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Longmont's fiber-optic network still state-of-the-art

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LONGMONT — It's 17 miles long and 13 years old. It makes a loop around the city and is capable of bringing high-speed telecommunications into every home and business in Longmont.

The city's fiber-optic network, a cable containing glass tubes, is still as state-of-the-art as the day it was laid in the ground in 1997. But it remains underused, and city officials are hoping that changes.

"It's such a no-brainer to have this amazing asset under our feet," said Joe McBreen, the executive director of information technology for the St. Vrain Valley School District. "We have an amazing opportunity that we can leverage right under our feet."

The district uses the network to provide high-speed connectivity among its schools within the city. It also allows the schools to connect, through the Internet, to other schools around the world.

"It could be next door; it could be on the other side of the planet — you can't tell the difference," McBreen said.

The school district leases access to the network through a contract with Reliance Globalcom, which leases fiber bandwidth from the city.

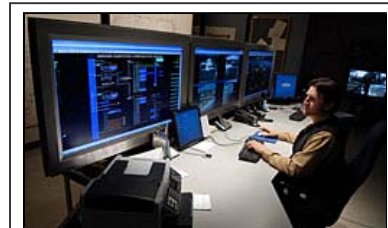
McBreen said that when the school district sought a competitive bid last year for a company to provide high-speed telecom services, Reliance came in at half the cost of its nearest competitor.

The city leases "dark" fiber to companies such as Reliance, which use their own equipment to "light" the fiber and provide services to clients — in this case, the school district.

The city would like to be able to partner with a private company to offer more users access to the fiber, but state law prohibits that.

Ballot Measure 2C was defeated by Longmont voters in November. That measure would have allowed the city to get around the state law that prohibits cities from partnering with private companies to offer telecommunications services to residents.

So only a limited number of users — the city, the school district, Longmont United Hospital and a few others — are using the fiber network. The average business or residential user can't afford to, because that much bandwidth —



Substation technician Kevin Stenson works in the Longmont Power and Communications network operations center on Wednesday. The city uses smart grid technology, which allows for constant and real-time monitoring of the city's six electrical substations, using the fiber optic "backbone" the city installed in 1997. **Richard M. Hackett/Times-Call**

What is fiber optics?

Fiber optics is a technology that uses glass (or plastic) threads, or fibers, to transmit data. A fiber-optic cable consists of a bundle of glass threads, each of which is capable of transmitting messages modulated onto light waves.

The biggest advantage of optical fiber is the fact it is the most cost-effective means of transporting information. Fiber can transport more information longer distances in less time than any other communications medium.

Also, the bandwidth and distance capability of fiber mean that fewer cables, fewer repeaters, less power and less maintenance are needed. In addition, fiber is unaffected by the interference of electromagnetic radiation, which makes it possible to transmit information and data with less noise and less error.

Sources: *Webopedia.com*; *the Fiber Optic Association*

even one fiber's worth — is far more than one home or one business would need. It wouldn't make economic sense for such users to lease dark fiber from the city individually.

And it's not enough, city officials said, to just lease the fiber — someone has to operate the system, and that's where a private partner would come in.

A partner would be able to offer just the bandwidth needed by a resident or business at a price competitive with high-speed connection prices charged by Qwest, Comcast or Level 3 Communications, known in the telecommunications industry as "the incumbents."

The Longmont City Council, which discussed the subject during its retreat in January, believes allowing broader access to the fiber backbone would be a boon to residents and businesses.

Just as it did with electric power in 1912, when the city became its own electricity provider, the council would like to do the same with telecommunications.

Thinking ahead

City leaders in the 1990s, recognizing the power of fiber-optic communications, began exploring the idea of a fiber-optic network. In 1996, the City Council approved the construction of a 7-mile fiber-optic "backbone" that would stretch around the city and be able to carry vast amounts of data.

The following April, Platte River Power Authority agreed to fund and expand the project. It became a 17-mile loop around the city that was connected into a regional fiber network that serves all four of Platte River's cities: Longmont, Loveland, Fort Collins and Estes Park.

The Longmont portion of the network cost \$1.1 million, all of it paid for by Platte River.

The city hooked up its 40-plus facilities and began using the network immediately.

"Before '97, we had T1 lines," said Jim Wall, the city's chief information officer.

Using fiber optics allowed the city to communicate at speeds of 1 gigabit — 1,000 megabits — a second, an almost 700 percent increase over the 1.5-megabit speed of a T1 line.

The city's uses for the fiber include emergency communications, connectivity between employees working at remote locations, monitoring the status of Longmont Power's substations and conditions at the water plants, and carrying all internal telephone and data communications, Wall said.

"What makes this all doable is the tremendous speed of this system," said Tom Roiniotis, director of Longmont Power & Communications.

After the network was installed, the city sought a private company to allow broader use of the network, and it found Adesta Communications. The city intended to lease network bandwidth to Adesta, which would then sell its services — such as high-speed voice and data communications — to residents and businesses.

"The idea (was) that the private sector would provide the service," Roiniotis said. "We would provide the infrastructure, but they would provide the service."

But in 2001, Adesta filed for bankruptcy. Then in 2005, a state law was passed that prohibited Colorado cities from partnering with private companies to provide telecommunication services to residents.

That law said cities could not provide any new telecommunication services. A provision in the law, however, allows a municipality to re-establish the right if voters approve a ballot measure in a local election.

Five municipalities have done that, Roiniotis said.

"We don't know what opportunities we're going to see in the future," he said. "But we do know that, with the current state law, we kind of have some shackles on us when it comes to even considering partnering with the private sector."

Longmont voters in November said no to removing those shackles. As one local attorney who was against 2C wrote in a guest opinion in the Times-Call, "Approval of (2C) would throw open the door to the city getting deeply involved in the telecommunications business, including the ability to offer pay TV, telephone and Internet services with or without partners from private enterprise. If the city has a specific plan, it hasn't bothered to share it with voters."

Dark fiber waiting for a light

The fiber backbone itself is a cable that contains 12 buffer tubes. Each tube contains 12 fiber-optic strands. Each of the 144 individual fibers, each about the width of a human hair, is capable of carrying an almost unlimited amount of data.

The technology of the fibers has not changed, according to Matt Scheppers, senior electrical engineer for Longmont Power. What has changed is the technology used to move information through the fibers.

"It's equipment-limited on the end," Scheppers said. "The question (of how much data moves how fast) is directly related to what kind of equipment is on the end."

Within the city's 144-fiber network, Platte River owns 12 fibers, and the city uses 12. The city leases 26 dark fibers to other users, such as Reliance Globalcom and Longmont United Hospital.

That leaves 94 unused fibers.

Karl Niemann, LUH's manager of technical services, refers to the six fibers the hospital leases as "three pairs," because three of them are used for sending information and three for receiving information.

LUH uses the fiber to connect its business office on South Sunset Street to the main hospital on Mountain View Avenue. It also connects to the Longmont Medical Center at Pike Road and South Main Street. There, LUH provides network services for the tenants by reselling bandwidth to them.

One of those, Twin Peaks Medical Imaging, sends X-rays through the fiber to the hospital, where they are read by radiologists, Niemann said.

"It's at least a three times reduction in cost," Niemann said of leasing fiber from the city, versus contracting with a commercial provider. "And oftentimes, if you go with a commercial provider, you have construction costs."

That's because a company would have to put in fiber where none exists. The city's network makes a loop around the city and, since 1997, has added another 25 miles of extensions that connect users to the main backbone.