser that sends pulses of light as signals. When the connection reaches capacity, the lasers can be upgraded to send much more information along the same strand of fiber. This technology will remain the dominant method of transmitting information for the foreseeable future.

FTTH

Fiber-to-the-home. As most telecommunications networks use fiber in some part of it, FTTH is used to specify those that use fiber to connect the subscriber. Some claim they have a fiber-optic network because they use fiber to the node even when they use phone lines or a cable network over the last mile.

Mbps

Megabits per second—a measure of speed. 8 Mbps means that 8 million bits are transferred each second. Using an 8 Mbps connection, it would take 1 second to transfer an 1 MB (Megabyte) file—a photo, for instance. Don't get lost in the details—when it comes to Mbps, more is faster. 1 Kbps (Kilobits) < 1 Mbps < 1 Gbps (Gigabits)

Passed

Residences or businesses that have access to the network. As a FTTH network is constructed, it will generally be built through a neighborhood before individual houses or businesses are connected via a drop cable (which is also a fiber-optic cable). When a house or businesses is “passed,” it means they are eligible to sign up for services.

Open Access

An arrangement in which the network is open to independent, competing service providers to offer services.

Symmetrical

Internet connections have two components—a downstream (from the Internet to the user) and upstream (from the user to the Internet). When the two speeds are comparable, the connection is termed symmetric. Fiber-optic networks more readily offer symmetrical connections than DSL and cable, which are inherently asymmetrical because the upstream speeds are so much slower than downstream.

Take Rate

The number of subscribers to a service—typically expressed in a percentage of those taking the service divided by the total number of people who could take the service. If a community fiber network passes 10,000 people and 6,000 people subscribe, it has a take rate of 60%. When planning the network, it will be built to be profitable at or above a certain take rate as defined in the business plan.

Triple play

The three main services offered over telecom networks today—television, phone services, and Internet access. Service providers frequently offer deals that will lower the cost on these packages. Typically, television breaks even or loses money whereas the service provider makes the most profits from phone and Internet access.

Wi-Fi

This is a suite of protocols that allow wireless devices to exchange information using unlicensed frequencies. Equipment carrying the Wi-Fi brand is interoperable. A number of cities and private companies attempted to blanket their cities with Wi-Fi but the technology is not well suited to such large scale efforts.

Notes

- 1 [“All Hands On Deck”](#) report, September 2014, Christopher Mitchell and Lisa Gonzalez, p. 61.
- 2 Mankato Free Press news story http://www.mankatofreepress.com/news/local_news/gfw-students-to-get-ipads/article_a90f4424-1d4b-521e-a71f-64a7a6e99062.html
- 3 [“All Hands On Deck”](#) report, p. 65.
- 4 RS Fiber Cooperative was established under MN law as a Chapter 308B cooperative.
- 5 This service is provided using 2.4 GHz and 3.6 GHz technology).
- 6 ILSR interviews with RS Fiber officials, Dec. 10,2015
- 7 Phil Keithahn email on January 18, 2016.
- 8 <https://www.revisor.mn.gov/statutes/?id=469.1813>
- 9 <http://www.ftthcouncil.org/p/bl/et/blogaid=359>
- 10 [“All Hands On Deck”](#) report, p. 65
- 11 <http://mn.gov/deed/newscenter/press-releases/newsdetail.jsp?id=466-155088>
- 12 http://www.newmarkets.org/section/lisc_newmarkets/faq#what_nmtc
- 13 http://bbcmag.com/Primers/BBC_Nov14_Primer.pdf
- 14 [“All Hands On Deck”](#) report, p. 59-60
- 15 [“All Hands On Deck”](#) report, p. 59-60
- 16 [“All Hands On Deck”](#) report, p. 60
- 17 [“All Hands On Deck”](#) report, p. 60
- 18 [“All Hands On Deck”](#) report, p. 60
- 19 [“All Hands On Deck”](#) report, p. 61
- 20 [“All Hands On Deck”](#) report, p. 61
- 21 CCG Consulting LLC “Sibley County & Fairfax” report
- 22 [“All Hands On Deck”](#) report, p. 62
- 23 See the section on Monticello in the [“All Hands On Deck”](#) report.
- 24 [“All Hands On Deck”](#) report, p. 63
- 25 [“All Hands On Deck”](#) report, p. 63
- 26 [“All Hands On Deck”](#) report, p. 62
- 27 [“All Hands On Deck”](#) report, p. 62
- 28 See WindomNet case study in [“All Hands On Deck”](#) report
- 29 For more information on what happened to the Monticello project, see [“All Hands On Deck”](#) report, p. 62
- 30 [“All Hands On Deck”](#) report, p. 65

