LAMB FTTH Network Fulfills Local Consumers' Needs in Sterling, Mass.

The Sterling Municipal Light Department sets out to build a fiber-to-the-home network that thinks beyond profits and aims to fulfill the community's broadband needs.

By Sean Buckley / *Broadband Communities*

Sterling, a town of about 8,000 in Worcester County, Massachusetts, has become another example of a community controlling its broadband destiny. The Sterling Municipal Light Department (SMLD) is building the Local Area Municipal Broadband (LAMB) network, which will bring fiber-based internet to Sterling's residents and businesses. The name is fitting: Sterling is where Mary Sawyer Tyler, the alleged real-life "Mary" of Sarah Josepha Hale's famous poem, "Mary Had a Little Lamb," lived.

Set to be fully completed in the fourth quarter of 2024, SMLD will proactively notify residents as construction begins in their neighborhoods. "When Darren Borge, general manager for SMLD, came up with the LAMB name, you could not believe the response from the locals who think it's a great name," says Bill Underhill, network coordinator at SMLD. "We're stressing the local part."

Unlike an incumbent service provider or large electric power company, SMLD focuses on improving residents' lives. "We are owned by the people we serve, so we have to answer to them," says Borge. "We can bring next-gen services to our little town of Sterling to help our residents save wherever they can. SMLD benefits everyone – it gives them a stronger robust electric system and now the internet."

COLLABORATION IS KEY

In 2017, SMLD started seeing the big data push from consumers. It also saw utilities aligning with electric, residential internet service and supervisory control and data acquisition (SCADA) networks for tracking internal utility use.

Sterling was inspired to build the LAMB fiber-to-the-home (FTTH) network by a neighboring municipal utility, Shrewsbury Electric and Cable Operations (SELCO), which had started to convert its own network to fiber.

After a few years of developing ideas and troubleshooting, Sterling won a $150,000 Community Compact IT Grant through the state for broadband and townwide institutional network (I-Net) systems. An I-Net connects governmental, educational and community institutions. The grant enabled the town to install fiber connecting 26 town buildings and equipment, including the police and fire stations, library, town hall, the Sterling Lancaster Cable Television station, the Sterling Department of Public Works, water towers, radio towers, solar and battery projects, and SMLD and its substation and distribution equipment.

Through the grant, SMLD started working with SELCO and utilities in the nearby municipalities of West Boylston Electric Light and Boylston Electric Light Department. Sterling, Shrewsbury, Boylston and West Bolyston created a pole attachment agreement: The four towns are running the fiber inside the power space of each pole.

SMLD's FTTH network will top speeds of 1 Gbps symmetrical service for consumers and 2 Gbps for businesses.

SMLD is working with utilities in three neighboring towns to build out miles of fiber for its new FTTH network.

"We split the costs three ways," Borge says. "We oversized the trunk line so everyone could take a part of the 432-count fiber cable for their system and not hinder the other systems' fiber availability."

SMLD and surrounding municipal electric departments have collaborated for decades. Massachusetts has 41 municipalities, nine of which are in Central Massachusetts, where SMLD is located. SMLD and other nearby electric departments share electric resources.

"We always work together when there are big ice storms and help each other with things such as borrowing a transformer," Borge says. "All of us have the same goal and focus as the large co-ops and IOUs, but we feel like we are better at providing restoration, services and speed to our customers because we're owned by people we serve."

SHARING FIBER RESOURCES
Now, Sterling, Boylston, West Boylston and Shrewsbury are collaborating on building a brighter broadband future.

An SMLD line crew worked with line crews from the other three communities to install 23 miles of fiber in four months. It installed 9 miles of fiber in Sterling. Sixteen miles of fiber were established from the Sterling/West Boylston border, through Bolyston, West Bolyston, and the Shrewsbury town line. These routes were then

spliced together to feed SMLD's headend, creating its I-Net.

Enough fiber was available in each town for the headends as of April 2020. After that, SMLD worked on the I-Net ring for Sterling and spliced the town buildings. Borge says that once SMLD made the connections to town buildings, the question was, "We have it here, so what can we do with it now?"

As SMLD created a business case, it worked out a deal with SELCO to be its headend provider. SMLD will purchase wholesale capacity from SELCO and sell it as a retail service. SMLD then established a cost-per-foot breakdown, the ROI and the number of subscribers it needed to be financially profitable.

SMLD's broadband ambitions were boosted when it tapped municipal broadband veteran Bill Underhill as its network coordinator in January 2021. Previously, Underhill led broadband efforts in Concord, Mass., and Austin, Texas. "Bill understood fiber-to-the-home deployments, headend, and network provisioning," Borges says. "We were able to pick him up and throw him right in."

A FOCUSED STRATEGY
LAMB will be built out in two phases. SMLD initially installed fiber from the West Boylston line to the Leominster town line. Phase one of the project

connected Sterling facilities along the route. During the second phase, SMLD will extend broadband services to residents and businesses along the same route. Funding for phase two was supplemented when Sterling secured American Rescue Plan (ARP) funds.

SMLD plans to use the money to connect remote town facilities and assets not included in the original construction, allowing it to pass almost 42 percent of its customers.

Seeing how vital broadband has been since the COVID-19 pandemic, SMLD bypassed the current GPON architecture for XGS-PON. XGS-PON is an updated standard for passive optical networks (PON) that can support high-speed, 10 Gbps symmetrical data.

As part of its focused strategy, SMLD began using the 432-fiber route constructed during the first phase of its network build to create a transmission and fiber distribution network.

In April 2021, SMLD turned up its first customer, then connected a few friendly sites to work out speeds and figure out the billing system. The LAMB network went live on August 1, 2021. As of early 2022, seven months after launch, the LAMB network hit the 50-subscribers mark. "It's a testament to everyone's work here," Borge says of the milestone.

Now SMLD is building off those fiber points. Having installed the fiber network throughout Sterling, the utility can leverage it for operations. "This will enable us to tie in our electric assets via a VLAN network for SCADA, safety and security through cameras and key cards," Borge says.

He adds that the fiber network will also enable the electric company to shed expensive, third-party network connections. By using the available fiber network, Sterling is saving $66,000 a year. SMLD said in a Telegram and Gazette article that it could save the town an additional $8,500 as the project expands.

"We can start getting rid of all these other locations where it's necessary to have business ISPs," Borge says. "This will allow us to generate savings for ourselves and our customers because we offer competitively priced services."

ENHANCING BROADBAND COMPETITION

Before SMLD began offering its FTTH service, the town could access only slow DSL from Verizon and Comcast's cable modem service. SMLD has been conducting speed tests with town residents as it applies for FCC ReConnect Loan and Grant Program funding. It found that residents' connections weren't optimal.

"Our competitors' speeds aren't that good," says Underhill. "We're going to be able to show in the ReConnect filing that the speeds aren't what they need to be and often don't meet the minimal qualifications for what the FCC considers broadband."

Customers eligible to get the LAMB FTTH service can choose from many internet speeds and options. SMLD offers four competitively priced symmetrical speed tiers: 250 Mbps for $65, 500 Mbps for $80, 750 Mbps for $90, and 1 Gbps for $100 a month. Business customers can access the same tiers, including the highest tier of 2 Gbps. "When we do a speed test on our equipment, we get 1 Gbps," Underhill says.

Residents also access 24/7 customer service, a fiber modem, a Wi-Fi 6 router and a Roku video streaming stick. In addition, the service provider offers managed Wi-Fi, home applications, parental controls and cybersecurity.

Beyond the range of available speeds it offers, SMLD sets itself apart from competitors because it is more tied to a community than a large ISP is. "Because we're a municipal utility, accountability is much higher," Underhill says. "My phone number and email are on the SMLD website, so if there's a problem, a customer can reach out directly."

He adds that because it is a municipal broadband player, SMLD better understands what a community needs. "We're local and small, so we're more in tune with what's happening in the community that's helpful to our customers," he says.

Municipal broadband providers generally cause ire among large ISPs, but so far the big players haven't taken notice of SMLD's presence. SMLD operates 4,000 electric meters that serve 8,000 residents, much smaller than a large ISP's territory. "We're small enough that I don't think Comcast or Verizon have seen what we're doing," Underhill says. "We've been running things under the radar."

CULTURAL TRANSITION

For SMLD, which has spent its 100-plus years as a traditional electric utility, the move to delivering fiber-based broadband is a new venture that requires new skill sets. Though

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FIBER MATERIALS, BROADBAND CONSTRUCTION DEMAND RISES

As local communities look to take advantage of new broadband expansion opportunities through funding mechanisms from the FCC and other federal government plans, demand for fiber and network construction has never been greater. Communities and providers can access funding via a reverse auction developed by the FCC's $20.4 billion Rural Digital Opportunity Fund and the $42 billion Infrastructure Investment and Jobs Act (IIJA).

This was reflected in the earnings of all major U.S. fiber manufacturers: Corning, Prysmian, CommScope and Sterlite. Research firm IBIS World estimates that annual U.S. fiber optic manufacturing will be about $2 billion in 2022, a 7 percent market-share increase following several years of decline.

Corning, for instance, reported that fourth-quarter 2021 optical communications sales rose 22 percent to $4.3 billion. Growth was supported by increased spending in broadband, 5G, and cloud computing. Corning's management expects significant growth in 2022 and beyond, including from IIJA, which provides broadband deployment funding to benefit underserved and unserved communities.

Likewise, Prysmian reported strong "organic growth, mainly thanks to the [U.S.] market" because of a new generation of miniaturized optical cables for FTTx and 5G networks. The company says telecom segment sales were $1.74 billion, with an organic change of +12.7 percent. What's more, Prysmian said, organic growth was chiefly attributable to the recovery of fiber optic cable demand in North America, although positive signs were also recorded in southern Europe.

Network construction companies, including Dycom, are also noting growth. Dycom recently told investors that telephone companies and, increasingly, rural electric utilities deploying FTTH enable high-speed gigabit connections. Fiber construction revenue from electric utilities increased organically 37.2 percent year over year and was $57.4 million, or 7.5 percent of contract revenues.

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such a transition can create issues for electric utilities in terms of company culture, Borge says, SMLD's electric crews are motivated to be part of the broadband project.

"These guys are hungry and knowledgeable," Borge says. "We're running the fiber cable in the power space on each of our utility poles. I give them a lot of input on construction, ideology and design."

The utility's foray into telecom and broadband is just one of many ways it has been forward-looking. SMLD installed the largest-sized battery storage system in 2016 and the first utility-scale and first solar-plus battery scale in 2018.

"We're a very progressive utility, but we don't do it for the accolades," Borge says. "We do it to help keep prices where they are, or even lower, for residents and ratepayers. We are now doing this for internet and data."

SIMPLIFYING CUSTOMER EXPERIENCE

Besides offering higher speeds at lower prices, SMLD is focused on simplifying the customer experience. By leveraging Calix hardware and its cloud-based tools, Calix software tools enable SMLD to interact and manage customer connections better.

"The Calix software gives insight into the customer experience with managed Wi-Fi and the CommandIQ app," Underhill says. "All of this is part of our product delivery."

When customers sign up for a SMLD speed tier, they get routers, managed Wi-Fi, Roku video sticks, three home services that provide the ability to set parental controls, advanced security options and new capabilities enabled through Calix CommandIQ mobile apps. They include

- **Sterling LAMB Smart Home App:** The app allows residents to create profiles for specific devices and guest or custom wireless networks. It also allows customers to quickly add new devices to the network through the app's WPS feature.
- **ExperienceIQ:** This app offers subscribers the ability to manage content, applications and websites for devices connected to their home networks.
- **ProtectIQ App:** Customers gain an extra layer of protection with tools that make their home networks safer by blocking all connected devices' viruses, malware and malicious websites.

"All of these apps are baked into the cost of the service, so there are no surprises on the bill," Underhill says.

SMLD has excellent support from the town and the utility board, so the main focus now is extending service to more people in the community. "As the

word gets out about what we're doing with fiber, we're turning people away because we have not built out to them," Underhill says. "When a neighborhood sees fiber being put up on poles, it generates a lot of questions to the guys in the trunk."

GENERATING INTEREST

The SMLD municipal broadband project won't cost current taxpayers a dime, debunking the myth anti-municipal-broadband groups often cite. "The next phase of the fiber project will put the fiber network in front of 42 percent of our customers without any debt to our ratepayers or taxpayers," Borge says.

Just as Sterling sought Shrewsbury's help to start its FTTH network, SMLD is now fielding inquiries from other surrounding towns, including Paxton and Princeton, which have asked Sterling how to develop an FTTH

plan or whether SMLD can expand its network to them.

Getting into the broadband business is a way for SMLD to generate new revenue, which is critical as the growing adoption of solar power threatens its traditional energy business.

"We are in the business of selling electricity, and as people start to become energy-conscious, that's all well and good for the environment, but it's going to start cutting into revenue streams," Borge says. "We're asking ourselves how we can create different avenues of revenue streams. Why not by offering internet?"

ENABLING ECONOMIC DEVELOPMENT

Offering residents better internet is the priority, but SMLD is keen on winning over more businesses in Sterling, too.

A fiber network will make the town more attractive to a host of small and

more-significant businesses that need high bandwidth available only with a fiber connection. Of the 50 broadband customers SMLD signed up for the fiber-based broadband service, 16 customers are commercial businesses.

Sterling's location is a potential lure for businesses; it has two ways to access Route I-190 and is only an hour away from Boston.

Underhill says the word is spreading about Sterling's quality, high-speed internet service. The fiber network is "a big part of the economic engine that will help the town bring in, attract and retain businesses," he says. ❖
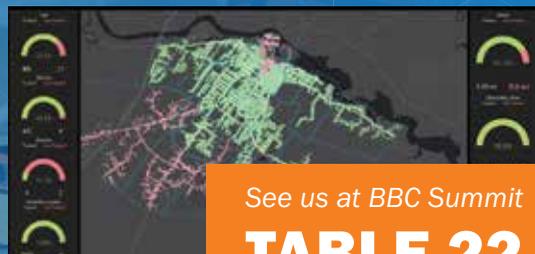
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