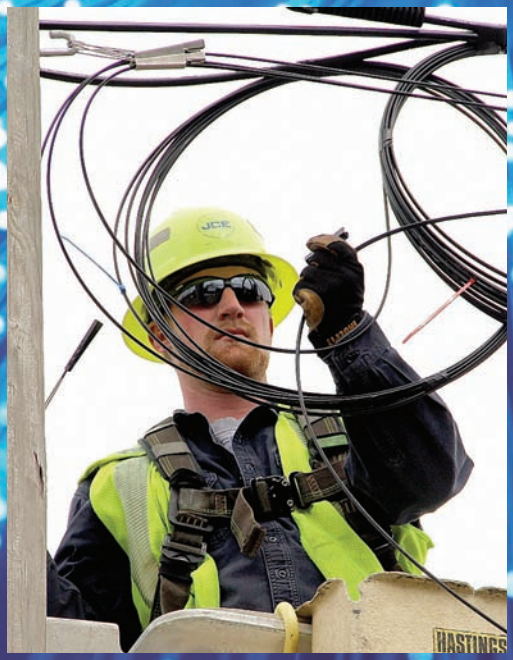
connected

creating fiber optic communities



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Sand Prairie
Connecting our members to the world.
A service of Jo-Carroll Energy

Special section of:

The Galena Gazette

Then. Now. Always.

WE'RE PROUD TO POWER YOUR LIFE.

Co-ops work with communities to do things that might otherwise be impossible - like when electric co-ops brought power to areas others didn't find feasible.

Today that means convenient member services, youth programs, renewable energy options and broadband internet service.

We work hard everyday to bring members safe, reliable, affordable electric, natural gas and broadband internet services.

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connected

creating fiber optic communities

Jo-Carroll Energy and Sand Prairie's vision is to enhance the quality of life for our members. Eighty years ago that meant turning on the lights; today it is connecting our members to the world.

Although high-speed Internet options have become increasingly available, much of rural America remains unserved or underserved. That's why Sand Prairie, a service of Jo-Carroll Energy, undertook a fiber project.

Reliable high-speed Internet service, combined with advances in technology, enriches local innovation, precision agriculture, education, healthcare, the workforce and the overall quality of life.

For rural areas to remain competitive and prosper, it is necessary to have the infrastructure in place–that includes high speed fiber Internet service. Jo-Carroll Energy has an obligation to deliver safe, affordable and reliable service. As a co-op, we believe we have a responsibility to work together with our board, our employees and our members to achieve rural prosperity.

Businesses are the economic driver in our area; they bring jobs that fuel our local economy. More jobs, more money, more tax revenue. It all adds up and feeds the economic engine that leads to a long-term prosperous future.

I recently attended an economic development workshop where a speaker shared the importance of preparing our rural communities *now* for decades out. He emphasized that more people will begin moving back to rural towns where they can perform the same work virtually and live a much simpler life.

Rural areas currently export more 20-year-olds than they are attracting. We need to work to retain and bring in new talent to our area. Most young people aren't looking to relocate because of the job, but for quality of life. More jobs can now be performed remotely. If we provide the infrastructure–fiber–for them to work remotely, they will stay or return.

The speaker also discussed the importance of developing attractions that will draw younger people to our communities. We already live in a unique area of the country that draws over a million visitors a year. When they leave, they want to come back. Many have. They purchase or build new homes and start or move their businesses here.

Fiber is a key element to keeping and drawing younger people and transforming more of the visitors into residents who can bring in new businesses that heighten the quality of life our area offers.

Within a decade, we envision northwest Illinois as a new hub for high-tech businesses in Illinois, fiber being a critical component.

We are extremely pleased with the feedback and testimonies of those who have received high-speed Internet service and how it has enhanced your lives and businesses.

We look forward to hearing from you regarding your interest in fiber.

Mike Casper, Jo-Carroll Energy
president and CEO

On the cover: The lineman is Jordan Esser.
In the group photo, from left: David Niccum, broadband technician; Merri Sevey, Elizabeth Chamber president and JCE vice president of human resource; Tammy Trebian, Common Cents; Dan Marcure, director of technology; Steve Ludwig, lineman; Ryan Doty, lineman; Jeremy Whitmer, lineman; Jesse Shekleton, director of engineering; Mike Dittmar, Elizabeth village president; Ryan Randecker, broadband technician; and Jacob Salzmann, lineman.

Jo-Carroll considers fiber to be the most effective and economic broadband investment for members.

Roots

For Jo-Carroll Energy, today's fiber project harkens back to its original purpose

The Jo-Carroll Energy fiber project of today harkens back to the energy cooperative's roots.

In the late 1930s, when others weren't interested in bringing electricity to rural areas, Jo-Carroll Energy formed to solve a problem and improve the quality of life for residents of Jo Daviess and Carroll counties.

Now, decades later, Jo-Carroll, through Sand Prairie, a service of Jo-Carroll Energy, has returned to its problem-solving ways as the cooperative builds the necessary infrastructure that will bring jobs, productivity, opportunity and growth to this corner of Illinois.

While it was once electricity that was imperative, it is now access to reliable, high-speed broadband on which Jo-Carroll is focusing.

Electricity

Times were changing in the United States in the late 1930s. People in towns and cities took advantage of the latest technologies powered by electricity. There were electric lights, radios, washers, dryers, electric irons.

Life in rural America, however, was very different. Work was done by hand and light came from the dim glow of kerosene lamps.

Electric companies bypassed rural areas, hesitant to string power lines and turn on lights in areas where there weren't really enough people to justify the cost.

The numbers were staggering. In the late 1930s, 77 percent of the farms in Jo Daviess County and 82 percent in Carroll County still didn't have electricity.

When those rural residents gathered, talk often turned to forming an electric cooperative to improve quality of life and benefit businesses.

That happened on March 21, 1939, when a meeting convened at the Elizabeth High School gym to investigate bringing electric service to the rural areas of Jo Daviess and Carroll counties. Eleven days later another meeting took place in Mount Carroll, where the co-op was organized and nine incorporating directors were nominated and elected.

Jo-Carroll was born.

It was slow going at first for the fledgling co-op as members applied for a $240,000 Rural Electrification Administration loan, funds that would be used to construct lines and extend service to members.

The first 60 members received electricity over the initial 20 miles of distribution lines on May 3, 1940.

It took time, but the effort was underway and quality of life was improving.

For the future

Times are drastically different than they were in the 1930s and 1940s. In fact, it's difficult to even imagine a home without electricity and the technology it powers.

In Jo-Carroll Energy's early days, crews used manual labor to set poles. *Jo-Carroll Energy photos*

Fiber Internet is the electricity of today.

Unfortunately, just as with electricity, rural America is being largely passed by in fiber installation. Much of rural America is unserved or under-served.

And much in the same way that Jo-Carroll brought electricity to rural areas of northwest Illinois years ago, it is the rural cooperative spirit that makes Jo-Carroll naturally suited for fiber infrastructure.

In a 2018 survey, 30 percent of respondents to a Jo-Carroll Energy survey have wireless or satellite Internet service, 28 percent cable modem and 14 percent DSL. Another 12 percent rely on their cell phone or mobile device. One percent still use a dial-up connection.

Members want a better communication system. Economic development initiatives for this area are hampered by the lack of advanced communication systems. It limits business development, expansion and education and restricts modern amenities.

Just as with electricity, the natural beauty of this area also presents challenges when providing rural members with services. In the Driftless region, there are rocks, hills and forested areas that make construction and maintaining broadband systems difficult.

Fiber optics, Jo-Carroll officials know, are the best value-added technology to provide broadband to rural communities, farms and existing utility operation systems that have economic and personal benefits to living in northwest Illinois.

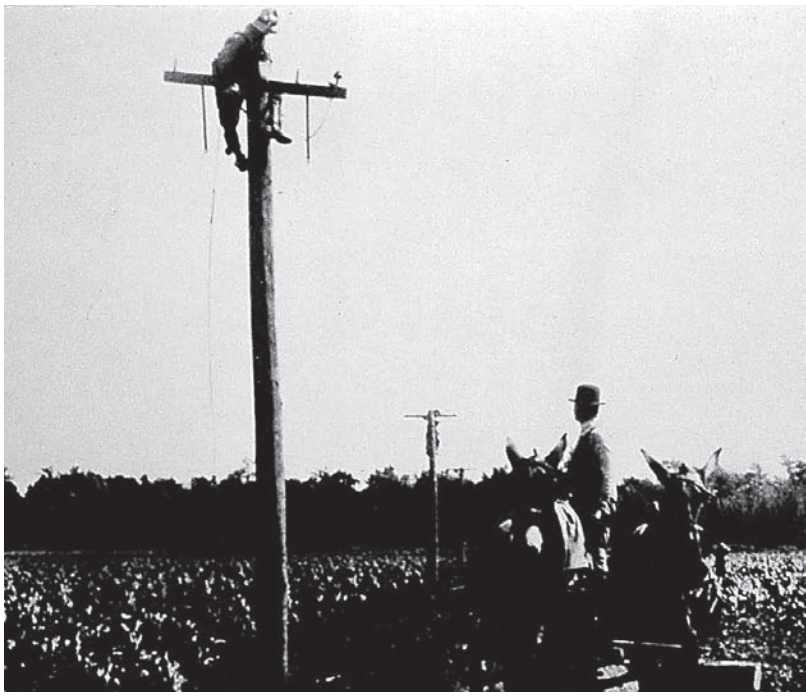
Jo-Carroll considers fiber to be the most effective and economic broadband investment for members.

'The U.S. is in 10th place worldwide in broadband speed. The U.S. has 14 times the number of devices on average of the top 15 countries with 142 million devices.'

Jesse Shekleton, director of engineering, Jo-Carroll Energy

Due diligence

Before delving into fiber, cooperative gives plenty of thought and study regarding feasibility of offering broadband service to its members



Standing with a team of horses in a cornfield, an observer watches as a cooperative lineman balances himself on a pole as electricity was brought to homes and businesses while electrifying rural America. *Jo-Carroll Energy photo*

Jo-Carroll Energy officials haven't jumped into the cooperative's fiber optic project without carefully considering all aspects.

In 2006, when the board of directors started to examine how to provide Internet service to members, there weren't a lot of options out there. Constituents, however, wanted an option and turned to the local electric co-op to possibly meet the need.

Jo-Carroll looked into multiple possibilities and business plans, said Kyle Buros, senior vice president and assistant general manager of Jo-Carroll. Visioning for the future was key, and that's been consistent through the years.

Two years later, in 2008, when Sand Prairie Wireless launched from the first tower at the Jo-Carroll headquarters in Elizabeth, officials had their sights set on fiber for the future.

Jesse Shekleton, Jo-Carroll director of engineering, said the advantage of wireless was the relatively low cost to install. But, wireless is limited in terms of capacity. From the beginning until today, Jo-Carroll was able to build its wireless customer base to 17,000 subscribers, Shekleton noted.

As the wireless business got off the ground and continued, Shekleton continued, Jo-Carroll officials continued to focus on fiber with research into peer co-ops with fiber experience and with information from a consulting group that assisted with preliminary feasibility studies. In 2015, Jo-Carroll officials began networking with local leaders in Galena for the Galena downtown pilot project the following year.

To help put the fiber need into perspective, Shekleton said, the U.S. is in 10th place worldwide in broadband speed. The U.S. has 14 times the number of devices on average of the top 15 countries with 142 million devices. If rural America were on pace with urban areas with fiber, the U.S. would climb from 10th to third place in terms of speed.

That's definitely motivation for the fiber project, said Shekleton.

The Galena downtown pilot project is an example of continued due diligence on the part of Jo-Carroll.

"We knew we needed to start somewhere," said Buros, explaining that the downtown area, with a good mix of overhead and underground lines, proved to be the perfect high density location.

From there, once the word was out, member interest drove the expansion.

"It's really about getting out and educating our membership," Shekleton said, of how important the cooperative has found member engagement to be with the fiber project.

A key aspect of Jo-Carroll's fiber success, Buros said, is the "polygon," a grassroots effort in which neighborhoods are able to express an interest in receiving fiber. Once enough interest is expressed, the engineering and design phase begins, cost estimates are compiled and then construction begins.

Shekleton echoed those comments. When considering bringing fiber to an area, Jo-Carroll staff monitor the database where members submit interest.

After internal review, if there's enough interest, preliminary engineering takes place.

Members are able to track where the area is in terms of a fiber build on the Jo-Carroll website, Shekleton said.

Once there's enough interest and the initial steps are complete, members from that zone can sign up, again on the website, committing to taking the service. When all that paperwork is complete, the process moves to the pre-construction phase. Construction takes four to six months, Shekleton noted.

If there's not a lot of interest in an area, Buros noted, that's not the end of the discussion. Jo-Carroll members, both individuals and businesses, can contribute to the cost of installation to make the project happen faster. That's happened multiple times.

Additionally, if other projects are underway, such as replacement of gas or electrical lines, Jo-Carroll may add fiber to the project.

"We're trying to build out as fast as we can," said Buros, noting the tremendous expense of the project and how great the board, staff and members have been throughout the process.

Mike Casper, Jo-Carroll president and CEO, credits the cooperative's board of directors with understanding the importance and necessity of this project from an economic development standpoint.

While the cost is high, Casper said, the co-op is designating funds each year to grow the fiber project. Other cooperatives have borrowed large sums of money, but Jo-Carroll opted for a different approach, budgeting over time.

Jo-Carroll is also applying for and pursuing U.S. Department of Agriculture grants and loans.

Jo-Carroll Energy

Your Touchstone Energy® Cooperative

Directors

Jo-Carroll Energy directors represent members of the cooperative's service area

David Senn,
Mt. Carroll, District 7
chairman

Russell Holesinger,
Fulton, District 8
vice chairman

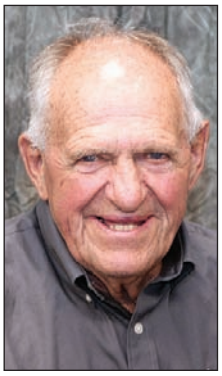
Martin Werner,
East Dubuque, District 1
treasurer

Marcia Stanger,
Apple River, District 3
secretary

Joseph Mattingley,
Scales Mound,
District 2

Dan Tindell,
Galena,
District 4

Patricia Smith,
Galena,
District 5



Thomas Lundy,
Savanna,
District 6

Larry Carroll,
Thomson,
District 9

Robert Kuhns,
Geneseo,
District 10

Continuing the cooperative spirit

Member-focused is the way Mike Casper, president and CEO of Jo-Carroll Energy, describes the culture of the cooperative.

The goal from the co-op's beginning has been to listen to the wants and needs of members and consider how the vision and goals of the co-op enhance the quality of life for members.

It really is about "connecting our members to the world," said Casper, citing the slogan of Sand Prairie, which is a service of Jo-Carroll Energy.

Such is definitely the case when it comes to fiber optics.

Jo-Carroll members shared a need, beginning in 2006, and the co-op responded, launching in 2008 the first tower at the office in Elizabeth for the wireless side of the business, Sand Prairie.

Jo-Carroll officials knew at that time that fiber was the ultimate goal, explained Kyle Buros, senior vice president and assistant general manager of Jo-Carroll.

There's something very satisfying and encouraging about seeing communities and neighborhoods work together to make things happen, said Buros.

"That really goes to the essence of the cooperative spirit," Buros noted.

In 2016, with the Galena downtown pilot project, the cooperative spirit again came into play. Jo-Carroll officials worked with city staff and business owners to test the waters with both underground and overhead fiber lines, said Jesse Shekleton, director of engineering for Jo-Carroll.

"This is a grassroots movement," said Shekleton, noting the fiber project speaks to the grit and determination of rural America to improve life and add economic value, just as the electricity projects of the 1930s did decades ago.

When the Elizabeth fiber project got underway, Jo-Carroll crews weren't so sure about what the fiber project was all about, said Casper, but it took very little time for them to really buy into the work they were doing.

Most of the crews live in the village or within a 15-mile radius.

When they experienced the benefits of fiber in their homes and heard positive responses from neighbors, crews knew the their work was improving the quality of life, enhancing the lives of Jo-Carroll Energy members.

Currently there are about 95 out of over 800 cooperatives across the country that are developing fiber programs, so there's a long way to go, said Casper.

And while the platform every co-op develops may be different, the goals are very much the same: to work together to bring fiber optics to rural America.

"We're here for one reason, and that's to provide services that are going to improve the quality of life," said Shekleton.

Sand Prairie timeline

- September 2008: JCE board of directors considers a proposal to construct substation infrastructure backbone to enable communication with the co-op's substations. Additionally, the staff proposal included a business plan to provide broadband wireless Internet services to the members utilizing the same infrastructure. The board approved the substation infrastructure and broadband service proposal.
- February 2009: Board approves rate proposal for the new Sand Prairie Wireless Internet service, establishing the broadband division as a new service for members.
- Dec. 1, 2011: Jo-Carroll Energy acquired JISP, a Stockton-based Internet service. All JISP patrons became a part of the Sand Prairie Wireless division and co-op members.
- Feb. 1, 2016: The co-op announces it was breaking ground on a fiber pilot project in downtown Galena.

'Broadband has brought the Jo-Carroll staff closer together. Staff members have the opportunity to talk about fiber in their communities and have the opportunity to be hometown heroes. We are all ambassadors. We are all in this together.'

Mike Casper, CEO, Jo-Carroll Energy

Fiber for everyone:
Jo-Carroll Energy's aspirational goal

by P. Carter Newton, cnewton@galgazette.com

Jo-Carroll Energy has a goal and then it has an aspirational goal.

The goal is to grow services to its members. The local cooperative, through its strategic objectives, believes it can do this through growth, by enhancing the value of the cooperative to members through operational excellence such as reliability and efficiency.

Then there's the aspirational goal: offering fiber optic services to every single cooperative member. It's a goal that requires a lot of work, effort and money.

As he talks about this aspirational goal, the eyes of Mike Casper, Jo-Carroll Energy chief executive officer, light up. He doesn't use the words "way cool," but his excitement demonstrates that is what he means.

The effort started with a test project in downtown Galena and then proceeded to provide fiber optic service in Elizabeth. Now other communities such as East Dubuque, Apple Canyon Lake and The Galena Territory as well as neighborhoods including High Ridge Road and Chestnut Mountain are showing interest.

"Broadband has brought the Jo-Carroll staff closer together," Casper says. "Staff members have the opportunity to talk about fiber in their communities and have the opportunity to be hometown heroes. We are all ambassadors. We are all in this together."

He continues, "Words can hardly express what it means to me to be part of this effort, to have this type of impact. We want to enhance our area with our services.

"Fiber enables people to grow. It impacts and enhances the quality of their lives."

Mike Casper, Jo-Carroll Energy president and CEO

The fact that Jo-Carroll is pioneering this effort here is not lost on Casper. The cooperative's first goal was to provide electricity in rural Jo Daviess and Carroll counties. He's been recently going through paperwork of his grandmother who lived in the Council Hill area. He's found paperwork detailing how she first obtained electric service from Jo-Carroll in 1947.

Just as it took time for the cooperative to provide electric service through its territory, it's going to take time to provide fiber optic to its 19,500 members.

The cooperative, Casper says, currently invests $2 million annually in providing fiber optic service. It's going to take upward of $80 million to provide service to everyone.

That's a daunting task.

That's partly why the cooperative has been working closely with elected federal representatives and the United States Department of Agriculture to put more attention on rural broadband programs.

Casper is hoping that at some point in the near future grants will be awarded to grow fiber more quickly.

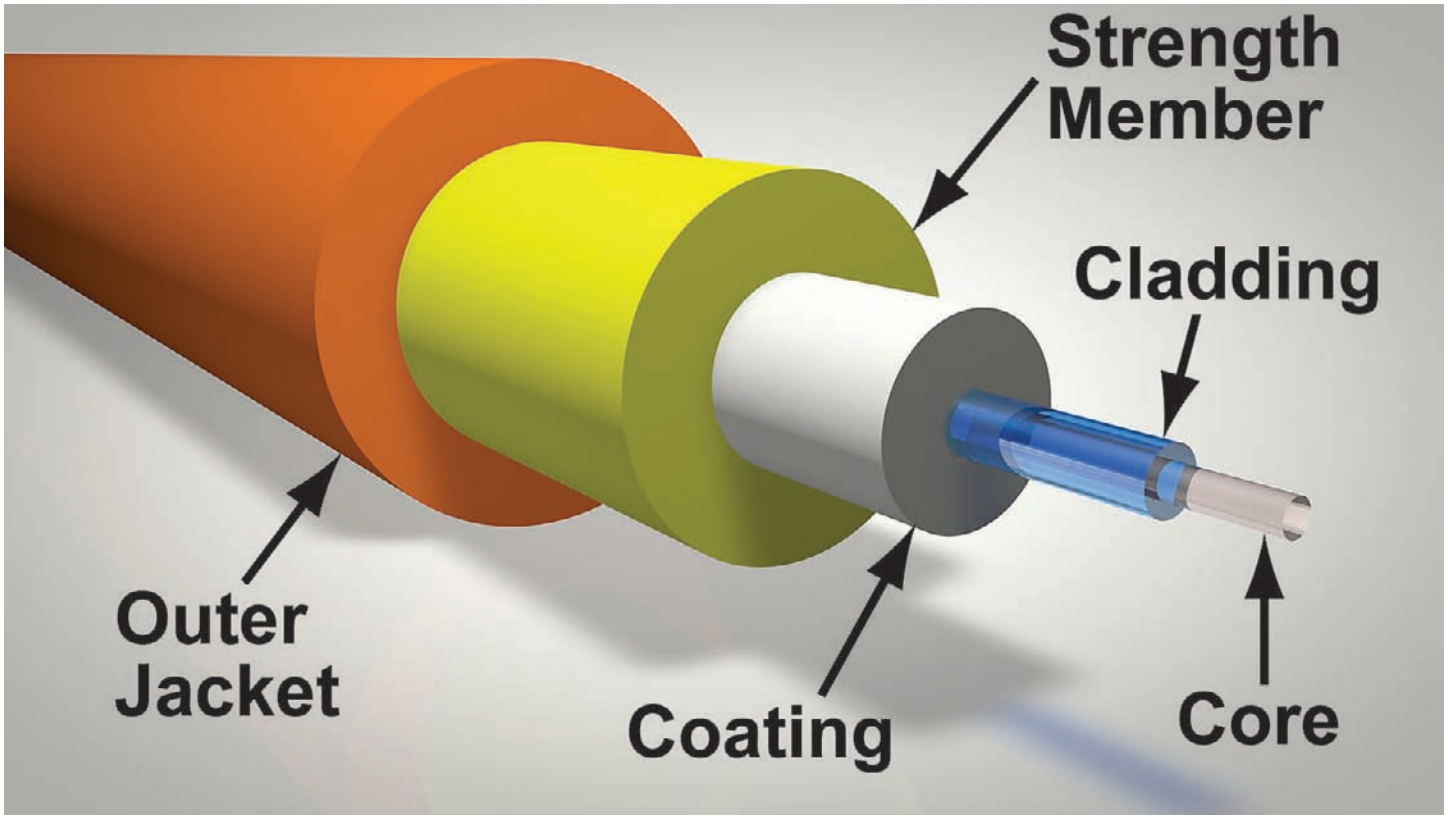
One of the reasons Jo-Carroll has taken the grassroots approach to providing fiber optic is to ensure that its investment is used in places where members want the service.

Casper also credits his board of directors as driving the aspirational goal.

Thus far Jo-Carroll has added four broadband-related positions through Sand Prairie, a department of Jo-Carroll Energy. There is a possibility of adding additional positions as fiber optic grows.

"We, the staff, are providing the support and background for this effort," he finishes.

Fiber is like a mile-wide river



This graphic shows a fiber line that would be connected to a home, apartment or business. The core or actual glass fiber is fragile and has many layers of protection. Digital information from devices is converted into light waves and then sent through the core. The light waves make it possible for fiber systems to send and receive great quantities of information at high speeds. *Graphic courtesy of Thorlabs*

What is fiber optic Internet service?

The technology allows for data to be sent and received at high speeds to facilitate business, school and personal needs in a very stable environment

by P. Carter Newton
cnewton@galgazette.com

Think of a river, let's say the Mississippi River. Think of how much water flows down river.

Then, think of a garden hose, a one-inch garden hose, and how much water flows through it.

Then, replace the word water for information.

That's how Jesse Shekleton, Jo-Carroll Energy director of engineering, describes the difference between fiber optic and other ways of delivering broadband Internet service.

Fiber, he says, is the mile-wide river. Coax and other metal-based delivery systems such as DSL, are the one-inch garden hose.

So, what makes fiber optic the Mississippi River of broadband Internet?

A proper answer requires a full lexicon of technical terms. But, put simply, fiber optic allows for more information to be transferred at faster speeds.

A term that is used is "latency." Simply put, latency is the amount of time it takes for data to go out and come back.

Aficionados of gaming have better experiences when their Internet service is faster, according to Dan Marcure, Jo-Carroll Energy director of technology. Lower latencies also make the experience of talking with others through Facetime a more enjoyable experience as well.

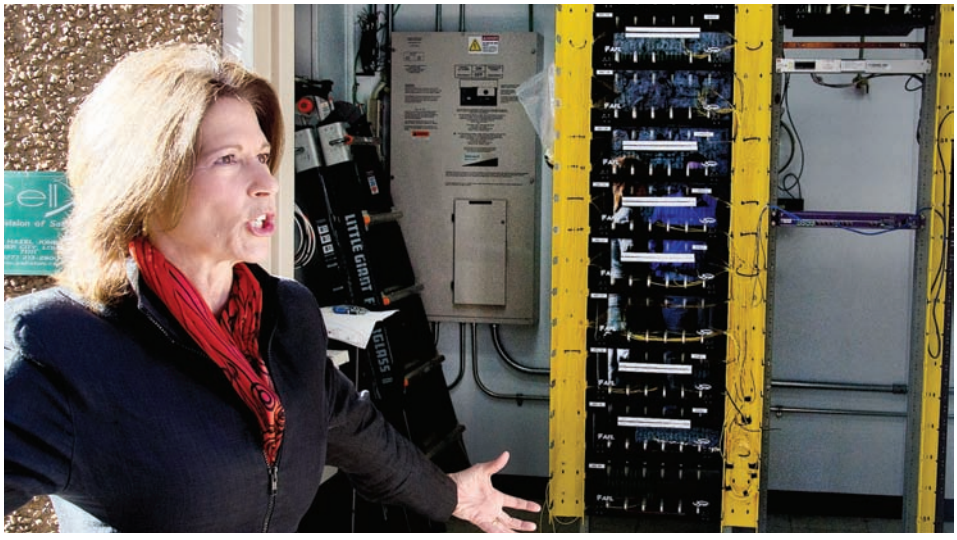
Fiber incorporates a thin flexible piece of glass through which bursts of light are sent around which is a protective cocoon. *See graphic above.*

A router/modem in your home or business translates information you produce on your computer or other devices into light waves which are then sent out through a glass fiber. When information comes to your home or business, the router/modem translates the light waves into information for use with your devices.

That process of translating information into

Above: During the Elizabeth project, a Jo-Carroll lineman takes a fiber line to the home and prepares it for installation. Below: Broadband technician David Niccum completes final testing procedures after completing a fiber splice on the side of the home.

A crew uses a crane to deliver the control office or CO for the Galena downtown fiber optic project in 2016. It is at the CO where fiber in the downtown area connects to a middle mile provider for connections on the World Wide Web and email servers. Below: Rep. Cheri Bustos examines the downtown Galena CO when she came to Galena to learn about Jo-Carroll Energy's fiber optic project in fall 2017.



light waves and light waves into information is called modulation.

Just as your devices use information in a digital format, so too, does fiber, which adds to the speed and efficiency of this type of broadband Internet service.

The advantage of fiber is that it delivers more information faster than coax (through a cable service) or DSL through a copper telephone line.

This is why Shekleton uses the river/garden hose comparison.

Connecting to the World Wide Web

If someone in The Galena Gazette office wants to connect to the Sand Prairie website, the staff members types "connectsp.com" into the web browser. That information or request goes through the router in the back of the office and through the fiber optic line to a control office which is located next to the Jo-Carroll Energy substation on the north side of EZ Sell USA along Water Street.

In the control office, also called a "CO," are a bank of electronics into which all of the fiber connections to homes, businesses and apartments in the downtown neighborhood are connected. This downtown neighborhood extends from U.S. 20 down Main Street, including Bench and Commerce Streets, down through Broadway Street and Dewey Avenue. The fiber neighborhood then goes up Franklin Street and then left up South Dodge Street and terminates near the water tower in Cemetery Park.

Above: As Jo-Carroll Energy linemen string fiber cable in Elizabeth, technicians from Sand Prairie are readying homes and businesses for fiber service. Below: Sand Prairie broadband technician Matt Noll terminates fiber on a router to be located at an Elizabeth business. It's one of the final steps in setting up a home or business for fiber optic service. The technician will also make certain that all devices are working correctly with the router. *Jo-Carroll Energy photos*

The electronics in the CO are used to determine the bandwidth or speed of each fiber connection.

It is also at the CO where the broadband user is connected to the World Wide Web through a middle mile provider through their fiber optic transport line.

Sand Prairie works with a handful of middle mile providers to provide redundancy in the system. In case one line is cut, Internet traffic can be routed to other transmission lines.

Delivery of fiber service

According to Shekleton, fiber is delivered to homes and business in one of two ways: 1) Active Ethernet (AE) or 2) Gigabit Passive Optical Network (GPON).

Active Ethernet involves one fiber connected to the home or business. This is the model which Jo-Carroll Energy uses. In fact, two, three or four fibers go to the installation site, but only one is live, says Shekleton.

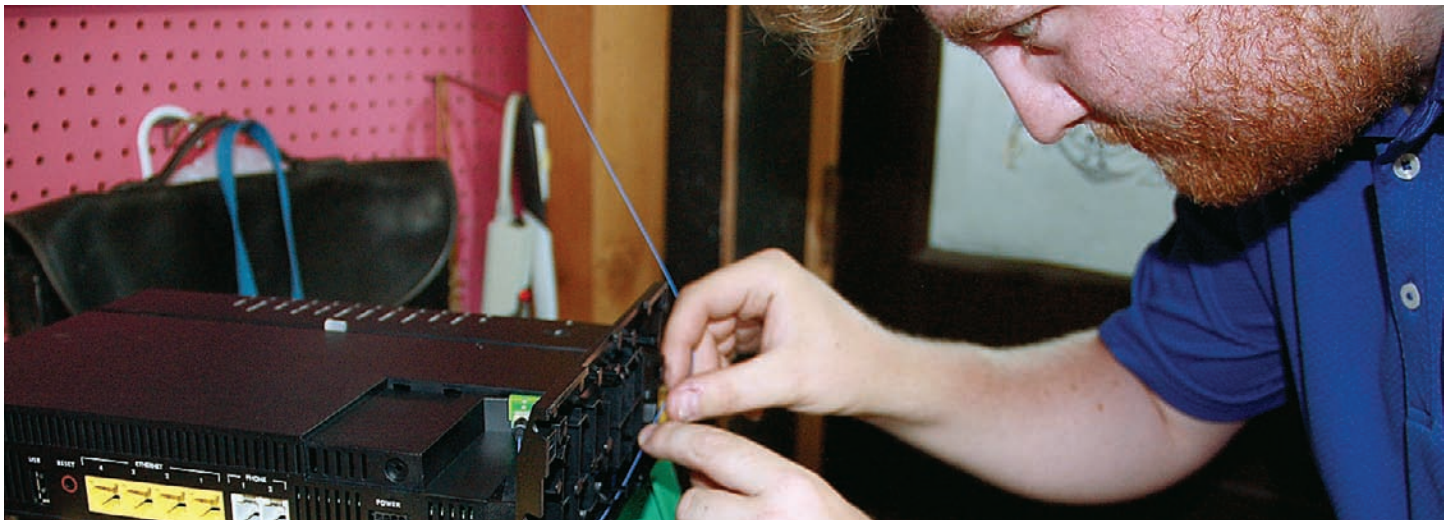
The Gigabit Passive Optical Network, he continues, splits the light spectrums into multiple 64 parts per fiber. With this method, up to 64 different homes and/or businesses can use just one fiber.

Neighborhoods and polygons

To provide fiber service to a community such as Galena, East Dubuque, Elizabeth, The Galena Territory or Apple Canyon Lake, for example, Jo-Carroll Energy puts a lot of thought in organizing the service and how it will be delivered.

Service to a community is divided into neighborhoods. The industry term for a neighborhood is a "polygon," which, as the name implies, is a multi-sided shape.

Galena, for example, is divided into 14 different neighborhoods. East Dubuque is divided into 10 neighborhoods and Elizabeth into six neighbor-



hoods, with the sixth neighborhood extending out to a T-Mobile tower in Rodden.

Apple Canyon Lake has seven neighborhoods. One neighborhood is in pre-construction phase.

The Galena Territory has 11 neighborhoods. Two are in sign-up phase and one is in pre-construction phase.

Editor's note: For a detailed description of the six phases from interest to install, please see pages 16-17.

As a fiber system is laid out in a neighborhood, Jo-Carroll Energy linemen string the cable, which contains the fiber, from pole to pole or the cooperative's underground contractors installing the cable underground.

Fiber is then spliced from the cable for installation on the outside of a home or business. A technician then installs the fiber service in the home and makes sure it works with all devices.

Jesse Shekleton, Jo-Carroll director of engineering, inspects the neighborhood map for East Dubuque.

Steve Ludwig, left, and Jacob Salzmann, right, are two of the linemen who string the fiber optic cable. Directly in front of the two linemen are stringing dollies used to string cable around a pole in order to switch direction. The three-foot-long dolly in front of Ludwig is used to minimize bending around sharp corners during stringing activity. The dolly for applications needing lesser turn radius is in front of Salzmann. The other piece in front Ludwig is a trunnion and is used to attach fiber optic cable to a pole. The piece to the right is a snap-on roller. *P. Carter Newton photo*

'That makes our job rewarding knowing that members see the benefit of what we're doing.'

Steve Ludwig, Jo-Carroll Energy crew line foreman

Putting it all on the line

Linemen buy into aspirational goal and would love to see the day when fiber service is offered throughout the entire Jo-Carroll Energy service territory

by P. Carter Newton
cnewton@galgazette.com

Steve Ludwig, Elizabeth, has a dream.

"I would love to see the day when the entire Jo-Carroll Energy service territory is fiber," he says.

It's an aspirational goal for the electric cooperative, Mike Casper, Jo-Carroll president and CEO remarks.

Ludwig, a crew line foreman for Jo-Carroll, is helping make that happen, pole-by-pole. It is the Jo-Carroll Energy linemen who are actually stringing the cable, which contains fiber, that will eventually be installed in homes and businesses throughout northwest Illinois.

They are playing a role in the delivery of a new service just as linemen did 80 years ago when they strung electric cable from pole to pole to electrify rural Jo Daviess and Carroll counties.

Stringing fiber optic cable is similar to stringing electric lines, say Ludwig and his co-worker Jacob Salzmann, Galena. Yet, they are quick to add there are differences as well.

Many of the skill sets are the same.

With fiber cable, they don't need to wear the protective rubber gloves and sleeves which on a hot summer day is quite a blessing.

On the other hand, fiber is more fragile than electric lines because it has glass strands that carry data through it and thus requires more care. They say the difference is similar to picking up a 5-year-old versus a newborn baby.

"We're learning as we go," Ludwig says.

Although they use the same trucks and much of the same equipment, there is some specialized equipment needed for stringing the cable.

The bend radius of fiber cable is different than electric lines. This is important when linemen need to bend the cable or electric line 90 degrees in order to change direction.

The electric cable can bend and take sharp corners. Linemen use a six-inch diameter string dolly to do this.

For the fiber cable, lineman use a string dolly that is three feet long. "We need two feet in diameter for the cable," Ludwig notes.

The fiber cable is held onto the pole with a trunnion.

The line crews also use different grips for stringing the fiber and electric lines. They can grip much tighter on the electric lines.

Above: Jo-Carroll lineman Jeremy Whitmer strings fiber optic cable for the downtown Galena project. Right: Linemen Steve Ludwig, above, and Jeremy Whitmer, below, string fiber optic cable for the T-Mobile project near Menominee. *Jo-Carroll Energy photos*

Line crews also don't want to damage the fiber cable, because splicing fiber "is a long drawn-out process and takes a long time," Ludwig says.

The linemen don't splice the fiber. That's left for the Jo-Carroll Energy technicians or the cooperative's splicing contractor.

The linemen can cut and splice the electric lines. "That takes about 10 seconds," Ludwig adds.

Thus far the linemen haven't damaged the fiber cable.

Salzmann and Ludwig say they enjoy stringing the fiber. It's a nice change of pace.

Currently they are stringing fiber wire from Galena along Blackjack Road to Longhollow Road to one of the T-Mobile towers.

As they work, neighbors come out and inquire about what they're doing. Upon learning that fiber is being strung, the first question is, "How do I get it?" Salzmann says.

They talk about spotty or no Internet reception. They're happy to see the fiber line going by their home.

Ludwig adds, "That makes our job rewarding knowing that members see the benefit of what we're doing. "

Salzmann and Ludwig see the need for fiber service.

Salzmann notes that fiber is needed in this day and age.

Ludwig says that having fiber is a way to keep residents here in northwest Illinois and attract new residents.

"This is something which rural areas haven't had," he continues. "This is a huge benefit for people who live here and gives them another option."

'As we enter Illinois' third century, we must bring a renaissance to downstate Illinois which has been deprived of some basic resources for education and business building that are taken for granted elsewhere in our state. To begin, we will work to deliver high speed broadband internet coverage to everyone, in every corner of Illinois. Today every new job and every student is dependent upon connectivity, and no part of our state should be left out.'

Gov. J.B. Pritzker, inaugural address 2019

Promoting rural broadband

Chris Allendorf connects with federal, state authorities to promote programs bringing broadband services to rural communities; says co-ops play a role

In June 2017, Chris Allendorf travelled to Washington D.C., with a message.

The vice president of external affairs and general counsel for Jo-Carroll Energy testified before the U.S. House of Representatives Small Business Committee's Subcommittee on Agriculture, Energy and Trade upon the invitation of Rep. Brad Schneider (D-Illinois).

Allendorf was there to promote federal support of rural broadband development, specifically about fiber optic connectivity.

He told committee members, "Co-ops were tasked with providing electricity to rural America so that rural America had the same quality of life and business benefits that electricity provided their urban peers. We see it as equally imperative for rural America to have access to reliable, high-speed broadband as they had electricity."

Allendorf's role with rural broadband solutions, including fiber optic in Jo Daviess County, revolves around developing, nurturing and maintaining relationships with elected officials at state and federal levels.

He communicates with Rep. Cheri Bustos (D-Illinois) or a member of her staff every month or two. He appreciates her interest in and support of developing rural broadband services.

The interest of Jo-Carroll, he says, is for the federal government to have programs which support the build out of rural broadband.

In a recent interview, Allendorf related that the United States Department of Agriculture (USDA) has just been allocated $500 million for loans and grants to support rural broadband projects. He's glad to see the funding going through the USDA rather than the Federal Communications Commission.

He notes, "Our (cooperatives) natural governmental partner is the USDA and not the FCC. We are at a disadvantage with the FCC. The USDA helps level the playing field."

It is through the USDA which cooperatives received loans and funding to bring electricity to rural areas 80 years ago.

Allendorf believes the federal and state governments need to support rural broadband development with grants and direct investment rather than loans.

He reminded the representatives of the challenges faced by the cooperative to bring fiber optic to members due to the rugged terrain.

Chris Allendorf, Galena, vice president for external affairs and general counsel for Jo-Carroll Energy, testifies before the U.S. House of Representatives Small Business Committee's Subcommittee on Agriculture on June 22, 2017. *Contributed photo*

That same terrain also made it difficult to offer reliable wireless Internet services.

Allendorf also noted that states who best utilized federal programs for rural broadband have their own programs as well. Missouri and Indiana are much more advanced than Illinois, he continued.

But there is hope in Illinois.

Gov. J.B. Pritzker's inaugural address and plan mention support for bringing broadband to rural areas.

Allendorf credits Bustos for this. She served on Pritzker's transition team.

"I'm sure we'll see the state becoming more involved," he noted.

From his vantage point, Allendorf sees how fiber has helped Jo-Carroll Energy do a better job serving members. He also sees how fiber can benefit economic development including the area's ag industry and medical care providers.

From casual communications with friends, he's also seen how fiber impacts their lives.

He finishes, "High speed Internet is the new electricity. To have a growing rural population, you need high speed Internet."

'I don't know why a high-tech company would not want to be here.'

Mike Casper, Jo-Carroll Energy CEO

Getting the most out of fiber

Fiber has benefits ranging from economic development to agriculture to a myriad of home uses

Jo-Carroll Energy chief executive officer Mike Casper tells a story.

A company wanting to expand had to make a choice between building a facility in one of two small towns. The offers from each community were about the same.

The community which didn't have fiber optic Internet service lost out on the deal. The company felt that fiber optic service gave it a leg up on employee recruitment.

Fiber optic, he says, "enables people to grow. It offers possibilities of attracting new residents, building employment and improving our educational system."

Casper believes that fiber optic is an economic development tool, especially in rural communities.

In rapid-fire succession, he lists how fiber optic is an economic development tool:

- telemedicine.
- agriculture: technologies for soil mapping, GPS and precision agriculture.
- education: online courses for students to learn and educators to teach.
- work from home.
- local innovation.
- shared work space opportunities.

But that's only part of the story.

Dan Marcure, Jo-Carroll Energy director of technology, says this only scratches the surface of what high speed Internet through fiber optic can do in a business, your home and on the farm.

Marcure, who grew up on a farm near Woodbine, says there are an incredible number of farm applications that can take advantage of fiber optic technology,

Interconnected devices make robotic milking possible. You can put cameras in birthing pens and monitor them from your cell phone. Interconnected devices can play important roles with grain mixing systems and the feeding of animals.

This is already being done in Jo Daviess

Mike Casper

Dan Marcure

County through wireless broadband. Marcure says fiber is more reliable and faster.

As Casper ticked off in rapid-fire succession how fiber benefits economic development, Marcure can equally tick off home applications. These include:

- home security cameras.
- house monitoring and smart-home technologies allowing you to lock and unlock doors, check temperatures and view webcams.
- backup of data.
- Internet-connected devices such as washing machines, dryers and refrigerators.
- gaming.
- over the top television such as Hulu, Netflix, Amazon Prime.
- personal communication through Facetime, Skype, Whatsapp, etc.

He adds that fiber optic is perfect for gaming and other applications which require lower latencies (the amount of time for communication to go out and come back).

Marcure also notes that fiber optic has many educational applications. With schools assigning students laptops and tablets, he believes more homework will be required on these devices. Fiber optic will be a benefit.

As Casper looks out over the landscape of Jo Daviess County from his office, he reflects on the possibilities of fiber optic connectivity here.

"This is such a unique area," he says. "It's rural and yet, it is not. There is a beauty to the Driftless (region). I don't know why a high-tech company would not want to be here as opposed to northern Virginia where I moved from. Life is simpler here."

Fiber makes that thought viable.

Plenty of thought goes into designing fiber systems

Broadband technicians Ryan Randecker and Matt Noll work near Derinda Road. The photos shows a "figure eight" of a 96 count mainline fiber. A figure eight is a process used at intermediary points for a long, continuous stringing operation. The loops prevent twisting in the cable. *Jo-Carroll Energy photo*

Design of the fiber system follows the same footprint as the electric system

Area's terrain and low-density population makes the work challenging. But Jo-Carroll can 'leverage' its assets adding feasibility to its fiber optic networks

Todd Tunks

by P. Carter Newton
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Todd Tunks lives along the north edge of The Galena Territory. He wants high speed Internet service at his home, but isn't satisfied with any of the possible solutions, including wireless. The terrain and low density population make providing the service a challenge.

As ironic as it may seem, Tunks' day job involves getting broadband services to Jo-Carroll Energy members. He's the manager of broadband services for the cooperative.

His team of three technicians installs wireless, fiber and performs router maintenance at wireless towers.

There's more to the job.

When enough members sign up for fiber optic service in their neighborhood, Tunks' team designs the fiber layout through the neighborhood and determines whether the cable will be overhead or under ground.

Their design follows the same "electric footprint," Jesse Shekleton, Jo-Carroll Energy director of engineering, notes. "We are able to leverage our existing facilities, such as poles, to install fiber in a neighborhood. We're able to install the cables high on the poles, giving better clearance over streets and reduces the environmental impact and costs."

It's a benefit to Jo-Carroll for its linemen to install the cable from pole to pole. The skill sets are the same, except that the linemen aren't dealing with voltage.

If the fiber needs to go underground, Jo-Carroll uses its underground contractor for that job.

Regardless as to whether the cable goes above ground or below ground, Tunks' team needs to know how many potential members will be served so they can order cable with the appropriate number of fiber wires.

Tunks says every fiber line is designed to service the total number of existing subscribers and allow for future growth.

Using Elizabeth as an example, three cables serve the community plus additional territory. The cable going to the east terminates at a tower in the Derinda area. The cable to the west goes past Vincent Earthmoving and then out to a tower in the Rodden area. Each has extra capacity for serving additional members in the future.

As Tunks' team goes about planning the deployment of the cable, they need to know the loca-

Jo-Carroll Energy follows its electrical footprint when it comes to stringing fiber cable. For parts of the downtown Galena project, cable was laid underground by the cooperative's contractor.

tion of each pole and of potential for subscribers.

They also need to determine the location for a control office or CO in each neighborhood. Usually the CO is located at an electric substation or in a pad-mounted cabinet.

The CO plays an important role in the deployment of fiber, Shekleton notes. This is where the fiber from a neighborhood connects with the World Wide Web through transport line provided by a middle-mile provider.

Jo-Carroll Energy works with a number of middle mile providers to ensure redundancy; or if one transport line is cut, service can be sent through the line of another middle mile provider.

The CO also includes all the electronics needed to control and manage the service to members at the promised speeds.

Once the cable is installed, there's more work to be done, says Dan Marcure, Jo-Carroll Energy director of technology.

Splice cases must be installed on the poles enabling fibers to be spliced from the cable and readied for delivery to homes and businesses.

The spliced fiber line is then attached to a box within two to three feet from the power meter. The fiber terminates at the box.

And, according to Shekleton, more than one fiber is connected to the home, but only one fiber is live. This redundancy allows Sand Prairie to use a second or third cable in case the primary fiber line is damaged.

There's one additional step, Marcure says. An appointment will be made for a technician to come and set up the home for fiber services. The homeowner or business owner will determine the best place to bring service into the home or building and then set up the router for service.

The technician, Marcure adds, will make sure all devices are working with the fiber service.

That's what Tunks, an Navy veteran with years of experience installing underground fiber service, hopes happens in his home. First, he needs his neighbors to show interest in the project, just like everyone else.

He's so close and yet so far away.

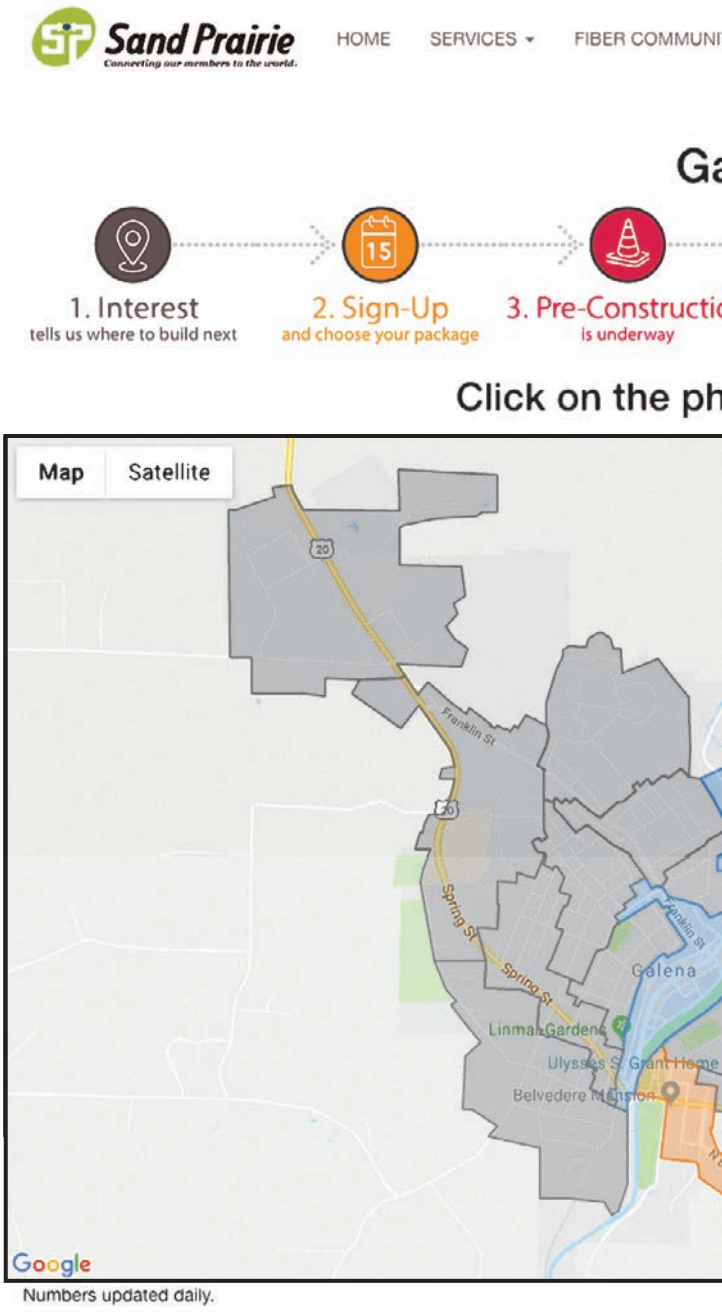
Jo-Carroll linemen string fiber cable near Council Hill. This photo shows the challenges of working in The Driftless terrain in Jo Daviess County. *Jo-Carroll Energy photo*

Getting fiber optic service starts by showing your interest

Process has six steps

1 Interest phase: Members have the opportunity to show their interest in fiber optic service. The process is simple and starts by visiting connectsp.com. Look for the purple arrow with "Want Fiber in Your Neighborhood" pointing to "Click Here," and click. You'll be taken to the interest page where you simply fill in the blanks with your street address, your street name and your zip code, and then click on "Lookup." You'll then be asked to select the correct address from a drop down menu to ensure your address matches company records and then confirm. You'll then be taken to an "Interest Form," where you'll be asked to submit your first and last names, telephone numbers and email address. You'll also be asked as to whether you might be interested in an alternative Sand Prairie service, how you learned about Sand Prairie fiber and if you have any questions. In a typical area when 25-35 percent of residents in a community show interest, they will divide the community into neighborhoods. When an appropriate percentage of the residents in a neighborhood show interest, Jo-Carroll Energy will determine its investment in delivering fiber optic service. If the payback can happen in an adequate amount of time, the project will be moved to the sign-up phase.

2 Sign-up phase: If you have shown interest, a representative of Sand Prairie Wireless will call and than send, via email, paperwork for you to sign. This is all done electronically through DocuSign. The website shows the number of people and/or businesses who yet need to make the commitment before Jo-Carroll Energy takes it to the next stage.



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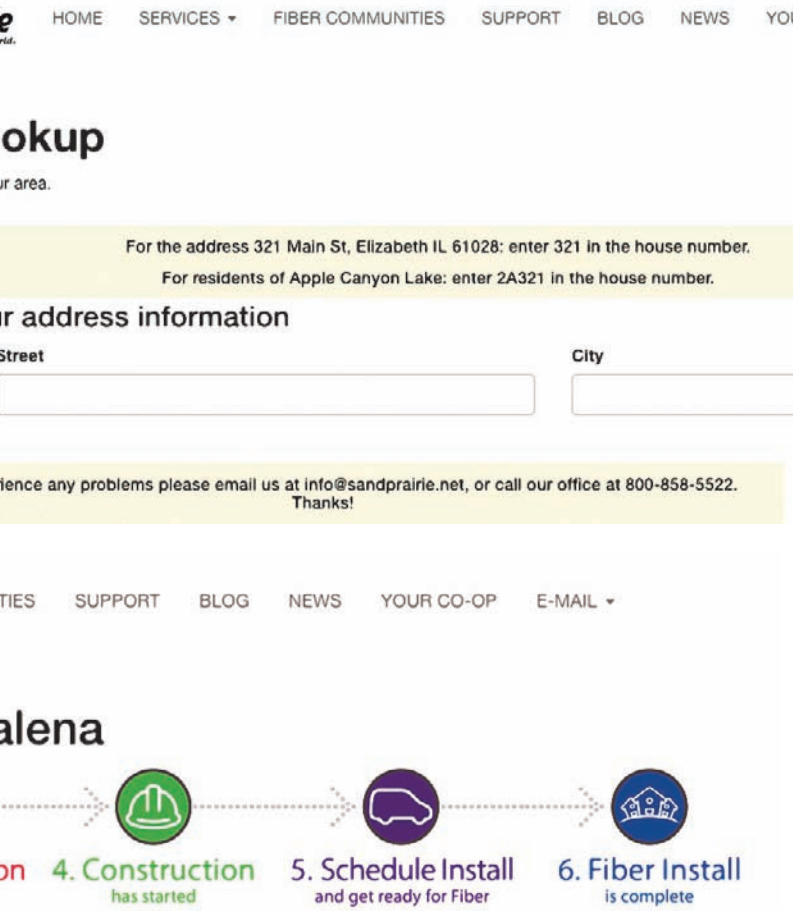

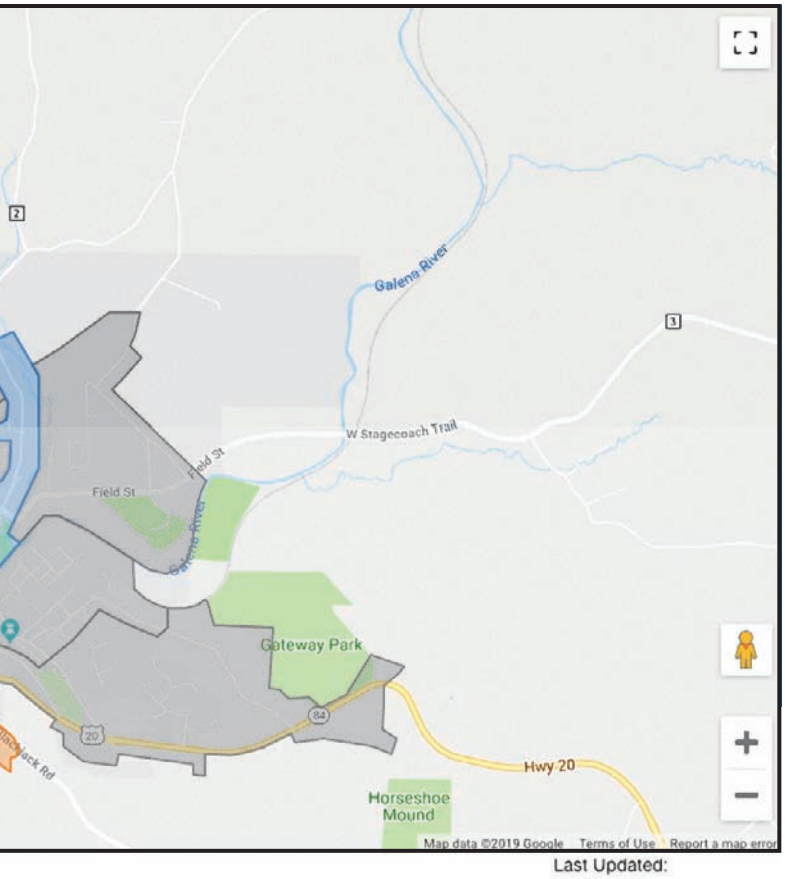

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3 Pre-construction: Jo-Carroll Energy determines how the fiber will be deployed through a neighborhood, overhead or underground. Generally, the fiber layout follows electrical distribution. Underground work is done in spring, summer or fall. Jo-Carroll determines timeline and investment, orders materials and obtains necessary permits.

4 Construction phase: The fiber system is built out in waves. Crews string the rope and then pull the fiber through. Splice cases are placed on poles. A fiber is readied which will then be taken to a home or business and then connected to a box typically located within two to three feet of the power meter.

5 Schedule install: Sand Prairie makes calls to schedule appointments.

6 Fiber install: After consulting with homeowner, a technician runs a tough flexible fiber line into the house and attaches the fiber line to a router. A pre-existing access into the house is best. The technician will make sure all devices are working with the router. If a Wi-Fi repeater is needed, it will be installed. There is no installation charge if the home or business owner signed up before the end of construction.

Jo-Carroll Energy lineman Jordon Esser goes about his work as he and other linemen string fiber optic cable in Elizabeth. *Jo-Carroll Energy photo*

'This gets us in the modern world. It's amazing we got it.'
Mike Dittmar, village president, Elizabeth

Fiber in Elizabeth:
A community effort

Efforts by village, chamber make Elizabeth first all-fiber community in county

Tammy Trebian is owner of Common Cents in Elizabeth. She says high speed fiber optic helps her get her products out faster. *Dan Burke photo*

by Dan Burke
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The village of Elizabeth sits in the heart of Jo Daviess County and also serves as the home of the Jo-Carroll Energy offices.

One might assume fiber Internet was installed in Elizabeth because it is Jo-Carroll's home office, but the credit rests squarely on the shoulders of the people of Elizabeth.

Mike Dittmar, village president, said Jo-Carroll approached the village about the fiber sign-up process.

"Of course we jumped on it," said Dittmar. "This gets us in the modern world. It's amazing we got it."

Dittmar said fiber Internet fits into the village's larger goals of attracting new residents and businesses.

"High speed Internet is the future," said Dittmar. "It's a selling point for the city, businesses and residents."

'We're always trying to get businesses to Elizabeth. Now we can say fiber is everywhere.'

Merri Sevey, Elizabeth chamber president

Above: Elizabeth Village President Mike Dittmar says fiber optic is a core selling point in bringing new businesses to his community. *P. Carter Newton photo* Below: Merri Sevey, Elizabeth Chamber of Commerce president and Jo-Carroll Energy vice president of human resources, played a key role along with other community members to bring fiber optic Internet service to the community.

Merri Sevey had a unique role in Elizabeth's adoption of fiber. Sevey is president of the Elizabeth Chamber of Commerce and is also employed by Jo-Carroll as the vice president of human resources. Sevey said she has no say in the capital development and technology domains of the cooperative, but she recognized the benefits fiber could bring to Elizabeth.

"Fiber is a huge thing," said Sevey, "especially with younger families."

The village still needed to meet sign-up requirements, a feat that happened "rather quickly," said Dittmar. Sevey said it was a community effort to meet sign-up numbers.

"It was really an all-town effort," said Sevey. "It was a pretty easy consensus. The businesses were all behind it."

Elizabeth has recently attracted new businesses such as a Midwest Medical Center affiliate office, pharmacy and Dollar General, and Dittmar said the village is working to bring other core services to town. Fiber is an attractive selling point.

The village was also awarded grants from the U.S. Department of Agriculture's Rural Development Program to replace its century-old water main. Community solidarity and common goals have helped Elizabeth revitalize its infrastructure and economy.

Sevey said things began to change for Elizabeth after Western Illinois University administered the MAPPING program. MAPPING is Management and Planning Programs Involving Non-metropolitan Groups and is intended to help residents formulate an action and strategic plan to transform their community.

The program helped usher in new village leadership and unite residents and businesses, said Sevey. The program helped change attitudes and fostered an environment of trust between village leadership and residents.

"The community knows and trusts each other," said Sevey. "They know we are all working for what's best for the town."

The chamber took the lead in creating a message and a call to action.

"We went full-bore," said Sevey.

The chamber designed, printed and mailed postcards, held informational meetings and used social media to spread the word about the fiber.

"It's a grassroots effort," said Sevey. "You have to knock on doors. It all falls to residents."

Postcards and information campaigns are essential, said Sevey, but word of mouth is a powerful tool. Now that fiber is being used in Elizabeth, Sevey said areas outside the village` limits are seeing the benefits firsthand.

"Word of mouth is important," said Sevey. "People outside of the village are now getting together and trying to get fiber."

In addition to resident support, businesses were instrumental in bringing fiber to Elizabeth, said Sevey. Midwest Medical Center was a strong ally and needed high speed Internet to transfer X-rays and patient data, said Sevey.

The pharmacy uses fiber to power its telepharmacy capabilities. Sevey said fiber is "definitely" a

Jo-Carroll Energy's Elizabeth project also involved stringing fiber east to a tower in Derinda and west to a tower in Rodden. Lines to these areas have capacity to serve future fiber members. *Jo-Carroll Energy photo*

building block for the future.

"We're always trying to get businesses to Elizabeth," said Sevey. "Now we can say fiber is everywhere."

Home values are also affected, said Sevey.

"Right now, one of our pushes is to get Realtors to list Elizabeth as a fiber community," said Sevey. "It's a really good selling point."

Fiber Internet allows for new business configurations, said Sevey. Multiple businesses could share a storefront and Internet service, and high speed fiber Internet makes that possible, said Sevey.

At nearby River Ridge School, Sevey said there is a one-to-one program that provides students with laptops. Fiber Internet at home guarantees students are always able to access school work. Dittmar, who has fiber at home, said fiber can accommodate multiple users and is fast and reliable.

Sevey said Jo-Carroll has been a great partner.

"Working with Jo-Carroll Energy has been great," said Sevey. "If you can get that kind of commitment in a community, Jo-Carroll will bend over backwards to work with you. We got it; it's been fantastic."

At Common Cents in downtown Elizabeth, owner Tammy Trebian also said Jo-Carroll has been great to work with.

We're really happy with fiber," said Trebian. "I just wanted something that would work every day."

Having a local energy co-op provide fiber service is an advantage over a national provider, said Trebian.

"It's nice to have someone local," said Trebian. "Any time you have an issue, Jo-Carroll is wonderful about working with you and getting it figured out. They take care of it right away."

Jo-Carroll was flexible and worked with her schedule, said Trebian. She added that they have excellent customer service.

Trebian's store sells vintage and unusual items and a fast and reliable service helps her do business. Faster Internet means more productivity and sales.

"I can get product out faster," said Trebian. "It's nice to get on, do what I need to do and not have any worries."

Trebian said before fiber, it was a struggle to find consistency in service. While wifi worked for a time, a nearby tree grew and blocked the receiver, said Trebian. Hers was not an isolated experience.

"It was so spotty for everyone," said Trebian. "To have something that is reliable and consistent is huge for everyone in town."

Trebian helped with the sign up process and said it was an easy, painless process. She said she would definitely recommend fiber from Sand Prairie, and, she hasn't "heard anyone not like it."

Ultimately, fiber Internet is well worth bringing to town, said Trebian.

"We're really happy with it," said Trebian. "It's so reliable, I have yet to have any interruptions with service. I definitely recommend it."

'People who are looking to buy out here are younger couples with kids. Internet is a way of life and it's expected. It's the way life is now.'

Shaun Nordlie, Apple Canyon Lake general manager

ACL-Shaun Nordlie

General manager says fiber will have a great impact on Apple Canyon Lake

by Dan Burke
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Apple Canyon Lake, a sprawling second-home community tucked away in central Jo Daviess County, embodies the rural good life.

Apple Canyon Lake (ACL), the community, wraps around Apple Canyon Lake, the three-mile long body of water. Not to be confused with Apple River Canyon State Park, which lies just to the east, Apple Canyon Lake is a private recreation community.

Billed as a "recreation community for all seasons," ACL lives up to the claim. From archery and fishing, to boating and swimming, to hiking and golf, if it can be done outside, one can probably find a place to do it at ACL.

Permanent residents and vacationers are the primary property owners, said Shaun Nordlie, Apple Canyon Lake Property Owners Association, general manager.

Despite having the lush rolling hills characteristic of the Driftless region, and beautiful, private homes dotted around a 483-acre lake, Nordlie continues to search for methods to make ACL even more appealing.

Addressing a common problem in rural America, Nordlie began looking for providers that could bring reliable Internet service to ACL. His initial research yielded disappointing options.

"I was trying to figure out different ways to improve Internet service here," said Nordlie. "The only option I found was, if Apple Canyon wanted to put up all of the money for infrastructure, then someone might come in and take it over. It would have been a big commitment financially for the association."

As larger corporations passed on bringing Internet to ACL, Jo-Carroll Energy, a local, member-owned energy cooperative, reached out to Nordlie.

"When Jo-Carroll Energy said they want to bring fiber in, I said, 'OK, this is wonderful,'" said Nordlie. "To have it at the Lake is a huge draw."

Shaun Nordlie

After moving through the sign up phase, a west side area of the Lake is primed for construction.

While there are still more neighborhoods needing to show enough interest, the one that will be connected is estimated to service more than half of the community's residents.

"We've tried to promote fiber to owners as much as possible," said Nordlie. "I'm trying to push for these other zones to show interest."

Fiber Internet from Sand Prairie comes at a crucial time for not only ACL, but the county.

Nordlie said there is an increase in younger property owners. Fiber will help keep them in the community.

"It's so important right now," said Nordlie. "People that are looking to buy out here are younger couples with kids. Internet is a way of life and it's expected. It's the way life is now."

Speed is one aspect of fiber bandwidth allows for multiple users on the same network without slowdowns, said Nordlie.

"The kids and grandkids can watch videos or stream, and there's no buffering," said Nordlie.

Having a high speed fiber connection only enhances the experience at ACL.

"We want people to have a good experience," said Nordlie. "You want the beauty and the nature, but people also want to be connected."

Fiber gives options beyond staying connected. It allows people to work remotely, stay longer and contributes to the growth of the community.

"Rather than come out for just a weekend, they can spend a whole week out here," said Nordlie. "The way business is today, they can work from home."

A greater population base benefits both ACL and the county, and fiber Internet can help attract and retain residents.

"I think fiber is important for the growth of the whole area," said Nordlie. "It would be great to say, 'Yes, we're rural, but we still have fiber out here.'"

Nordlie advises owners to show interest and sign up, even if they don't want it.

"Even if you're not interested in it," said Nordlie."If you don't have a need for it, when you go to sell your house out here, the people looking are going to be wanting that."

Joe Mattingley, Jim Mantey and Howie McCarty are pushing for Sand Prairie fiber optic service in The Galena Territory. *Dan Burke photo*

Fiber will add value to The Galena Territory

by Dan Burke
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The Internet has evolved from a niche technology, only usable by the most tech savvy, into an essential part of our daily lives.

For many rural neighborhoods and communities, finding quality Internet access can be challenging. Leadership in The Galena Territory has recognized the importance of reliable, affordable and fast Internet service as a cornerstone of growth and sustainability.

With 2,200 homes nestled in the rolling hills of Galena, providing quality Internet access is a large undertaking. Howie McCarty, former Galena Territory Association board member and fiber committee member, said they looked at multiple options for service.

"We decided to investigate what the potential solutions were for a problem we had," said McCarty. "There are some areas here that are an Internet desert. We wanted high speed Internet in the home. The Internet is turning into a necessity from a want."

Bringing in a new fiber connection is costly and must be done with care, said McCarty. One major provider wanted "a couple million dollars" of investment from the Territory without guaranteeing service, said McCarty.

Undeterred, McCarty said they kept looking for service and became aware of Jo-Carroll Energy's Sand Prairie fiber Internet.

"Sand Prairie has full high-speed Internet directly from its source all the way to the receiver in your house," said McCarty.

The benefits of high-speed fiber Internet are many, all made possible by the immense amount of data transfer.

"The comparison of data transmission capacity between copper and fiber is no contest," said Jim Mantey, chair of The Galena Territory Fiber Optic Committee. "If copper is a two inch pipe, fiber is a 15-mile wide river."

Fiber Internet gives a reliable connection that is able to handle multiple users, said Joe Mattingley, general manager, The Galena Territory Property Owners Association. McCarty said fiber gives people the option to work from home.

"A lot of people are trying to work from homes out here on the weekends and in the summer," said McCarty.

Vacation, seasonal and rental homes make up a bulk of The Territory's properties, said Mattingley, and fast Internet service is expected.

"People are accustomed to fast Internet," said Mattingley.

Internet access is a selling point for The Territory, said McCarty.

"Real estate people tell us your home value goes up 3.1 percent the moment you plug in," said McCarty. "That's why we want people to sign up. (Signing up) is not a contract. You don't have to use it, but it's there at a phone call away."

Sand Prairie didn't require any startup costs or for property owners to sign a contract. Jo-Carroll's flexibility and professionalism left an impact on Mantey.

"Jo-Carroll Energy has our respect for being very professional and organized," said Mantey. "They have a process. It works and it is fair."

One area of the Territory has cleared the sign-up phase and is now in pre-construction.

"Someone in the Territory will be using high-speed fiber optic line by July," said McCarty.

The goal is to have the entire Territory connected and fiber ready. The information campaign is in full swing trying to get residents to show interest. Mantey said they have sent out emails, e-blasts, ads and reminders to owners to sign up for fiber. Mantey said they are trying to stress the common benefit that comes with fiber.

"We're putting together a full-court press," said McCarty. "The more information out there will enlist more owners to our cause."

The sign-up process is driven by residents and property owners, thus the information push by the Territory Association.

"Jo-Carroll basically puts it on house owners to tell them where to install next," said Mantey.

Once the first area has fiber, McCarty said word of mouth will help drive interest.

"Once it's connected, I think that the word of mouth and the momentum will really increase," said McCarty. "One of the issues was educating individuals."

One of the barriers are residents thinking they do not need fiber.

"I think people have fallen into the thought that, 'I don't have a need myself,'" said Mantey. "We're trying to get beyond that and get people excited."

While the positives of fiber serve as a great selling point, Mantey said it's the excitement around fiber installation that will help with growth.

"We try to talk about the common good of getting fiber," said Mantey. "But I think the biggest point is the excitement, the sizzle, the billboard on Route 20. Those are the kinds of rejuvenation factors out here to pump house sales and rental

A really big deal

Midwest Medical Center benefits from fiber service

by Dan Burke
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Healthcare providers have specific needs regarding information systems.

Large amounts of data must be transferred quickly and securely, and the network must be reliable.

At Midwest Medical Center in Galena, fiber Internet has improved three key areas of operation.

Tracy Bauer, CEO and president, said fiber Internet impacts three areas: reliability, redundancy and cost. Bauer said she considers reliability to be fiber's greatest asset for the hospital.

Reliability ensures hospital networks and operations run smoothly and efficiently. "In the past, if Internet service went down, everything would come to a screeching halt," said Bauer.

Doctors and nurses would have to revert to pen and paper for patient reports and records, said Bauer.

Now, Bauer praises the connection.

"The reliability has been amazing," said Bauer of the fiber connection. "Staff has been able to be much more productive."

Midwest Medical has a satellite office in Elizabeth, and Bauer said Internet was "one of our biggest concerns" before opening the location.

Cindy Hefel is the information technology director for Midwest Medical Center. She said the hospital uses off-site servers to house its electronic medical records.

Tracy Bauer

Cindy Hefel

"To have fiber Internet is a really big deal," said Hefel.

The high speed connection allows the hospital to use remote servers, said Hefel. Bauer said the remote location has appropriate facilities and security, which takes the liability off Midwest Medical.

Hefel said redundancy is important so staff can always access hospital networks and continue to treat patients.

"The biggest thing for us is having the redundancy," said Hefel.

Fiber is a reliable and stable network, said Hefel, and as speeds are increasing, cost is decreasing.

"The cost has decreased tremendously," said Hefel, comparing previous providers.

Bauer said fiber will help usher in growth and business.

"In order to continue to bring businesses to rural areas, fiber is really key to that," said Bauer.

Fiber will help the entire area and Jo-Carroll Energy is the driver of technology infrastructure.

business. This is a way to do that."

Mattingley said any boost to economic development is welcome, but fiber truly lays the groundwork for the future.

"You can't have economic development without the Internet," said Mattingley. "The Territory has always been a huge economic boost for the county, this will help retain that boost."

The push for fiber is gaining traction and interest. Mattingley said it is encouraging to see both the private and public sector embracing the new technology.

"There's a countywide effort by like-minded people to bring fiber into our communities," said Mattingley. "It's really starting to gain a lot of momentum."

Having a local cooperative provide fiber Internet is not only a strong marketing message, said Mantey, it also breaks the hold from large communication providers.

"Northwest Illinois can use this as a compelling marketing message," said Mantey. "In a sense, what Sand Prairie is doing with partners like us, we're bucking the big corporations."

Having a local entity like Jo-Carroll bring fiber to The Galena Territory is a notable accomplishment.

"We're going to get fiber to the house in northwest Illinois," said Mantey. "In this day of chopping up territory for the big guys, making that happen is incredible."

Mantey said larger companies weren't willing to give the same level of commitment as Jo-Carroll.

"(Larger companies) didn't want to help all areas in the Territory," said Mantey.

Looking only for the most profitable areas, Mantey said larger companies will pass on rural and poorer areas. Mantey said as long as a neighborhood meets sign up requirements, Jo-Carroll will install fiber Internet.

Fiber will help the entire area and Jo-Carroll Energy is the driver of technology infrastructure.

"It just makes so much sense and it is so awesome that our local co-op is taking this on," said Mantey.

With a local energy cooperative, Mattingley said there is greater consumer input.

"Since it is cooperative owned, you have some sort of say at the local level," said Mattingley. "They appreciate the relationship with members."

"The partnership is working very well," added McCarty.

Paul Connor, right, shares with Rep. Cheri Bustos the impact fiber optic Internet service has had on his EZ Sell USA business in fall 2017. Listening are, from left, Tracy Bauer, Midwest Medical Center CEO, and attorney Nick Hyde.

Fiber helps EZ Sell USA

by Dan Burke
dburke@galgazette.com

EZ Sell USA was one of the first locations in Galena to utilize fiber Internet.

As soon as Jo-Carroll Energy and Sand Prairie announced the fiber pilot project, Paul Connor, EZ Sell owner, knew he had to sign up.

"When I heard they were bringing fiber to Galena, I immediately got on board and signed up," said Connor. "By having that kind of speed at my disposal, I am able to do business."

Connor buys and sells antique and unique items, and despite having a spacious one-story showroom and warehouse, Connor sees few of his many patrons in person.

"My business is predominantly web-based," said Connor. "If I had to base my business' success on the amount of business going out the front door, I wouldn't be here."

There is a large split between what Connor sells online versus what he sells on location.

"Seventy percent of my business at EZ Sell goes out the back door (from online sales)," said Connor. "Thirty percent goes out the front door."

While his old service, which was also with Sand Prairie, would have been adequate, Connor said fiber gives him more options.

"(Wireless) was OK," said Connor. "We were able to function with it. We could have gotten by without the change, but the change allowed us to bring more people on board."

During a discussion of the impact of Sand Prairie's fiber optic service in downtown Galena, Rep. Cheri Bustos watches a demonstration as to how the service has impacted Paul Connor's business EZ Sell USA.

Employing a staff of 10, Connor and his team make an economic impact.

"We're putting a significant amount of dollars into the economy every two weeks," said Connor.

Fiber Internet is a key part of business.

"The online business we do gives me the ability to maintain a staff of 10," said Connor. "That staff of 10 exists only because of the high-speed fiber and our ability to interact online."

Beyond payroll, Connor's business occupies a building in downtown Galena, which wouldn't be possible if not for high-speed Internet.

"All of my world is web-based," said Connor. "Fiber allows me to do business in the town I want to do business in."

Listing specialists take one of the thousands of items that come through EZ Sell and create a listing online. The items are photographed and the listing specialist writes a description.

Income is based on productivity, said Connor, and having the speed of fiber Internet affects everyone's bottom line. Connor said graphics and photos are data-intensive.

"When uploading graphics, it's really critical you have the speed to handle that," said Connor.

In addition to listing specialists, which can be as many as six people online at the same time, Connor's shipping and tracking is done online as is the point of sale system for physical customers.

"When you have the bandwidth to do whatever you want online, it just opens you up to so many choices," said Connor.

Speed is Connor's main priority for his Internet service, and he said fiber meets all his demands.

Consistency and reliability are next, and Connor said Sand Prairie delivers on all fronts with cost effective packages.

Opportunities for growth and development

East Dubuque city administrator served in same capacity in Bellevue when that community installed fiber. Says it had a tremendous impact on the community

Earlier this year, Jo-Carroll Energy made a presentation about its fiber optic to the East Dubuque City Council at a special meeting. One man in the crowd already had first-hand knowledge as to how fiber optic benefits a small town.

That man is Loras Herrig, East Dubuque's acting city manager. He lives in Bellevue, Iowa, and was Bellevue's city administrator when the city installed the system. He also served on the Bellevue City Council for 11 years and another six years as mayor.

He says fiber optic is a tremendous economic development tool. It's a benefit to the business community and a benefit to the citizens, he adds.

When Bellevue added fiber optic to its list of utility services, the city already provided electric and cable services.

Herrig recalls that when Bellevue got into the utility business, substandard services were being offered. It was controversial. People ran for public office because of the decision.

When the Bellevue City Council decided to offer Internet services, it decided on providing fiber optic service. The city already owned much of the infrastructure and equipment.

"Our guys were willing to learn," he said. "There are economies when you have the trucks. It was a natural extension."

Once installed, Herrig said the city's new fiber optic service dominated. Community members who visited the library to check their email soon ordered the service to their home. The city offered the first 30 days for free.

Loras Herrig

"We were close to having 95 percent of the homes on our fiber optic service," he noted. "We never lost a customer."

"Comparing fiber optic to other methods of Internet service to the home is like comparing an interstate highway to a gravel road.

"Fiber is the best."

Herrig says Till Chevrolet Buick in Bellevue was the biggest backer of the fiber service. "Once we hooked them up, it was tremendously advantageous to them. Their General Motors representative was amazed at what they could do. This was a source of pride."

Herrig also notes that there are rural communities all over Iowa that would love to have fiber optic services. It provides opportunities for residential growth and additional opportunities for businesses to compete.

"People will consider living in small towns, but they don't want to give up on their services," Herrig states. Fiber optic is one of those desired services.

That's why Herrig is so pleased that Jo-Carroll Energy approached the city of East Dubuque and was willing to send five people there on an icy night for an introductory meeting.

He had known the utility was interested in providing fiber optic. Jo-Carroll staff had visited Bellevue while he was city administrator as part of the cooperative's due diligence efforts.

"We discussed all of the pros and cons," he said.

Herrig also knows that providing fiber service is an expensive proposition. "The incumbent providers cannot justify the investment," he noted.

"But with a cooperative, the profits aren't going to New Jersey. Cooperatives are more customer service oriented. It gives them a different perspective."

He adds, "This will have a tremendous impact on our community. Fiber is the best technology available."

Herrig says his "hat is off" to Jo-Carroll for its willingness to make the investment "which could easily be hundreds of thousands of dollars."

Now it's up to the citizens of East Dubuque to make that individual decision to show interest in the project. It's a decision all other members will need to make as well.

Matt Gullone-High Ridge Road

Galena physician pushing for fast, reliable fiber optic service to facilitate his work

by P. Carter Newton
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Dr. Matt Gullone is a man on a mission. He's bound and determined to have fiber optic Internet service to his home in the High Ridge Road neighborhood just west of Ill. 84 North.

"Fiber is more reliable and is so fast," says the Midwest Medical Center physician.

After a chat with Dave Swisher, who has fiber optic service at his downtown Galena business, Benchmark Capital, Gullone went to work on his neighbors.

He created a flyer and distributed it door to door. He talked with neighbors and called and emailed them. Of the 36 homes in the neighborhood, he'd talked to 15 of them by January. He started the process last fall.

Gullone is anxious to have fiber service so he can do charting at home as well as look at X-rays.

Getting fiber in Galena is a big thing. He believes that it will have economic development impacts where it is offered.

"Fiber is a big advantage that people in the city have," he finished. It's an advantage he wants here as well.

Dr. Matt Gullone

Will Babler--Atten Babler Commodities

Sand Prairie's fiber optic service offers bandwidth and reliability for risk management and commodity trading firm to do business in Galena

Will Babler

by Dan Burke
dburke@galgazette.com

Galena is known for its history and has made a community effort to preserve historic structures and landmarks.

The moniker, "The town that time forgot" is aptly given to Galena's Main Street, a wonderfully preserved half-mile of history. On the west side of town, in both the literal and figurative sense, is Atten Babler Commodities, a modern business specializing in risk management and commodity trading.

Atten Babler Commodities is able to exist in Galena because of high speed Internet provided by Sand Prairie, an Internet service provider under the Jo-Carroll Energy company umbrella. Will Babler, one of three principal partners, said the core of the business is online.

"Our whole business is online," said Babler. "All of our trading, data, risk management systems, remote systems and websites are online."

Like many rural businesses, Babler found consistent and reliable Internet service to be initially elusive.

"We had a lot of challenges with our Internet connection," said Babler. "We've gone through the whole gamut of everything that's been available in Galena."

Atten Babler has two Internet connections, in case one goes down, said Babler, a testament to the company's need for a constant Internet connection.

"It's the lifeblood of what we do," said Babler. "What we do in the markets, you can work anywhere you have a good connection. The type of work we do, trading, (Internet) is a necessity."

Fiber Internet provides the groundwork for future growth, said Babler, and the company's needs are being met.

"Bandwidth needs always grow," said Babler. "The usage is constantly growing, so you have to have something that can expand. Once you have fiber, your problems are more or less solved."

Low latency, high bandwidth, reliability and cost are benefits of fiber Internet, said Babler. With nine employees all online at the same time, network bandwidth and reliability is a must.

"It's very cost effective," said Babler. "It's orders of magnitude lower cost compared to other alternatives. If you can get fiber, it's a really good solution."

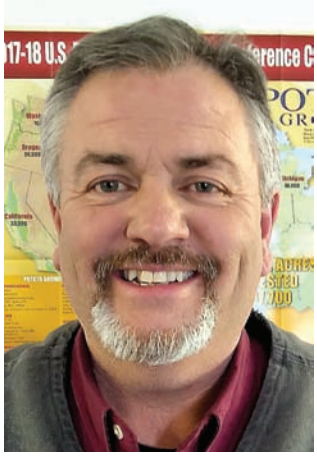
Babler said he approached Jo-Carroll about bringing fiber to the business and they said they could have him connected within a couple of weeks.

"I couldn't believe it," said Babler. "They did a good job."

Showing interest and signing up should be every community and neighborhood's priority, said Babler.

"The more people that use it, the more Jo-Carroll can invest in keeping it up-to-date, provide good service, tech support and reliability. Fiber will ultimately help everyone, but they need to show interest."

Jerry Brearton--Neumiller Farms



Jerry Brearton

For Neumiller Farms, fiber optic Internet service impacts all areas of farm operations

by Dan Burke
dburke@galgazette.com

SAVANNA–The uses for fiber Internet are quickly associated with industries such as health care and financial services, but just south of Savanna in the middle of Jo-Carroll Energy's territory, another industry is finding uses for high speed Internet.

Neumiller Farms in Savanna was connected to Sand Prairie's fiber Internet about a year and a half ago, said Jerry Brearton, Neumiller Farms food safety chief.

Brearton said a fire destroyed an office, and when they tried to reconnect to the Internet, the current provider "wouldn't cooperate."

Jo-Carroll stepped up and filled the void, and brought fiber to Neumiller Farms, said Brearton. Neumiller has gone through many versions of the Internet, starting with dial up, satellite, broadband and now fiber, said Brearton.

"Fiber is a part of efficiency and growth," said Brearton.

Neumiller uses cloud-based storage for its documents, said Brearton, and fiber allows quick and reliable retrieval. In agriculture, any method to increase productivity, efficiency and margins are needed to prosper, said Brearton.

"It's just so fast," said Brearton. "Our online documents, we track our semitrailers and semis all via the Internet. High speed fiber is very reliable."

Brearton said they can control irrigation through the web and he knows of one farmer that uses online connections to track his grain dryers, augers and tractors.

'We use fiber as a promotional tool to market the region. We view software and the Internet as a tool.'
Lisa McCarthy, Northwest Illinois Economic Development executive director

A true asset

Lisa McCarthy says Jo-Carroll's fiber optic service helps her promote northwest Illinois

by Dan Burke
dburke@galgazette.com

In rural counties with small populations, economic development is a high-value commodity.

Lisa McCarthy, Northwest Illinois Economic Development executive director, works to bring businesses and investments to the county and region. While not all businesses or industries benefit from high speed fiber Internet, the ones that do are positioned for flexibility and growth.

"We're seeing technology in almost every industry," said McCarthy. "The software of the future is really going to drive productivity. Without those tools, it makes it really hard to compete."

Illinois has a changing political landscape, and newly-elected governor J.B. Pritzker has said Internet access for all is a priority. McCarthy said she is encouraged by that statement. She added that high speed Internet is coming to rural areas with much the same impact as electricity had in the area in the 1930s and 1940s.

"In rural areas, high speed Internet is being rolled out like electrification," said McCarthy.

Fiber Internet is a selling point, said McCarthy, and one she uses to attract businesses to the county.

"We use fiber as a promotional tool to market the region," said McCarthy. "We view software and the Internet as a tool."

In the Internet age, every business can reach markets that were previously unavailable. Fiber Internet is utilized by many industries and is becoming a necessity alongside electricity and water.

"Increasingly, Internet is looked at by businesses as almost a utility," said McCarthy. "They may have expectations that high speed Internet already exists (in the region)."

Each individual business has different needs from Internet service. Some need reliability and a high speed connection, while others need redundancy or access to cloud-based storage.

"We look at high speed in different ways depending on what your concerns are," said McCarthy.

Flexibility and connectivity are two advantages to having access to high speed Internet. In businesses that only need an Internet connection, the entire county and region could be home.

"Often times, businesses will approach us as to where they want to be," said McCarthy. "Fiber helps you be more connected."

Lisa McCarthy

Want to know more?

Jo-Carroll Energy & Sand Prairie to host information session at Galena Gazette, 5-7 p.m., April 23

Do you want to know more about fiber optic Internet service? Do you have questions which need answering before showing interest? Are you interested, but would like to have a bit of help navigating through the process?

In anticipation of those questions, Jo-Carroll Energy is holding an information session, 5-7 p.m., Tuesday, April 23 at The Galena Gazette, 716 S. Bench St., Galena.

Jo-Carroll Energy and Sand Prairie staff will be present to answer questions and provide pertinent information about its fiber optic Internet service.

The Gazette utilizes the Sand Prairie fiber Internet service.

"We appreciate that the information session can be held at The Gazette," Mike Casper, Jo-Carroll president and CEO, noted. "There is ample parking and there are plenty of computers where we can provide demonstrations and plenty of space for personal discussions. We want everyone to know, regardless of where they live that they are invited."

Gazette staff members will be in attendance to share their experience with the fiber service.

Light refreshments will also be served.

Glossary of terms

Here are terms associated with computers, the Internet and the delivery of Internet Services.

3G: The term for the 3rd-generation wireless telecommunications standards usually with network speeds of less than 1 Mbps.

4G: The term for 4th-generation wireless telecommunications standards usually with network speeds greater than 1 Mbps.

5G: The term for emerging 5th-generation wireless telecommunications standards usually associated with network speeds of up to 1 Gbps or more.

Active Ethernet: One fiber goes to an installation and is not shared with others.

Backbone: This definition is much broader than the JCE application. For JCE, 'Backbone' means: A mainline distribution fiber that spans through neighborhoods and rural corridors to ultimately source fiber drops to each premise (e.g. home, farm, business).

Bandwidth: The amount of data that can be sent over a network.

Broadband: High-speed Internet access that is always on and faster than traditional dial-up access. Broadband includes fiber, wireless, satellite, digital subscriber line and cable. For the Federal Communications Commission (FCC), broadband capability requires consumers to have access to actual download speeds of at least 25 Mbps and actual upload speeds of at least 3 Mbps.

Cable: Uses a cable network to deliver services. Speeds vary from 6-30 Mbps download and 1-3 Mbps upload. Cable networks are shared, meaning you may not achieve the advertised speeds during periods of peak usage due to congestion from your neighbors.

Central Office: The location where electronics are stored which connect Internet users to the World Wide Web. Also called a "CO."

Community Anchor Institutions: Schools, libraries, medical and healthcare providers, public safety entities, institutes of higher education and other community support organizations that provide outreach, access, equipment and support services to facilitate greater use of broadband service by the entire population and local governments.

Dark Fiber: Fiber that is in place but not being used for broadband services.

Digital Divide: The gap between those of a populace that have access to the Internet and other communications technologies and those that have limited or no access.

DSL (Digital Subscriber Line): A form of technology that utilizes a two-wire copper telephone line to allow users to simultaneously connect to and operate the Internet and the telephone network without disrupting either connection.

Fiber: A flexible hair-thin glass or plastic strand that is capable of transmitting large amounts of data at high transfer rates as pulses or waves of light.

FTTH or FTTP (Fiber to the Home or Fiber to the Premise): The delivery and connection of fiber optics directly to a home or building.

Fixed Wireless Broadband Access: The use of wireless devices/systems in connecting two fixed locations, such as offices or homes. The connections occur through the air, rather than through fiber, resulting in a less expensive alternative to a fiber connection. Bandwidth is limited compared to fiber and reliability is based on line of site and distance.

Gigabit Passive Optical Network or GPON: Point-to-multipoint access network. Its main characteristic is the use of passive splitters in the fiber distribution network, enabling one single feeding fiber from the provider to serve multiple homes and small businesses.

Jo-Carroll Energy: A local member-owned cooperative that provides electric, natural gas and broadband services in portions of Jo Daviess, Carroll, Whiteside and Henry counties. Democratically controlled and operated on a not-for-profit basis, the cooperative returns margins to members in the form of capital credits.

Internet Service Provider (ISP): A company that provides users with access to the Internet and related services.

Last Mile: The technology and process of connecting the end customer's home or business to the local network provider.

Lit Fiber: An active fiber optic cable capable of transmitting data.

Local Area Network (LAN): A group of network devices that are on a high-speed connection and typically within the same building or location.

LTE (Long Term Evolution): A 4G wireless broadband technology that provides speeds up to 100 Mbps download and 30 Mbps upload.

Middle Mile: The connection between a local network, also called a "last mile" connection, and the backbone Internet network.

Modulation: The process of translating information into light waves and then light waves into information.

Network Infrastructure: The hardware and software components of a network that provide network connectivity and allow the network to function.

Open Access Network: Networks that offer wholesale access to network infrastructure or services provided on fair and reasonable terms with some degree of transparency and nondiscrimination.

Polygon: A geographic area, also called a neighborhood, where fiber optic service is offered.

Router: A piece of network hardware which allows communication between your local home network (your personal computers and other connected devices) and the Internet. The router may also be called an Optical Network Terminal or ONT.

Sand Prairie: The brand name of Jo-Carroll Energy's broadband division.

Service Area: The entire area within which a service provider either offers or intends to offer broadband service.

Tier 1 Internet Network: A network of Internet providers that form a superhighway that allows users access to every other network on the Internet.

Tier 2 Internet Network: A network of smaller Internet providers that allow users to reach some portion of the Internet but that still purchase IP transit.

Telemedicine: The use of high-speed, high-capacity Internet to support long-distance healthcare services, patient and provider education and enhanced healthcare administration.

VoIP (Voice over Internet Protocol): A technology that allows users to send and receive voice calls using an Internet connection instead of a phone line.

WiFi (Wireless Fidelity): A technology that uses radio transmissions to enable electronic devices to connect to a wireless local area network (LAN).

Table of Units

The following units are associated with broadband:

Bit: Smallest unit of digital information.

Byte: Equal to 8 bits.

Bps: Bits per second.

Kbps: Kilobits per second (1000 bits per second).

Mbps: Megabits per second (1 million bits per second). 30 seconds to download an MP3 song.

Gbps: Gigabits per second (1 billion bits per second). 10 seconds to download HD movie.

Tbps: Terabits per second (1 trillion bits per second)

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