Southern Tier 8 Regional Board:

Chenango and Otsego Counties' Connectivity Plan

September 11, 2024

This plan was created as part of the Appalachia Digital Accelerator, a Connect Humanity program funded by the Appalachia Regional Commission with additional support from Truist Foundation and Ford Foundation.

Connect Humanity

ARC Appalachian Regional Commission

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Section 1: Executive summary

Micron Technology's 2022 announcement[1] of a $50 billion investment in memory chip manufacturing in Idaho and Central New York, coupled with a 2023 national designation[2] as North America's Tech Hub for Battery Innovation, has created significant economic opportunities in the Southern Tier region of New York. The communities of Chenango and Otsego now have a generational opportunity to transform their economic growth trajectory. However, these counties face a pressing need for enhanced broadband infrastructure to drive economic development, education, and access to essential emergency services. Gaps remain in both last-mile infrastructure and middle-mile coverage, which are crucial for enabling last-mile deployments and offering diverse fiber solutions for businesses, anchor institutions, and emergency communications.

Fortunately, the 2021 Infrastructure Investment and Jobs Act (IIJA) unlocked unprecedented federal funding for last-mile broadband expansion, primarily through the Broadband Equity, Access, and Deployment (BEAD) Program. In advance of that program, community leaders identified a strategic path to strengthen middle-mile routes in the counties — which in turn will make last-mile deployments via BEAD or other capital investments much more efficient. Not only will pursuing middle-mile now enable more last-mile deployments, it will also increase resiliency and redundancy for existing small internet service providers (ISPs) in the region and improve services for businesses, anchor institutions, and emergency communications throughout the counties.

This plan details how the most efficient path toward expanded middle-mile can come from a collaboration with Southern Tier Network (STN) — a nonprofit, open-access middle-mile provider already operating in nearby communities. This initiative is designed to:

- Enhance the operational capacity of local ISPs to serve unserved and underserved areas.
- Deliver cost-effective, high-performance service to municipal buildings, businesses, and community anchor institutions (CAIs).
- Bolster the resilience of regional fiber infrastructure, mitigating service disruptions.
- Foster competition among ISPs, resulting in improved service offerings and reduced costs for residents.

[1] Micron Technology, Inc. (2024) "Micron, Biden-Harris Administration, U.S. Senate Majority Leader Schumer Announce $6.1B in CHIPS and Science Act Funding for Historic Planned Investment in Domestic Leading-Edge Memory Manufacturing in Idaho and New York." Available at https://investors.micron.com/news-releases/news-release-details/micron-biden-harris-administration-us-senate-majority-leader. Accessed September 10, 2024.
[2] U.S. Economic Development Administration (2023) "Biden-Harris Administration Designates Tech Hub in New York's Southern Tier to Strengthen the Battery Manufacturing Industry." Available at https://www.eda.gov/news/press-release/2023/10/23/New-Energy-New-York-Battery-Tech-Hub. Accessed September 10, 2024.

This plan presents several middle-mile expansion opportunities that can be pursued together or in stages, with costs ranging from $3.7 million to $7.8 million. The route prioritized thus far by stakeholders (Binghamton to Sherburne) is estimated to cost $3.7 million. This capital expense is partially secured as of the writing of this report, and though raising money for rural middle-mile projects is always challenging, leaders in the Southern Tier are committed to advancing the project by securing funding for the entirety of the build. The funding strategy recommended in this report focuses on building a coalition of stakeholders — including local ISPs, municipalities, and CAIs — who stand to benefit from this deployment, and creating a framework for each of those entities to contribute a commensurate amount to construction based on the savings and improved services they will receive later on.

The project has gained momentum as more stakeholders become involved in planning this deployment and understand the benefits to the region — and with sustained focus and collaboration, the Southern Tier region is well-positioned to secure the necessary funding to complete the project. This will enable the construction of critical broadband infrastructure, ultimately transforming connectivity and creating new economic opportunities for Otsego and Chenango counties.

Section 2: Background

The Appalachian Regional Commission's (ARC) Local Development District (LDD) — the Southern Tier 8 Regional Board — encompasses eight counties bordering Pennsylvania in the state's south-central area. This diverse region includes Broome, Chenango, Cortland, Delaware, Otsego, Schoharie, Tioga, and Tompkins counties. Characterized by a mix of rural landscapes, small cities, and college towns, the Southern Tier is home to approximately 580,000 residents. The area is known for its scenic beauty — including the Finger Lakes and portions of the Catskill Mountains — as well as its agricultural heritage and educational institutions such as Binghamton University, Cornell University, Hartwick University, and the State University of New York (SUNY) in Oneonta.

As with most rural areas, the Southern Tier faces challenges with internet connectivity. Many of its rural communities need access to reliable high-speed internet to address the digital divide and increase economic opportunity. The region's topography, with its hills and valleys, presents physical obstacles to network deployment, and coupled with the low population density (55 to 60 people per square mile), ISPs have not seen a business case to invest in building broadband to many areas in the region.

These issues hinder economic development, access to educational opportunities, and telehealth services, leaving rural Southern Tier residents and their communities at a distinct disadvantage in the digital age. However, with increased attention paid to the importance of broadband connectivity — and significant federal and state funds available to build better broadband — the region has reason to be hopeful that many broadband challenges will be addressed in the coming years.

2.1. About this plan

This plan was created as part of the Appalachia Digital Accelerator, a Connect Humanity program funded by the Appalachia Regional Commission with additional support from Truist Foundation and Ford Foundation.

A significant analysis of regional connectivity needs informed the direction of this plan. The analysis included examining last-mile service gaps, evaluating service at residences, businesses, and community anchor institutions, and assessing grant opportunities and eligibility parameters.

Ultimately, ST8 leadership directed this work to focus on expanding open-access middle-mile routes in Chenango and Otsego counties, based on ISP partnership availability, the funding landscape, and greater opportunity for the public sector to leverage resources to increase the likelihood of project success.

2.2. Project partners that made this plan possible

Connect Humanity: Connect Humanity is a nonprofit impact fund advancing digital equity by investing in and advising underserved U.S. communities to build essential internet infrastructure. Since 2021, they have partnered with 90 communities across 20 states, catalyzing $45 million in broadband investments and helping 160,000 people access affordable internet. They focus on low-income, rural, and Black, Indigenous, and people of color (BIPOC) communities, with 75 percent of investments going to minority- or women-led ISPs.

Southern Tier 8 Regional Board: New York's Southern Tier 8 Regional Board (ST8) serves as a regional planning and economic development board fostering intercounty collaboration to drive growth and prosperity in Broome, Chenango, Cortland, Delaware, Otsego, Schoharie, Tioga, and Tompkins counties.

ST8 advances projects that boost the region's financial viability and quality of life through strategic planning and coordination with local stakeholders. This framework ensures a cohesive approach by aligning objectives, resources, and efforts to promote sustainable economic progress in the communities ST8 represents. In July 2020, ST8 launched a "Regional Broadband Collaborative" to assess current limitations, build community capacity, and align resources to position communities for the expansion of broadband infrastructure, bringing improved internet access across the region to support economic development.

Chenango County Planning Department: Chenango County is home to 47,000 people across one city, 21 towns, and eight villages. Among other priorities, the county's planning department focuses on economic growth while preserving its agricultural character and natural resources.

Otsego County Planning Department: As part of the Southern Tier region, the Otsego County Planning Department oversees the sustainable development and preservation of a 1,003-square-mile area, balancing rural character with economic growth. Otsego County has approximately 60,000 residents across 24 towns and nine villages, including the City of Oneonta and the Village of Cooperstown.

Rural Innovation Strategies, Inc.: RISI is a mission-driven nonprofit that provides broadband technical assistance for small communities and supports efforts to expand and improve broadband infrastructure to maximize economic development.

2.3. Better connectivity leads to better economic outcomes

Universal high-speed internet should form the backbone of modern rural economic development strategies. The basic premise of economic development strategies focused on maximizing the value of universal, high-speed internet is that the strategies allow for the

local creation of digital products and services, which can be exported around the country and the world, bringing resources and wealth back into the community.

This is similar to how rural industries have worked for a long time, but instead of exporting manufactured goods such as paper or fabric and natural resources like timber or coal, the goods being made locally and sold elsewhere are digital — based on software or enabled by software. Fostering businesses, remote workers, and local entrepreneurs working in digital spaces will create high-paying jobs, retain talented individuals who might otherwise leave for opportunities in urban areas, and bring new revenue streams into the local economy that can be spent in local brick-and-mortar businesses.

A healthy, self-sustaining rural digital economy has several conditions:

- A growing density of technology workers — some working for local companies (e.g., cybersecurity analyst for a local bank) and some working remotely and learning from employers around the country and world.
- A workforce and education pipeline producing technologists — whether through high schools, post-secondary education, tech boot camps, or other avenues — to ensure the total number of technology workers in the community can grow and employers have people to hire locally.
- A growing culture of seeing opportunity in entrepreneurship, where people have access to resources, skills, funding, and mentorship to start and grow digital businesses.

The benefits of widespread broadband extend far beyond the tech sector. Southern Tier residents will experience diverse positive impacts, including:

- Increased property values that boost tax revenue for community enhancements.
- Improved efficiency through digital tools, which helps local businesses thrive.
- Extended visitor stays due to reliable connectivity, injecting more money into the local economy.
- Enhanced healthcare access via telehealth, which expands services and reduces costs.
- Streamlined government services resulting from increased online citizen engagement.
- Improved emergency communication during climate-related disasters.

These wide-ranging effects underscore how comprehensive broadband deployment — coupled with digital literacy initiatives — can transform rural communities. By embracing the digital age, rural areas can create new economic opportunities while preserving their unique character and quality of life.

Section 3: Chenango and Otsego counties' connectivity challenges today

Chenango and Otsego are adjacent counties in the ST8 region, sharing borders and similar geographic and economic challenges. The Susquehanna River flows through Otsego, Chenango, and Broome counties, while the Unadilla River acts as a boundary between Chenango and Otsego.

Source: Southern Tier 8 Regional Board.

This section details relevant demographic and economic characteristics and provides an overview of the current state of broadband connectivity in the two counties.

3.1. Demographic and economic context

Examining the demographic and economic conditions in Chenango and Otsego counties underpins the challenges and opportunities associated with broadband infrastructure deployment in the area.

Chenango County is home to 47,220 residents with a median age of 44.9.[3] The county has 52.8 people per square mile — a significantly lower population density than the 2020 national average of 93.8 people per square mile.[4]

[3] United States Census Bureau (2023) "QuickFacts: Chenango County, New York." Available at https://www.census.gov/quickfacts/fact/table/chenangocountynewyork/HSG860222. Accessed May 28, 2024.
[4] United States Census Bureau (2021) "Historical Population Density Data (1910-2020)." Available at https://www.census.gov/data/tables/time-series/dec/density-data-text.html. Accessed May 30, 2024.

The county has 19,886 households, 85.4 percent of which subscribe to broadband.[5]

Chenango County's workforce of 21,234 is primarily employed in manufacturing, healthcare, and education[6] — sectors that increasingly rely on robust internet connectivity. The utilities, transportation, and warehousing industries offer some of the highest-paying jobs in the county. However, 12.4 percent of Chenango residents live below the poverty line.[7]

Neighboring **Otsego County** has 58,524 residents with a median age of 40.8.[8] The county's population density of 59.6 people per square mile,[9] while slightly higher than in Chenango County, is still well below the national average.

Approximately 84.9 percent of the 22,305 households in Otsego have a broadband subscription[10] — a similar adoption rate to Chenango.

In Otsego County, around 27,300 people work in healthcare, retail, and education[11] — again, industries that require reliable broadband access. While higher-paying employment opportunities exist in the utilities, public administration, and finance sectors, 13.3 percent of the population lives in poverty,[12] reflecting economic challenges that could be addressed by increased access to online resources and job opportunities facilitated by improved broadband connectivity.

3.2. Current state of broadband in Chenango and Otsego counties

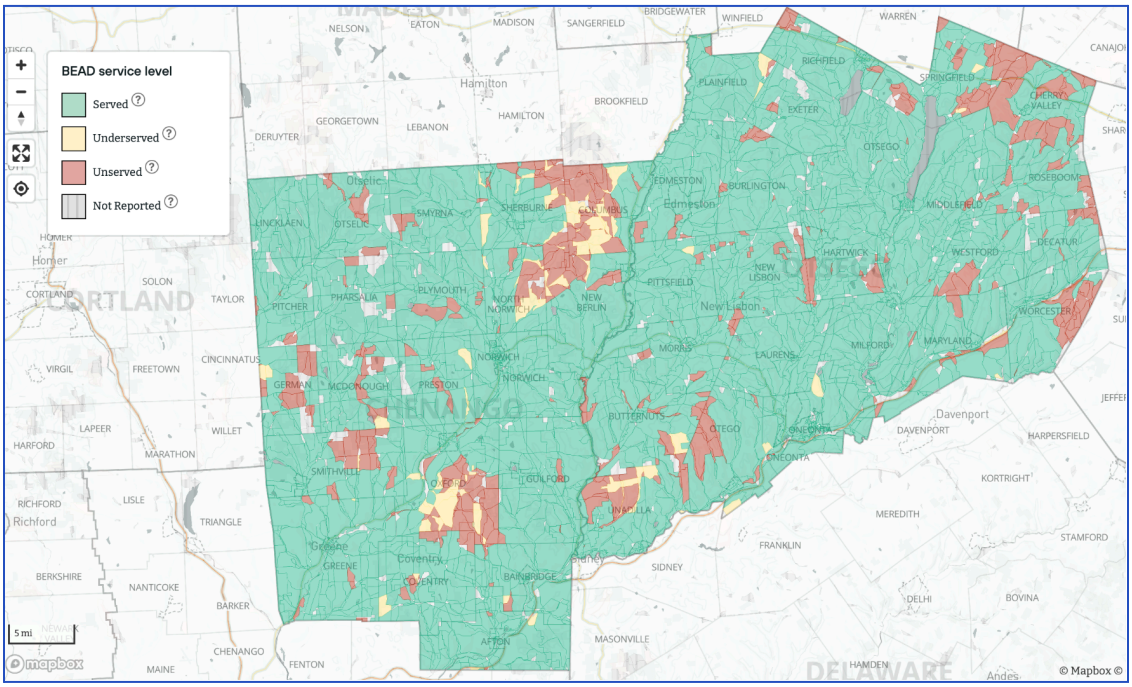
The Federal Communications Commission (FCC) defines broadband availability levels at broadband serviceable locations (BSLs) based on the existence of infrastructure capable of delivering specific internet speeds:

- Unserved: Broadband service is nonexistent or falls below 25 megabits per second (Mbps) download and 3 Mbps upload speeds.
- Underserved: Service speeds between 25/3 Mbps and 100/20 Mbps.
- Served: Connectivity achieves or exceeds 100/20 Mbps.[13]

[5] United States Census Bureau (2023) "QuickFacts: Chenango County, New York." Available at https://www.census.gov/quickfacts/fact/table/chenangocountynewyork/HSG860222. Accessed May 28, 2024.
[6] United States Census Bureau, "Chenango County, New York." Available at https://data.census.gov/profile/Chenango_County,_New_York?g=050XX00US36017#employment. Accessed May 30, 2024.
[7] United States Census Bureau, "Chenango County, New York." Available at https://data.census.gov/profile/Chenango_County,_New_York?g=050XX00US36017#employment. Accessed May 30, 2024.
[8] United States Census Bureau, "Otsego County, New York." Available at https://data.census.gov/profile/Otsego_County,_New_York?g=050XX00US36077. Accessed May 30, 2024.
[9] United States Census Bureau (2023) "QuickFacts: Otsego County, New York." Available at https://www.census.gov/quickfacts/fact/table/otsegocountynewyork/HSG860222. Accessed May 30, 2024.
[10] United States Census Bureau (2023) "QuickFacts: Otsego County, New York." Available at https://www.census.gov/quickfacts/fact/table/otsegocountynewyork/HSG860222. Accessed May 30, 2024.
[11] United States Census Bureau, "Otsego County, New York." Available at https://data.census.gov/profile/Otsego_County,_New_York?g=050XX00US36077. Accessed May 30, 2024.
[12] United States Census Bureau (2023) "QuickFacts: Otsego County, New York." Available at https://www.census.gov/quickfacts/fact/table/otsegocountynewyork/HSG860222. Accessed May 30, 2024.
[13] Federal Communications Commission (2024) *FCC Increases Broadband Speed Benchmark*. Available at https://docs.fcc.gov/public/attachments/DOC-401205A1.pdf. Accessed July 9, 2024.

According to FCC data,[14] Chenango and Otsego counties have approximately 6,885 unserved and underserved BSLs, illustrated in the map below.

Unserved and underserved BSLs in Chenango and Otsego counties



Source: Rural Innovation Strategies, Inc., "Rural Broadband Map." Available at https://rural-broadband-map.ruralinnovation.us/. Accessed May 27, 2024.

Unserved and underserved BSLs are scattered throughout both counties, with two dense clusters near the border separating the two counties and another cluster primarily concentrated in the town of Oxford in Chenango County.

There are four broadband technologies that serve the two counties: fiber, coaxial cable, fixed wireless, and copper wire (DSL). While DSL technology is widely accepted as outdated, fiber-optic, coaxial cable, and fixed wireless all have a place in solving connectivity gaps in rural areas.

Fiber transmits data as light pulses through thin glass or plastic strands. It offers extremely fast speeds (up to 1 Gbps or more), low latency,[15] and high reliability. Fiber is less affected by environmental factors and capable of symmetrical upload and download speeds. However, it can be expensive to build in rural areas due to topographic challenges (such as mountains, hills, or rocky soil) and long distances between existing infrastructure and rural homes.

[14] Federal Communications Commission (2023) Dataset retrieved from Rural Innovation Strategies, Inc., "Rural Broadband Map." Available at https://rural-broadband-map.ruralinnovation.us/. Accessed May 27, 2024.
[15] Low latency refers to the minimal delay between a user's action and the network's response, resulting in faster online experiences.

Coaxial cable uses the same coaxial cables that deliver cable television to transmit data. It is available in rural townships or villages and can offer high speeds (100 Mbps to 1 Gbps). However, speeds vary due to factors like congestion, oversubscription, and the age of the technology used on the ends of the networks. Shared bandwidth can lead to slowdowns during peak usage times, and upload speeds are typically much slower than download speeds. Coaxial is not as future-proof as fiber and often fails to provide reliable service as the system ages. Current broadband grant funding programs overlook areas served by cable and coaxial infrastructure due to reported speeds. However, it is likely that these networks will fail to keep up with consumer demand over the next 5-10 years and will need funding to be updated.

Fixed wireless uses radio waves to transmit data between a fixed antenna at the customer's location and the provider's network. Fixed wireless technology is installed on towers or water towers to transmit radio waves. It does not require physical cables to each home, making it easier and relatively less expensive to deploy. On the downside, it can be impacted by weather and physical obstructions, it is slower than fiber and cable, and it may have data caps or higher latency. Although wireless technology does not provide a long-term solution to connectivity, it can solve interim gaps in areas that have low-density or DSL networks.

Low-Earth Orbit (LEO) satellite internet — particularly Starlink by SpaceX — is emerging as a potential solution for broadband access in New York State's underserved areas. This technology offers lower latency than traditional satellite internet and could benefit remote and off-grid locations across New York's diverse landscape, especially where only DSL or traditional satellite options are currently available. However, LEO satellite internet faces challenges in New York, including potential service interruptions, concerns about capacity as the user base grows, and reliability issues due to obstacles like the state's abundant forests.

While it can fill connectivity gaps, LEO satellite internet is not seen as a replacement for fiber-optic infrastructure. It may not scale as well with increasing bandwidth needs and cannot provide the symmetrical speeds that fiber offers. There are also questions about its long-term sustainability, as satellites require replacement every five years, and service continuity depends on the provider's profitability.

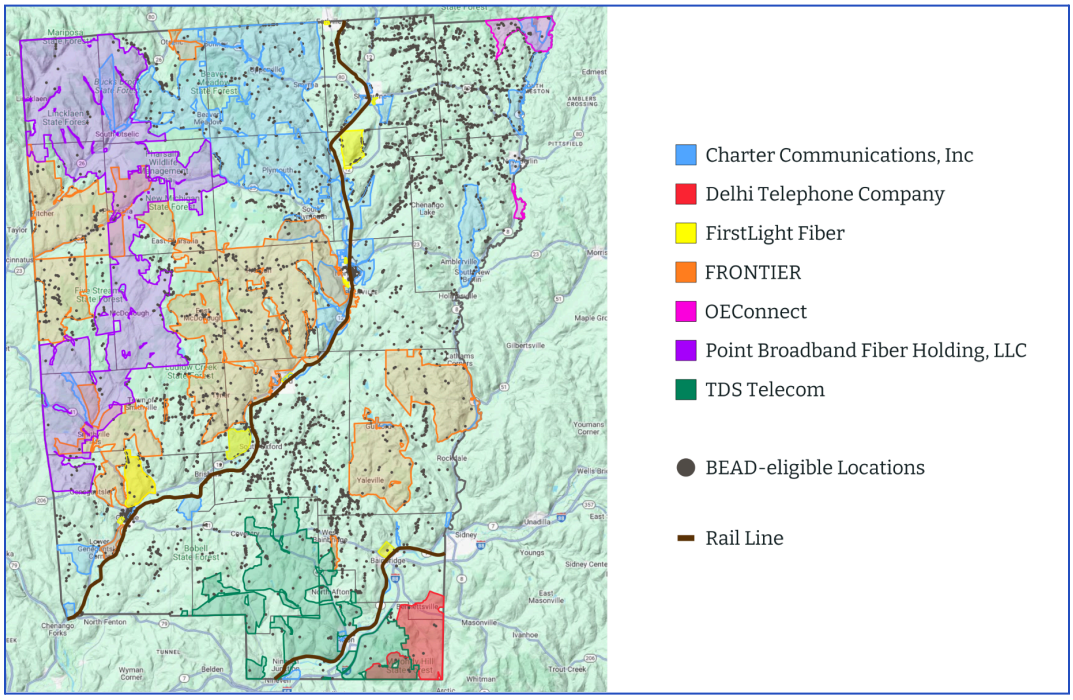
Given the long-term goal of connectivity for all, the following maps focus on fiber and wireless provider footprints in Chenango and Otsego counties and their overlap with unserved and underserved BSLs. Some ISPs are not represented due to deficiencies in available data. For example, Sherburne Connect, a new municipal provider, will serve the northeast corner of Chenango County in the next year. However, since they are currently building the network, they are not yet represented in FCC data.

According to the FCC data, several fiber ISPs operate in the vicinity of unserved and underserved locations in both counties:

- Charter
- Delhi Broadband*
- Fiberspark*
- FirstLight Fiber*
- Frontier
- MIDTEL*
- MTC Cable*
- OEConnect*
- Pavlov Media
- Point Broadband Fiber Holding, LCC (All Points Broadband)*
- Sherburne Connect*
- TDS Telecom
- Verizon
- Windstream

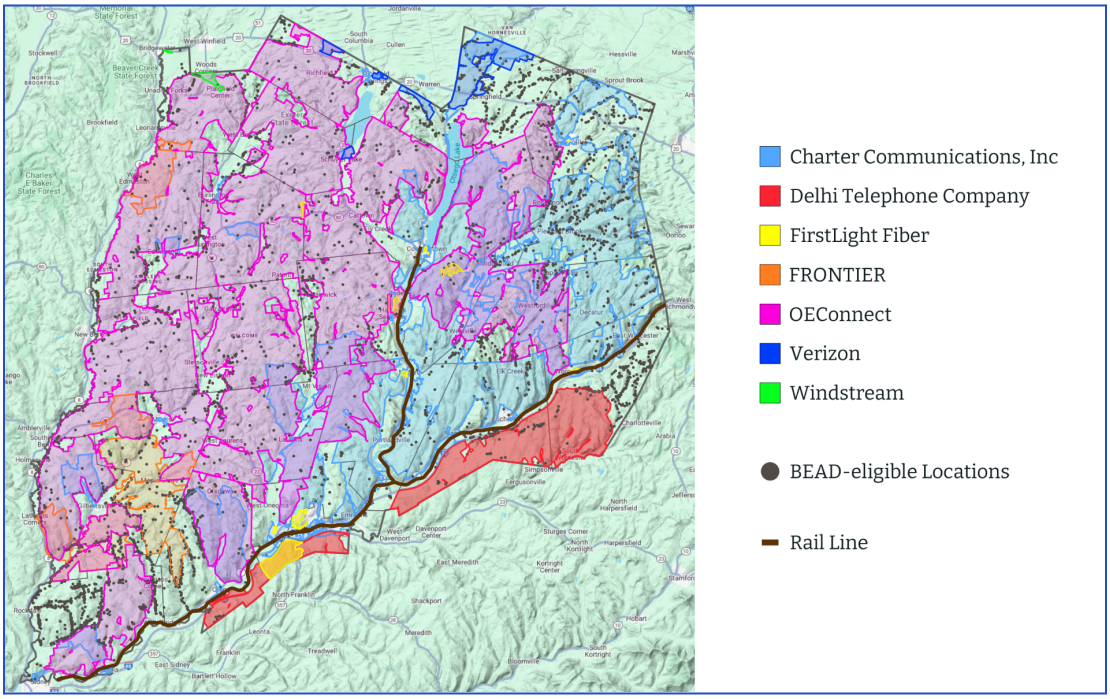
*Considered local or community-centered ISPs by county leaders.

Fiber ISPs in Chenango County



Sources: FCC (2023); Google Maps (2020).
Notes: Sherburne Connect and Fiberspark footprints are not represented here.

Fiber ISPs in Otsego County



Sources: FCC (2023); Google Maps (2020).

The low population densities in both Chenango and Otsego counties create deployment and market challenges for these ISPs — particularly in the pockets of very low population density. Greater distances between premises mean more fiber or cable infrastructure is required to reach customers, resulting in higher costs per subscriber and a lower return on investment for providers. Consequently, ISPs are reluctant to deploy infrastructure in these locations without subsidies to make these areas more economically viable.

3.3. BEAD is unlikely to solve all of the connectivity challenges in Otsego and Chenango counties

The federal government announced the BEAD Program in 2021 as part of the Infrastructure Investment and Jobs Act (IIJA). The goal of the program is to connect every unserved and underserved BSL to high-speed internet.

Despite state planning efforts, no networks have been constructed using BEAD dollars as of September 2024. In fact, many states have not yet started selecting applicants, let alone distributing the money. Network construction will likely start in early 2025, but most states are well behind this estimate.[16] The delay in funding distribution is primarily due to the extensive data collection phase, state planning requirements, federal regulations, and program complexities.

[16]Doug Dawson (2024) "Doug Dawson: When Will We See BEAD Construction," *Broadband Breakfast*. Available at https://broadbandbreakfast.com/doug-dawson-when-will-we-see-bead-construction/. Accessed September 10, 2024.

Considering the drawn-out timeline and increasing costs of building broadband,[17] BEAD alone will not be enough to close all of the country's connectivity gaps with fiber.[18] In New York, it would take approximately $1.9 billion to connect all BEAD-eligible locations with fiber, but the state's BEAD allocation is only $644 million.[19]

An analysis of the New York State BEAD rules and discussions with the ISPs best positioned to apply for BEAD funding in the region reveals that ST8 has little opportunity to influence BEAD outcomes. The default BEAD requirements favor incumbents and make it difficult for smaller ISPs to be competitive applicants, narrowing the potential subgrantee pool.[20]

Some ISPs have decided not to apply because building infrastructure in the areas they were considering will not be financially viable, even with the BEAD subsidies. For example, Otsego County's municipal provider, OEConnect, is well-situated to deploy infrastructure to the pockets of unserved and underserved BSLs across the entire county given their large footprint; however, they will be unable to apply due to the complex compliance requirements and financial constraints.

While there are other community-based ISPs, like MIDTEL, that could potentially build out the southwest corner of the county (i.e., Unadilla and Otego), pockets of underserved BSLs in the middle of the county may not have multiple (or any) competitive bids during the BEAD process due to the difficulty of serving those locations.

Furthermore, flaws in the BEAD eligibility maps make generating a business case around expansion through grant funding more challenging. Some ISPs have exaggerated speeds and coverage areas in the FCC maps on which the BEAD awards will be based because ISPs were permitted to report advertised speeds rather than typical speeds.[21] These inflated claims mean that numerous BSLs are incorrectly marked as served, or are deemed underserved when they are unserved — which in turn makes the business case for expansion difficult for all ISPs except the big incumbents with existing local infrastructure.

The Southern Tier 8 Regional Board, in collaboration with Otsego and Chenango county planners, has engaged in both the federal and state challenge process to address flaws in

[17] Doug Dawson (2024) "The High Cost of BEAD," *POTs and PANs*. Available at https://potsandpansbyccg.com/2024/07/10/the-high-cost-of-bead/. Accessed July 11, 2024.
[18] Brian Vo (2024) "Five Reasons BEAD Alone Won't Deliver Internet For All." Available at https://connecthumanity.fund/five-reasons-bead-alone-won't-deliver-internet-for-all/. Accessed July 9, 2024.
[19] Alex Gault (2024) "New York Advances Plan to Use $664M on Broadband Network." Available at https://www.govtech.com/network/new-york-advances-plan-to-use-664m-on-broadband-network. Accessed September 10, 2024.
[20] Kirstin Lardy (2023) "The NTIA's Default BEAD Rules Make It Hard for Small, Independent, Nonprofit, Cooperative, and Municipal ISPs to Participate — but Some States Are Trying to Change That." Available at https://medium.com/national-broadband-resource-hub/the-ntias-default-bead-rules-make-it-hard-for-small-independent-nonprofit-cooperative-and-a9555d8ed7a7. Accessed July 9, 2024.
[21] Doug Dawson (2023) "The Latest FCC Maps," *POTs and PANs*. Available at https://potsandpansbyccg.com/2023/06/05/the-latest-fcc-maps/. Accessed July 9, 2024.

data. They have also launched a broadband survey called Better Connection,[22] which will track speeds over the next decade. However, local ISPs continue to show little interest in engaging in BEAD's complex framework.

3.4. Existing plans to deploy last-mile fiber

Despite the challenges with building in the region, ISPs are discussing several plans for deploying infrastructure in specific areas.

First, Verizon approached Otsego County intending to serve unserved and underserved households with fiber in the northwest. Given the lack of local options, the county is considering lending a letter of support. However, county leaders will have little influence on long-term connectivity planning with Verizon as a partner.

Verizon explicitly stated they will not expand into Chenango County, leaving the county with few options for fiber expansion under BEAD.

Sherburne Connect plans to leverage Municipal Infrastructure Program (MIP)[23] funds to build in the village of Sherburne and east into Columbus but is unlikely to pursue BEAD.

Interconnect Wireless Corp (IWC), though a fixed wireless rather than a fiber provider, offers a potential solution to improve internet access in Chenango County. In 2021, the Chenango County Department of Planning and Development was awarded a $1.9 million grant as part of the NYS Community Development Block Grant (CARES Act) to expand wireless broadband service into the City of Norwich and Town of New Berlin. The project was completed in December 2023 and involved placing 14 antennae on pre-existing structures, offering broadband service at speeds up to 300 Mbps.

IWC continues to look for other ways to expand the network as funding and opportunities arise. IWC is exploring the addition of fiber in low-density areas east of Route 12 where wireline infrastructure is scarce. However, IWC does not meet the financial requirements of BEAD and may not continue to expand if areas adjacent to their current footprint become funded obligations of another provider.

The tentative expansion plans in the county — as well as the clear throughline that expansions for various providers are all contingent on funding and making a challenging business case work — serve as additional proof that expanding middle mile has the chance to support many ISPs in building more last mile. The next section describes how supporting an open-access middle-mile deployment will empower ISPs to build more efficiently in unserved and underserved areas, catalyzing last-mile deployments in multiple areas across the counties.

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[22] Southern Tier 8 Regional Board (2024) "The Better Connection Program." Available at https://betterconnection.org. Accessed September 10, 2024.
[23] New York State Broadband Program, "Municipal Infrastructure Program." Available at https://broadband.ny.gov/municipal-infrastructure-program. Accessed July 11, 2024.

Section 4: Supporting regional, small, and/or community-centric ISPs in Chenango and Otsego counties with open-access middle-mile

Improving open-access middle-mile connectivity can reduce last-mile costs and minimize the barriers to entry for smaller, typically more community-centric ISPs that are often competing with large incumbent providers. This is critical in rural areas like Chenango County, where residents experience increasing service rates for DSL technologies from large incumbent carriers that have no plans to upgrade these aging networks. Open-access middle-mile networks can combat this disinvestment by bringing in local or regional competitors that can drive down consumer costs and reinvest profits into network upgrades.

Alongside efforts to integrate all MIP-funded infrastructure into a more unified network, the New York State broadband office, ConnectAll, understands that local ISPs need affordable middle-mile infrastructure to enable last-mile connections in unserved and underserved areas and to keep profits in the community — and their funding programs reflect that understanding.

4.1. How open-access middle-mile impacts broadband connectivity

Middle-mile infrastructure connects backhaul to last-mile networks, which usually connect to the middle mile via centrally located hubs. Broadband backhaul is like a highway system that transports large amounts of data over long distances. Just as highways connect local roads to distant cities, backhaul links smaller local networks to the broader internet, allowing data to travel quickly between users and servers.

Typically, middle-mile networks are built in redundant rings so that if the connection on a route is severed (e.g., due to a fiber cut), the connection can still be rerouted to the global internet, avoiding a loss of service.

In open-access models, one entity builds and maintains a network but allows multiple ISPs to offer service via that network on a nondiscriminatory basis. In other words, the rate structure is the same for everyone and is meant to incentivize multiple providers to use the infrastructure. This type of middle-mile arrangement can bring numerous benefits[24] to communities:

1. **Improves the economics of last-mile networks:** By extending open-access middle-mile networks to sparsely populated, underserved rural areas, it becomes more economically feasible for ISPs to provide the necessary last-mile connections to homes and businesses.[25]

[24] Jordan Arnold, Jonathan Sallet (2020) *If We Build It, Will They Come? Lessons from Open-Access, Middle-Mile Networks* (Benton Institute for Broadband & Society, Evanston, IL). Available at https://www.benton.org/publications/middle-mile. Accessed July 11, 2024.
[25] Pew Charitable Trusts (2021) "How 'Open Access Middle-Mile Networks' Can Facilitate Broadband Expansion." Available at https://www.pewtrusts.org/en/research-and-analysis/speeches-and-testimony/2021/11/29/how-open-access-middle-mile-networks-can-facilitate-broadband-expansion. Accessed July 11, 2024.

2. **Increases competition:** Open-access middle-mile networks allow a greater number of ISPs to enter the market because the backhaul connection already exists, lowering financial risks in rural areas. This increase in competition can lead to lower prices for consumers as more ISPs vie for their business.[26]

3. **Encourages faster internet speeds:** Modern middle-mile networks are capable of supporting high-speed broadband connections. This capability enables ISPs to offer faster internet services to end-users, significantly improving the user experience and supporting higher-demand online activities. The more fiber infrastructure in an area overall, the more ISPs can scale speeds through their last-mile networks.

4. **Enhances connectivity in and between anchor institutions and government buildings:** In an open-access middle-mile model, infrastructure owners often build last-mile connections to certain locations within the jurisdiction, like government buildings and CAIs. This ensures public buildings have reliable, affordable broadband and eases communication between county departments.

5. **Bolsters redundancy for businesses and emergency services:** Open-access middle-mile infrastructure provides critical redundancy for county emergency services, ensuring reliable communication channels during crises. By offering multiple routing options, this infrastructure improves the resilience of emergency response systems, enabling seamless coordination between first responders, hospitals, and emergency management centers even when primary networks are compromised.

6. **Boosts economic development:** Enhanced connectivity can support the attraction and growth of businesses in previously underserved areas, fostering economic growth and job creation.[27] Improved internet access provides residents with proven pathways to upward mobility via education, training, and higher-wage job opportunities, and opens up more opportunities for local businesses and entrepreneurs to create and export digital products and services and import wealth back into the community.

These advantages highlight the critical role that open-access middle-mile infrastructure can play in both community development and empowering local ISPs to thrive and expand in a competitive market.

[26] Jonathan Sallet (2020) "Open-Access Middle-Mile Networks: Deployment and Competition." Available at https://www.benton.org/blog/open-access-middle-mile-networks-deployment-and-competition. Accessed July 11, 2024.
[27] Robert K. Knake, "Open Access Fiber to Improve U.S. Internet Connectivity." Available at https://www.cfr.org/report/open-access-fiber-improve-us-internet-connectivity. Accessed July 11, 2024.

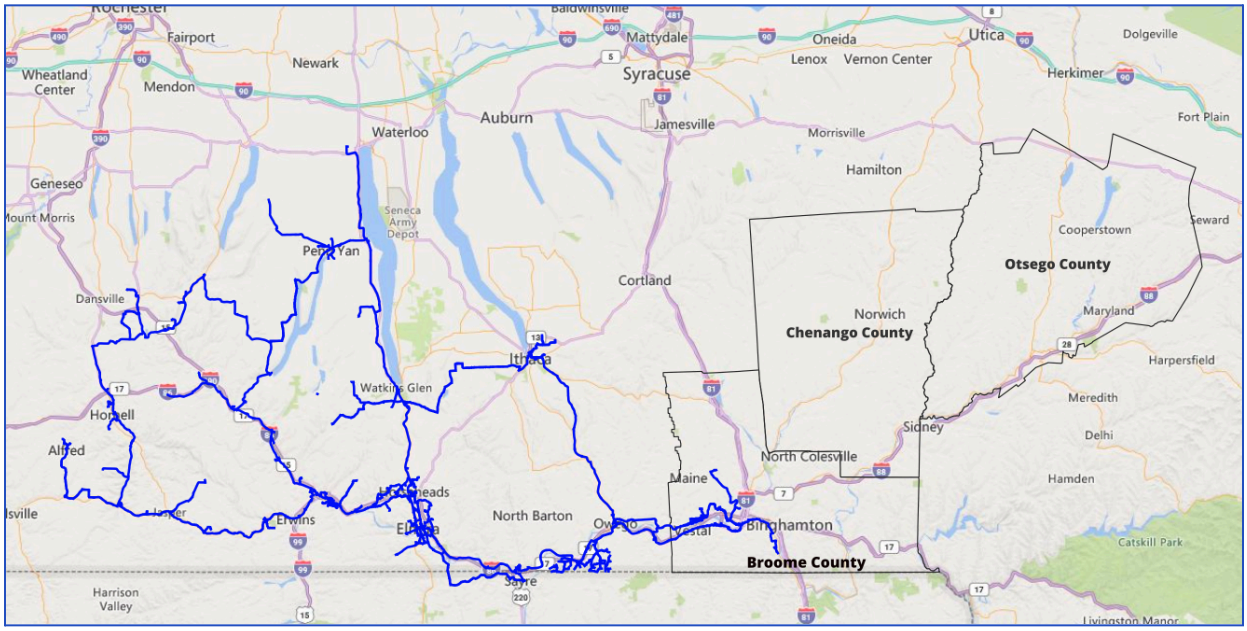
4.2. Partnering with STN to support the expansion of an open-access middle-mile network will create significant efficiencies

Southern Tier Network (STN) is the only entity actively facilitating open-access fiber infrastructure in the Southern Tier region. STN, a 501(c)(3) nonprofit, operates over 600 miles of middle-mile fiber infrastructure, reaching from Allegany County to Broome County. STN operates the middle-mile network and leases bandwidth to various internet service providers and mobile carriers under an open-access model.

STN also operates last-mile open-access infrastructure reaching over 6,000 customers. Open-access fiber-to-the-home (FTTH) operates similarly to middle-mile in that ISPs lease the network and provide internet service directly to consumers. However, ISPs do not need to build additional infrastructure off of the middle-mile fiber route to reach residents; STN covers all infrastructure needs.

STN's commitment to open-access last-mile and middle-mile expansion makes them the best partner to solve long-term connectivity challenges in Chenango and Otsego counties with ST8.

Southern Tier Network's existing infrastructure



Source: Southern Tier Network.

4.2.1. STN's last-mile infrastructure strategy

STN primarily focuses on operating open-access middle-mile infrastructure, but they will build some last-mile networks where enabled by their middle-mile network.

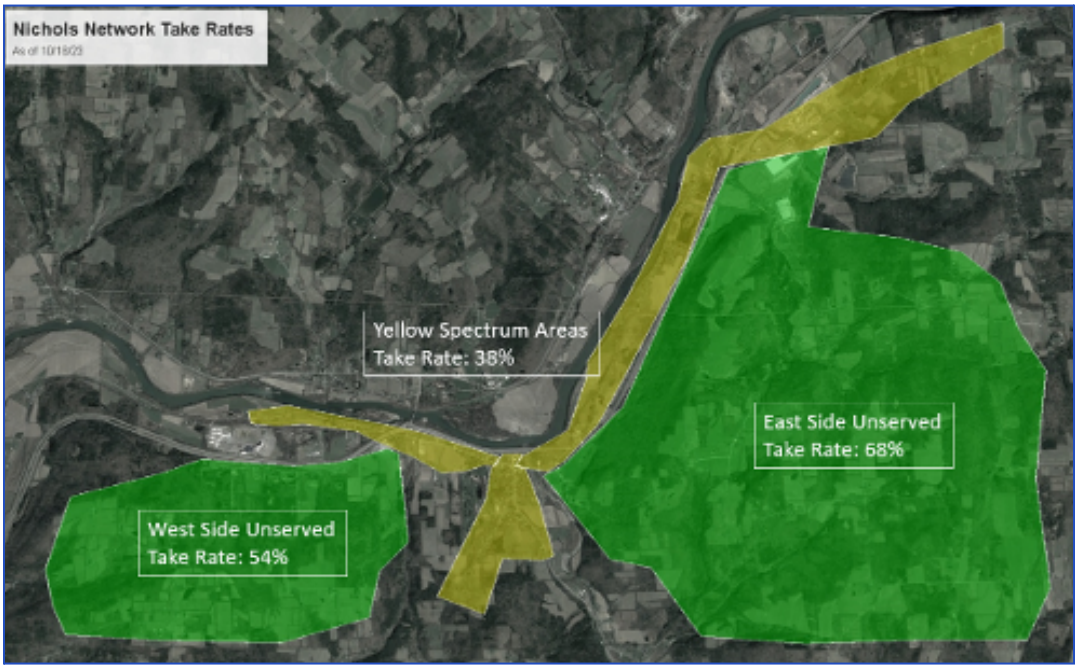
Below is a map of STN's last-mile project in the town of Nichols. This initiative resulted from a collaboration between ST8, Tioga County's Economic Development & Planning Department, and STN to address the need for high-speed internet in this underserved, rural area. The planning department and ST8 played crucial roles in attracting investors and developing business models to prepare STN for funding opportunities.

In June 2023, STN built to 750 homes in Nichols in partnership with Fiberspark, the initial provider on the network. Residents now have access to 100/20 Mbps for $40 a month, and 1 gigabit speeds for $80 a month (both of which are very affordable compared to the typical broadband market and more affordable than the prices of the incumbent cable provider operating in part of the community). The STN project team estimates that customers who switched from Charter Spectrum saved $25 to $45 per month.

In the map below, green indicates areas where customers did not have access to broadband before the build, and yellow indicates areas where customers did have access to broadband via Charter Spectrum. Each area has a different take-rate — the percentage of customers the network passes that subscribe to the new service. When ISPs build out new infrastructure in areas that do not have a strong existing broadband service, they often consider it a success to achieve a 20 percent take-rate or higher in year one.

In their recent builds, STN has far exceeded these numbers, even in areas where they are competing with the incumbent cable company. This is further evidence that significant consumer demand exists in both unserved and underserved areas in the Southern Tier, as well as served areas in need of fiber competition.

Nichols network take-rates



Source: Southern Tier Network.

STN's last-mile project demonstrates how open-access middle-mile networks can precede last-mile construction and lead to more affordable plans with better technology for residents, even in areas with some existing cable competition.

4.2.2. Proposed partnership structure between Southern Tier Network and the Southern Tier 8 Regional Board

Middle-mile expansion in collaboration with STN is best structured in a partnership where STN owns the infrastructure, ISPs lease middle-mile capacity from STN, and ST8 supports coordination with county stakeholders, community members, and funding sources. The table below proposes each entity's role and responsibilities.

Entity	Role	Responsibilities
Southern Tier Network, Inc. (STN)	Infrastructure owner and operator	Operate and maintain an open-access fiber network
Southern Tier 8 Regional Board (ST8)	Project and community engagement partner	Support STN in community engagement/marketing, county relationships, and fundraising
Last-mile providers	Partner and financial support	Offer service via STN's open-access network with a licensing agreement and potentially provide capital in the form of a loan or match for future expansion in their footprint

Section 5: Deployment routes that support last-mile connectivity

The primary goal of middle-mile expansion in Otsego and Chenango counties is to establish a network that enhances affordable, last-mile connectivity, particularly to unserved and underserved locations. Regional last-mile providers have expressed a need for redundant, cost-effective middle-mile infrastructure in partnership with STN to reduce network outages and last-mile costs.

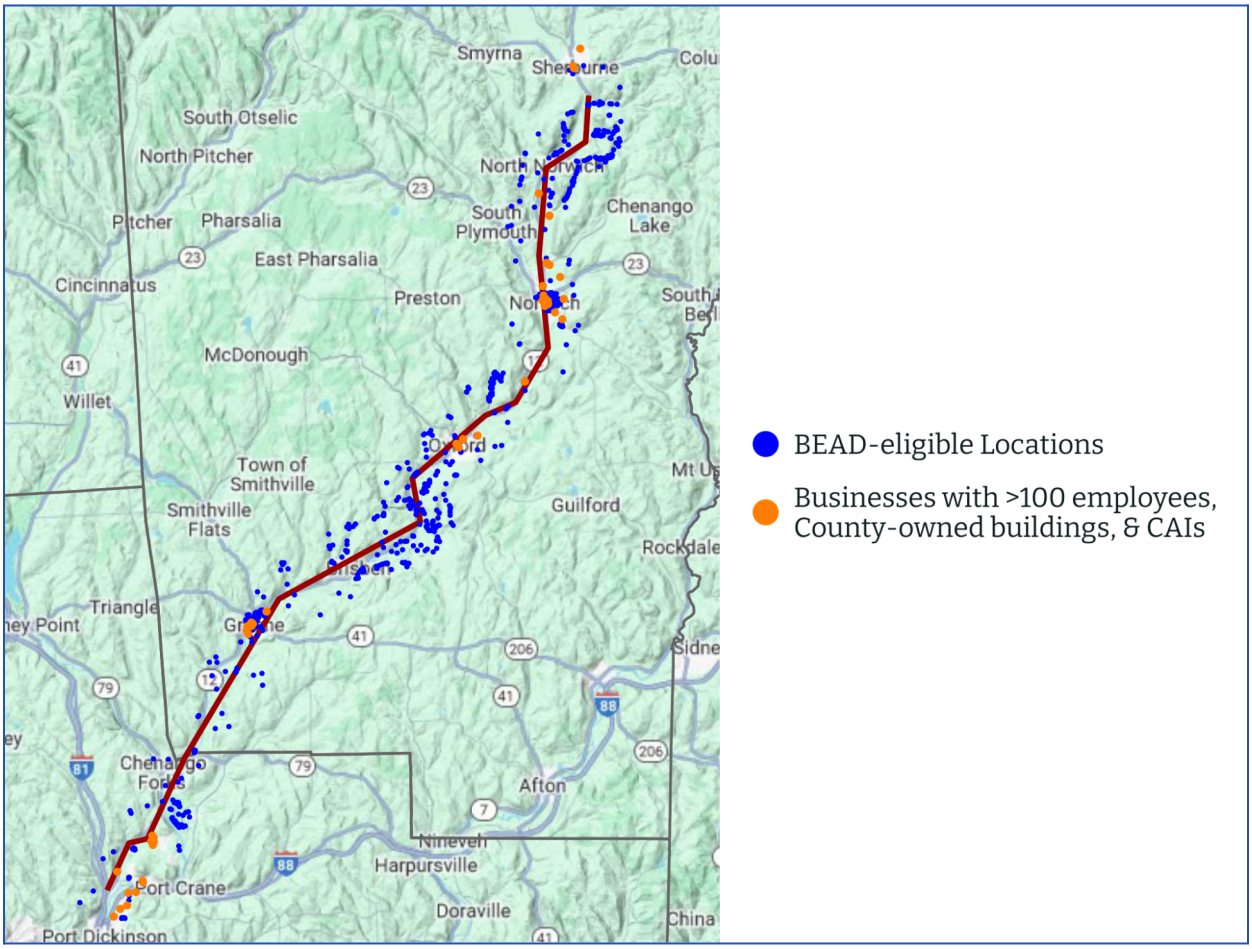
The specific expansion targets discussed in this section build off STN's existing middle-mile network in Broome County's Binghamton area and extend a high-capacity, open-access fiber-optic network to the village of Sherburne in Chenango County or to the city of Oneonta in Otsego County. The proposed routes could make significant regional advancements toward universal, competitive broadband service focused on community investment.

Section 5.1 explores a phased approach to expanding service to both Sherburne and Oneonta, while Section 5.2 focuses on how STN could connect Binghamton to Oneonta directly. This is followed by a discussion of potential risks for the project, as well as funding opportunities that project leaders could consider. All cost and impact numbers are estimations based on data from May 2024. Project leaders should update these estimates closer to the project kick-off date once funding is secured.

5.1. Expanding STN's middle-mile network from Binghamton to Sherburne

One option for middle-mile infrastructure expansion is the construction of a fiber route from STN's existing network in Binghamton, north along NY-12, to Sherburne Connect's infrastructure in northern Chenango County. The geographic scope of this project includes Chenango Forks and Hinmans Corners in Broome County, as well as Greene, Oxford, Norwich, and North Norwich in Chenango County.

Binghamton to Sherburne route



Source: Google Maps (2020).

The summary project metrics for the Binghamton to Sherburne route are as follows:

Fiber distance	Cost per mile	Total project cost
54 miles	$69,000	$3,700,000

Community anchor institutions & businesses*	Total BSLs within 2 miles of the route	Unserved and underserved BSLs within 2 miles of the route
49	12,802	676

Notes: This table does not include business data from Broome County.
**Only includes businesses with more than 100 employees. It also includes county- and state-owned buildings within two miles of the route.*

Along the potential route, STN can collaborate with ISP partners to service CAIs and residents, enhancing connectivity across these towns and villages. Locally based ISPs — including Fiberspark, Sherburne Connect, and Interconnect Wireless Corp (IWC) — have provided written letters of support for this route. In addition, there are multiple large-scale development projects in the works that could increase the customer base for the Route 12 build.

Fiberspark indicated they would use this proposed middle-mile expansion to serve last-mile households in need. They worked with STN in the town of Nichols and have a history of working closely with project leaders.

Sherburne Connect has expressed their need for redundant infrastructure coming from the south. They are funded to serve unserved and underserved BSLs to the east of Sherburne but need additional middle-mile support in case Fiberlight's backhaul experiences a service outage.

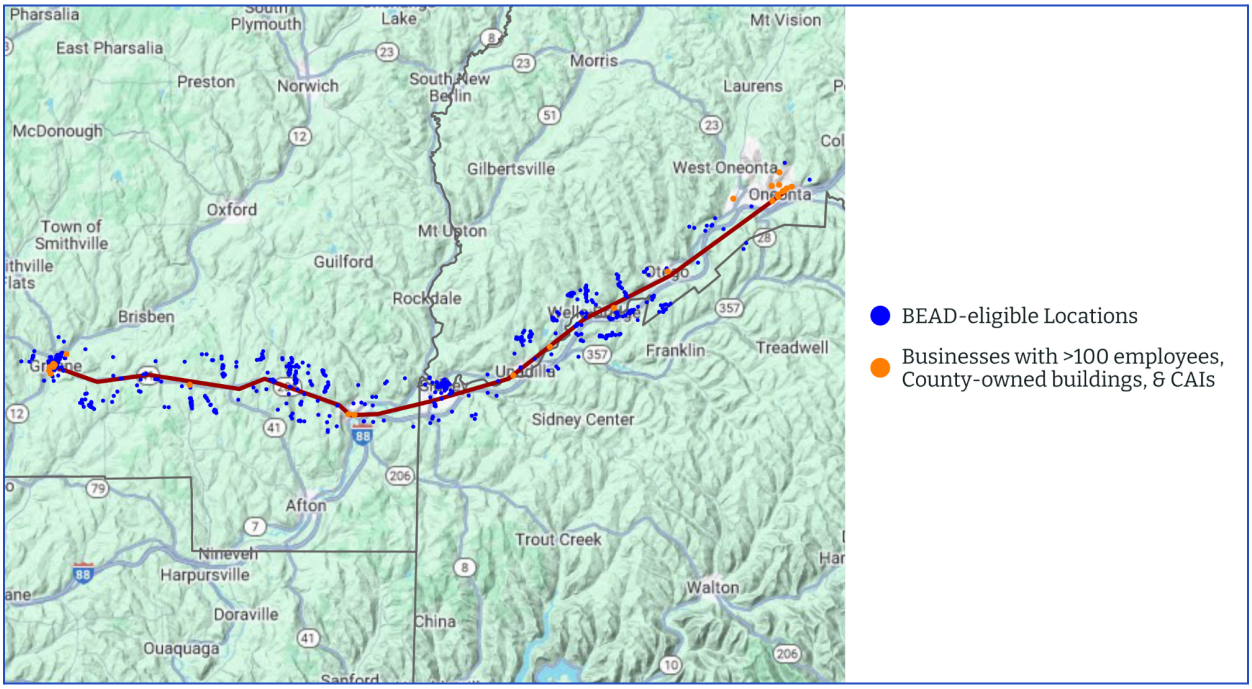
IWC pledged to connect unserved and underserved communities south of Oxford off of the proposed route. Southern Oxford has up to 250 unserved and underserved locations and needs alternative connectivity options.

Given the diversity of last-mile providers, the total number of BSLs along the route, and the number of CAIs, STN affirmed that this would be a sustainable route from an operational perspective if the construction was supported by substantial grant funding.

5.1.1. Exploring expansion opportunities off the Binghamton to Sherburne route from Greene to Oneonta

After building phase 1 from Binghamton to Sherburne, there is an opportunity to expand off of the NY-12 route into Otsego starting in the town of Greene, traveling east through Sidney, and ending in Oneonta — the largest population center in the county.

Greene to Oneonta route



Source: Google Maps (2020).

The summary project metrics are as follows:

Fiber distance	Cost per mile	Total project cost
43 miles	$69,000	$2,967,000

Community anchor institutions & businesses*	BSLs within 2 miles of the route	Unserved and underserved BSLs within 2 miles of the route
30	11,638	554

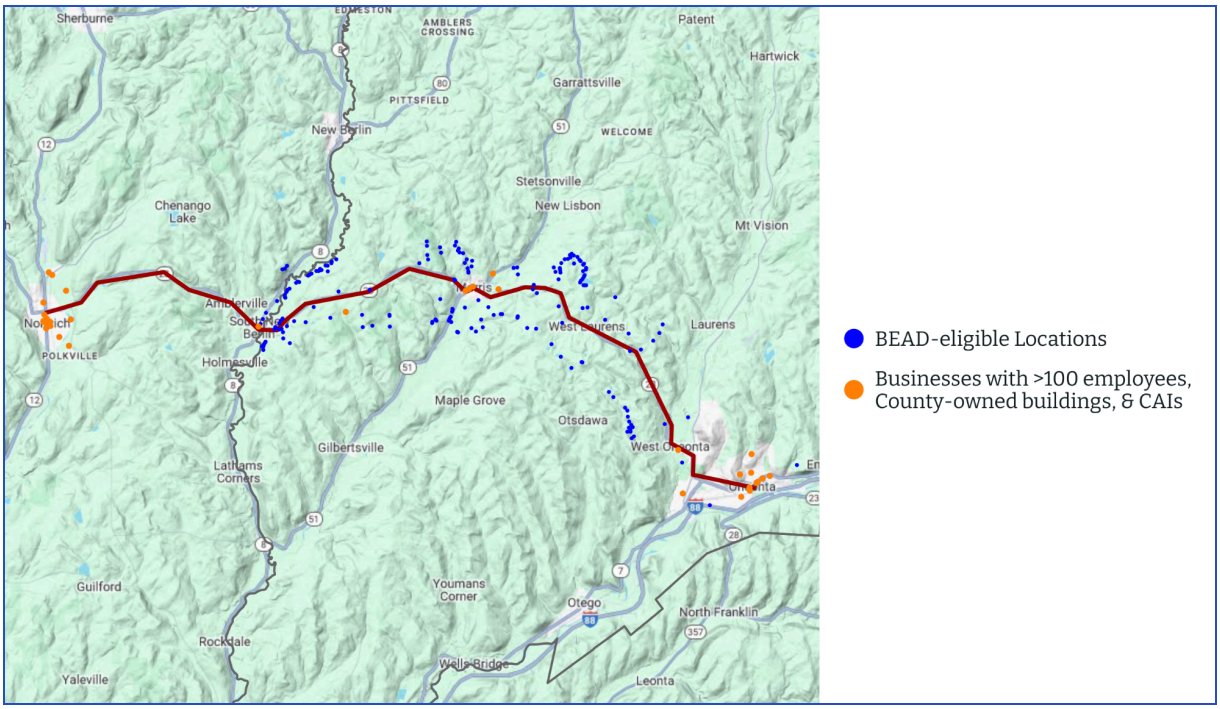
Notes: This table does not include data from Broome County.
**Only includes businesses with more than 100 employees. It also includes county- and state-owned buildings within two miles of the route.*

Building up NY-7 starting just before Sidney presents a promising scenario. Multiple locally based ISPs — including MIDTEL, OEConnect, and Delhi Telephone Company, Inc. — could use STN's middle-mile network, which would increase demand for STN's services and the likelihood of last-mile provider competition and deployments. Not pictured along the route above is a substantial number of BSLs that are already served by cable. The density of total BSLs within 2 miles of the route presents an opportunity for STN or other providers to consider overbuilding cable with last-mile fiber infrastructure in the future.

5.1.2. Exploring expansion opportunities off the Binghamton to Sherburne route from Norwich to Oneonta

Another option for expansion into Otsego County is building east off of the NY-12 route, following NY-23 from Norwich through Morris, and ending Oneonta. Since IWC has served households from Norwich to New Berlin, we did not include BEAD-eligible locations between those points. However, we did include total BSLs as IWC would most likely connect to STN infrastructure between Norwich and New Berlin.

Norwich to Oneonta route



Source: Google Maps (2020).

The estimated project metrics are as follows:

Fiber distance	Cost per mile	Total project cost
31 miles	$69,000	$2,100,000

Community anchor institutions & businesses*	BSLs within 2 miles of the route	Unserved and underserved BSLs within 2 miles of the route, starting in New Berlin
37	9,680	188

Notes: This table does not include data from Broome County.
**Only includes businesses with more than 100 employees. It also includes county- and state-owned buildings within two miles of the route.*

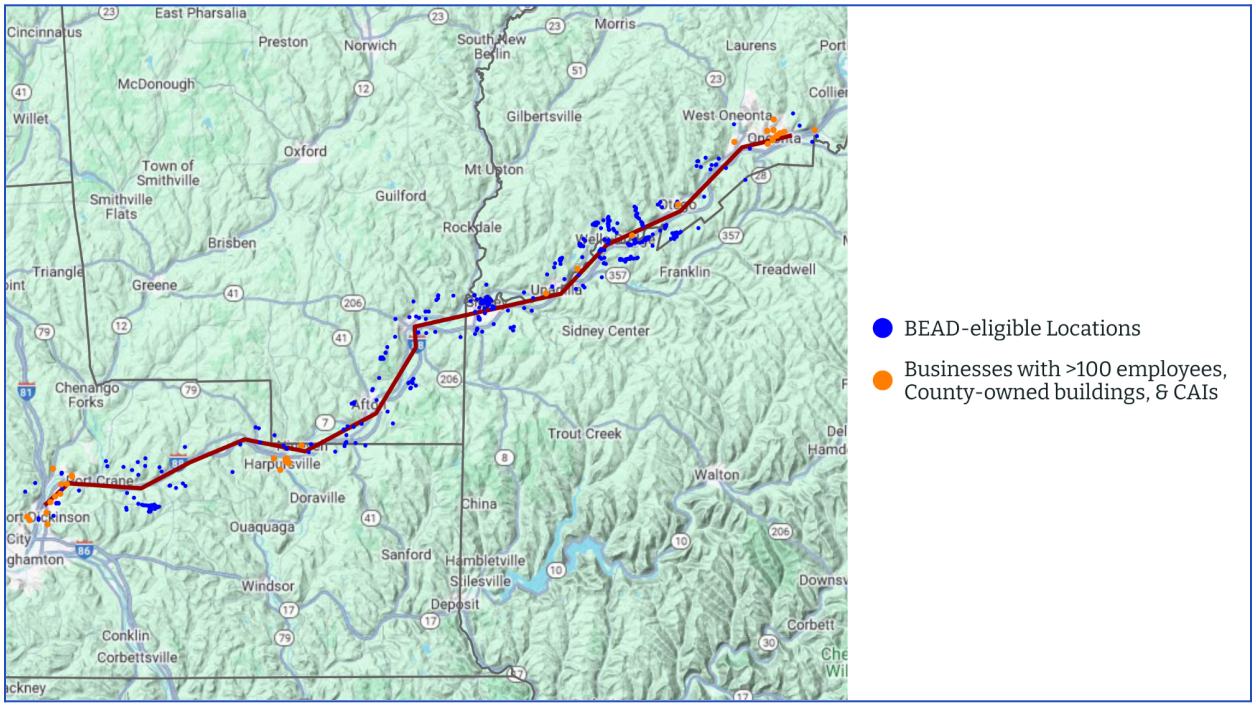
Expansion from Norwich through Morris to Oneonta has several benefits. For instance, this option is less expensive due to the shorter route mileage between Norwich and Oneonta along NY-23, while still serving a similar number of CAIs in Chenango and Otsego counties. In addition, OEConnect — funded through the Rural Digital Opportunity Fund — serves a significant portion of the surrounding area north and south of NY-23, making OEConnect a strong potential partner.

However, based on initial conversations, OEConnect is the only ISP that would potentially use the open-access middle-mile infrastructure along this route. Pursuing this route would depend on getting a firm commitment from OEConnect, as well as ensuring the cluster of CAIs in Oneonta can be reliably counted on as customers.

5.2. Expanding STN's middle-mile network from Binghamton to Oneonta

Starting from STN's backbone in Binghamton and following NY-7 up to Oneonta could be another option for expansion. If Chenango County leaders do not support a NY-12 build, this route could provide much-needed connectivity going east.

Binghamton to Oneonta route



Source: Google Maps (2020).

The approximate project metrics are as follows:

Fiber distance	Cost per mile	Total project cost
60 miles	$69,000	$4,140,000

Community anchor institutions & businesses*	Total BSLs within 2 miles of the route	Unserved and underserved BSLs within 2 miles of the route
38	17,547	391

Notes: This table does not include data from Broome County.
**Only includes businesses with more than 100 employees. It also includes county- and state-owned buildings within two miles of the route.*

The proposed route presents a mix of promising opportunities and significant challenges for expansion. On the positive side, the high population density along the route offers a substantial potential customer base and therefore a better last-mile business case. Moreover, the presence of multiple local ISPs in the area opens up possibilities for strategic partnerships, potentially increasing the utilization of the infrastructure. Private middle-mile providers, Firstlight and Uniti Fiber, have also expressed interest in connecting to STN's open-access fiber along the NY-7 corridor.

However, this route has existing middle-mile competition, which increases uncertainty and risk for a new middle-mile deployment. More competition for business customers, CAIs, and data transport means that the business case for new middle-mile service is harder to evaluate. Confidence in the viability of this route will require STN and ST8 to secure commitments from customers prior to construction to establish a careful business case based on actual customer projections.

5.3. Preparing for risks that would impact STN expansion

The project faces several risks that stakeholders must carefully consider and address alongside expansion opportunities. This section outlines four primary challenges: competitive behavior from existing ISPs, upcoming BEAD awards, leadership changes in partnering organizations, and climate change and natural disasters. Project stakeholders can enhance the likelihood of success by understanding these risks and developing effective mitigation strategies.

5.3.1. Competition along each route could impact STN's revenue

The biggest project risk along most of these routes is estimating the total demand from CAIs and businesses, and how that relates to potential competitive behavior. Along several of these routes, there is one private middle-mile provider from which many CAIs and

businesses likely receive services. Many of these businesses would probably switch to a local, nonprofit provider — especially if their costs were lower — but the existing provider may try to forestall this by locking customers into long-term contracts or significantly lowering rates.

To mitigate the risks associated with competition, project partners could assess each CAI's specific needs along the route, investigate existing long-term contracts between CAIs and their current service provider, and build a business model around entities that are willing to commit to switching services to STN ahead of time.

5.3.2. BEAD awards could change last-mile ISP footprints

BEAD funding will be awarded in late 2024 or early 2025, and the bigger ISPs and incumbent providers are best positioned to leverage this funding to expand their networks in eligible areas. As part of this process, they may build more of their own middle-mile networks in the areas discussed, which would not only increase competition for STN, but also reduce the number of areas available for expansion for other ISPs that are likely to be STN's customers.

To navigate these challenges, project partners should consider a phased deployment strategy, aligning expansion with areas less likely to receive immediate BEAD-funded development. Additionally, the assessment of whether to expand should rely as much as possible on confirmed customers (CAIs and government entities) rather than speculative customers that could be blocked by competitive behavior.

5.3.3. Leadership changes could influence project buy-in in unexpected ways

The open-access broadband expansion projects detailed above will require a wide range of buy-in across county departments, especially given the funding landscape. However, changes in government or ISP leadership could disrupt efforts. New administrations or department heads may bring differing ideologies or approaches to broadband development. Shifting priorities can abruptly end negotiations between private- and public-sector partners, jeopardizing relationships with communities. In addition, slow government transitions and policy changes delay project timelines, causing broadband initiatives to miss critical funding opportunities.

To mitigate these challenges, project leaders should establish formal agreements with government and ISP leadership indicating their intent and role in the project. Formal agreements help communicate the value of the project to new leaders and delineate responsibilities without the need to re-establish an agreement.

5.3.4. Climate change and natural disasters will impact deployments and network resiliency across the region

Project stakeholders have been vocal about the need to account for climate change and natural disaster risk in thinking of the region's connectivity landscape. To support their

focus on this issue, this report asserts two important facts. First, climate resilience must be taken into account when building networks to ensure they are as disaster-proof as they can be in areas at higher risk of disaster (i.e., flood plains). Second, building more middle-mile routes supports connectivity resiliency in the face of increasing natural disasters. The more routes that data can take to be transported across local networks, the lower the chance that a disaster or fiber cut in any one location will impact emergency services or the community's ability to connect.

For more information about specific tract-level risks due to natural disasters, we recommend using the Broadband Climate Risk Mitigation Tool, which provides estimates of disaster risk to telecommunications infrastructure based on historical data from the Federal Emergency Management Agency (FEMA) and other sources.

Section 6: Funding the proposed middle-mile deployments requires collaborative public-private efforts

ST8 and STN need to leverage diverse sources of public and private funding to make these plans a reality. This section outlines potential sources of capital and the stakeholders that should have an incentive to support the project now due to savings or opportunities the project will unlock for them in the future. It is almost guaranteed that a combination of many of the following sources will be needed to fully fund the project.

6.1. There are many public funding opportunities for STN and ST8 to access

Public funding plays a crucial role in the deployment of rural broadband where customer density is not sufficient to provide a market-based incentive to deploy. Furthermore, though middle-mile infrastructure is essential to enable last-mile deployments, funding for middle-mile deployments is typically harder to find. Therefore, ST8 and STN will likely need to pull together funding from several of the sources described below.

6.1.1. Appalachian Regional Commission

The Appalachian Regional Commission (ARC) promotes broadband development across the Appalachian region. Recognizing the critical role of high-speed internet in economic development, education, and quality of life, ARC has made substantial investments in broadband infrastructure and adoption programs. Through various initiatives and funding opportunities, ARC supports projects that aim to expand broadband access in unserved and underserved areas of Appalachia. Government entities, Tribal entities, nonprofits, and institutes of higher education can all apply for ARC funds. Applicants can partner with private-sector entities to leverage resources and expertise.

The ARC could potentially support the Binghamton to Sherburne route through a $2.2 million Area Development grant. However, ARC match requirements depend on the level of economic distress of the project counties; Chenango County's economic status will require the project to provide a 50 percent match against the ARC funds. The same match requirement applies to Otsego County.

6.1.2. ConnectAll

ConnectAll, New York state's broadband office, has developed funding programs to support nonprofit and municipal providers in rural areas through the Municipal Infrastructure Program (MIP). In addition, ConnectAll has stated a preference for connecting all MIP-funded last mile with open-access middle mile. While they have yet to release a middle-mile-specific grant program, ConnectAll has provisionally allocated approximately $900,000 to the Route 12 project if match can be secured. ST8's ongoing efforts should be regularly communicated to the broadband office to determine if additional funding opportunities can serve as a match.

6.1.3. Economic Development Administration (EDA)

The U.S. Economic Development Administration (EDA) promotes regional economic growth and job creation with grants and technical assistance that support local development strategies and attract private investment. The EDA has previously worked with STN on an open-access middle-mile project and would be a great source for match against ARC funds if other public and private funds cannot meet the ARC's 50 percent match requirements. STN leadership is open to applying for EDA match funding after completing reporting requirements for a previous project, expected by the end of 2024.

6.1.4. New York's Empire State Development (ESD)

As the state arm of the U.S. EDA, Empire State Development's mission is to "promote a vigorous, inclusive, and growing state economy, encourage business investment and job creation, and support diverse, local economies."[28] The industries and sectors specifically targeted by ESD represent a broad range of tech-centered, innovative, and entrepreneurial areas — all of which require robust broadband infrastructure. By emphasizing how improved connectivity can catalyze growth in these targeted industries, ST8 may be able to secure additional funding or resources from ESD.

6.1.5. New York industrial development agencies and authorities

The region's industrial development agencies and authorities (IDAs) are designed to advance job opportunities, health, general prosperity, and economic welfare for New York residents. As such, they provide financial assistance and tax incentives to retain existing jobs and create new employment opportunities in their jurisdictions. In addition, IDAs can facilitate public-private partnerships and issue bonds for larger infrastructure programs.

IDAs could view a middle-mile broadband deployment as a strategic infrastructure investment that aligns with their economic development goals. By highlighting how improved connectivity can attract businesses, support remote work opportunities, and enhance educational access, ST8 could make a compelling case for IDA involvement and financial support.

While the Chenango County IDA has been informed about the Route 12 middle-mile deployment, project leaders may want to present the project to them with a specific request for support that focuses on the impact the project will have on jobs and business growth in the region. It is also worth engaging other regional IDAs in surrounding counties once larger funding sources like ARC or EDA have been secured.

[28] New York State Broadband Program, "Our Mission Statement." Available at https://esd.ny.gov/about-us. Accessed July 12, 2024.

6.1.6. Municipalities in the region

Municipalities that will benefit from the network through better service at municipal buildings or better emergency services connectivity should be approached as potential contributors to the project. This could be framed as a downpayment that provides access to discounted services in the future.

Project partners should tailor their outreach approach based on the specific route chosen, targeting a range of public entities. This strategy should include outreach to counties, cities, towns, and villages along the selected route. Southern Tier 8 and STN may need to document future savings for municipalities to help them translate those future savings into financial contributions to the project capex.

6.2. Open-access middle-mile project could attract private investment as well

The successful implementation of this plan may depend on strategic partnerships with private investors and companies. Understanding the motivations and investment criteria of these potential partners will enable project planners to tailor their proposals and secure diverse funding sources.

Securing private investment along the route will also ensure a higher take-rate, reducing the risk of financial shortfall upon project completion.

6.2.1. Community-centered ISPs that would benefit from expanded middle-mile access

An open-access network allows local ISPs to expand their reach, reduce operational costs, and increase network redundancy without the burden of building and maintaining extensive infrastructure. Given these substantial benefits, ISPs along the route that are planning to use the network should contribute financial support to the build.

In Otsego and Chenango counties, two municipally owned ISPs — OEConnect in Otsego and Sherburne Connect in Chenango — serve as examples of local efforts to enhance connectivity. In addition, other providers like MIDTEL, All Points Broadband, MTC Cable, and IWC should be included in discussions.

Project leaders have already explored partnering with many of these ISPs; details about those conversations are available in Appendix E.

6.2.2. Philanthropic funding

Approaching regional foundations for match could be necessary given the federal focus on last-mile connectivity because philanthropic capital is usually not tied to government budget cycles or goals. Specifically, the Chobani Community Impact Fund offers small grants to grow economic development in the region. Beyond the financial incentive, approaching local or regional funders can build connections to other funders in the area.

6.2.3. Impact investments

A wide range of entities may be able to offer debt on terms friendly enough to enable the project to be sustainable. For one, Connect Humanity's Appalachia Broadband Fund offers infrastructure funding specifically to Appalachian communities. In addition, the project team may consider approaching revolving loan funds, community development financial institutions (CDFIs), or even exploring Community Reinvestment Act (CRA) loans available via commercial banks.

Appendix A: List of businesses from Binghamton to Sherburne

Below is a list of businesses along the route from Binghamton to Sherburne with over 100 employees, not including county-owned buildings or CAIs. This list does not include businesses in Broome County.

Name	County	# of buildings
The Raymond Corporation	Chenango	3
Amphenol Aerospace	Chenango	1
NBT Bank, Inc.	Chenango	2
Norwich Pharmaceuticals, Inc.	Chenango	1
GE Aerospace	Chenango	1
Delaware-Chenango-Madison-Otsego BOCES	Chenango	1
Chenango Memorial Hospital, Inc.	Chenango	1
Kerry Bioscience	Chenango	1
Blueox Corporation	Chenango	1
Professional Teleconcepts, LLC	Chenango	1
Ford Matthews Norwich, Inc.	Chenango	1
Greene Technologies Incorporated	Chenango	1
Nor-Cort Enterprises, Inc.	Chenango	1
Young Men's Christian Association of Norwich	Chenango	1

Appendix B: List of businesses from Greene to Oneonta

Below is a list of businesses along the route from Greene to Oneonta with over 100 employees. This list does not include businesses in Broome County. Please note, since this route is an expansion, businesses in Greene are not included, as they should be built to as part of the Binghamton to Sherburne route.

Name	County	# of buildings
Aurelia Osborn Fox Memorial Hospital	Otsego	2
Corning, Inc.	Otsego	1
Hartwick College	Otsego	1
SUNY Oneonta	Otsego	~5
Burt Rigid Box, Inc.	Otsego	1
Otsego County Chapter, Nysarc, Inc.	Otsego	1
Opportunities For Otsego, Inc.	Otsego	1
Lightning Temporary Services	Otsego	1

Appendix C: List of businesses from Norwich to Oneonta

Below is a list of businesses along the route from Norwich to Oneonta with over 100 employees. Please note, since this route is an expansion, businesses in Norwich are not included, as they should be built to as part of the Binghamton to Sherburne route.

Name	County	# of buildings
Aurelia Osborn Fox Memorial Hospital	Otsego	2
Corning, Inc.	Otsego	1
Hartwick College	Otsego	1
Lightning Temporary Services	Otsego	1
Opportunities For Otsego, Inc.	Otsego	1
Otsego County Chapter, Nysarc, Inc.	Otsego	1
Burt Rigid Box, Inc.	Otsego	1
SUNY Oneonta	Otsego	~5

Appendix D: List of businesses from Binghamton to Oneonta

Below is the list of businesses along the route from Binghamton to Oneonta with over 100 employees. Due to data availability restrictions, Broome County business data is not included. Most of the larger businesses along this route are in Oneonta, thus this list is the same as in Appendix C.

Name	County	# of buildings
Aurelia Osborn Fox Memorial Hospital	Otsego	2
Corning, Inc.	Otsego	1
Hartwick College	Otsego	1
Lightning Temporary Services	Otsego	1
Opportunities For Otsego, Inc.	Otsego	1
Otsego County Chapter, Nysarc, Inc.	Otsego	1
Burt Rigid Box, Inc.	Otsego	1
SUNY Oneonta	Otsego	~5

Appendix E: ISP information

OEConnect[29] was initiated by the Otsego Electric Cooperative with state funding from Phase 2 of the New NY Broadband Program.[30] Representatives indicated that OEConnect faces challenges in expanding to unserved and underserved areas due to stringent compliance requirements from grant programs like the Capital Projects Fund[31] and BEAD, as well as restrictions related to its tax-exempt status as a 501(c)(12) organization, which limits income from nonmember households to 15 percent of total revenue. Additionally, pole crowdedness and replacement requirements significantly increase expansion costs (by about $40,000 per mile) in areas controlled by National Grid.[32]

Although OEConnect aims to extend its infrastructure to unserved and underserved areas in Otsego County, these factors limit its short-term expansion goals.

The municipal fiber network **Sherburne Connect**, on the other hand, received funding from the pilot round of ConnectAll's 2022 MIP.[33] Stakeholders confirmed that the ISP is currently extending last-mile services within the village of Sherburne and has plans to expand eastward into clusters of unserved and underserved BSLs. The implementation of a middle-mile backbone is expected to reduce costs and enhance network redundancy for Sherburne Connect as it seeks further support through programs like BEAD and subsequent rounds of MIP funding.

The community-centric ISP **MIDTEL**, which originated as Middleburgh Telephone Company in 1897, now offers telephone, cable, and internet services to over 7,000 customers, primarily in Schoharie County but also in areas adjacent to unserved and underserved pockets in southern Otsego, north of I-88.[34] Given the expansion challenges that OEConnect faces in Otsego County, MIDTEL could potentially extend community-based services to those residents.

Additionally, **Delhi Telephone Company**, founded in 1897, mainly serves Delaware County, but its infrastructure is also adjacent to the unserved and underserved pockets on the southwest side of I-88 in Otsego County, offering another option for expansion in pockets along that route.

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[29] OEConnect, "About OEConnect." Available at https://www.oeconnect.coop/about-oeconnect. Accessed July 11, 2024.
[30] New York State Broadband Program, "New NY Broadband Program." Available at https://broadband.ny.gov/new-ny-broadband-program. Accessed July 11, 2024.
[31] U.S. Department of the Treasury, "Capital Projects Fund." Available at https://home.treasury.gov/policy-issues/coronavirus/assistance-for-state-local-and-tribal-governments/capital-projects-fund. Accessed July 11, 2024.
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