Questions Submitted by Superior CIT Committee Members and City Department Heads

New Technologies – Fiber Obsolescence

What are the thoughts on the new satellite services begin developed? Will that make fiber obsolete?

Starlink is not designed for city deployments, nor does it have the bandwidth capacities to be a realistic alternative to the existing Coax network (Spectrum), let alone the capacities of Fiber.

Why do we need gigabit fiber when there is Starlink or 5G?

As stated above, Starlink is challenged in speed and capacity and 5G depends on fiber infrastructure.

What is the fastest speed the fiber infrastructure will provide immediately, and what is the fastest speed it could provide in the future?

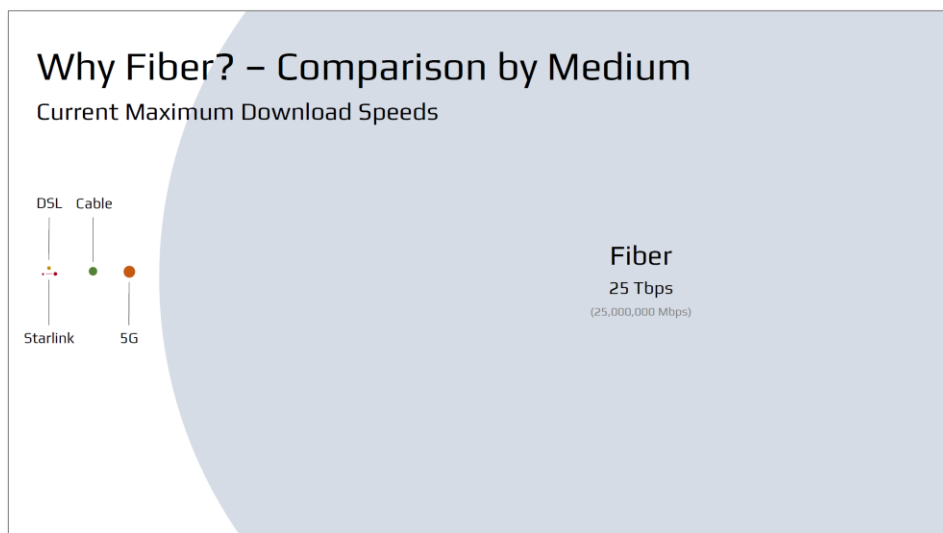Could competing technologies make broadband fiber obsolete in 10-20 years?

How are we assured that this will be the 'latest' technology? In five years, we don't know if another method will be a better option. Then what? Everyone is just out their money they have invested.

Are there any other emerging technologies that will eventually render fiber internet obsolete?

The Fiber network being proposed in Superior could immediately provide connection speeds of 10 Gig symmetrical bandwidth (10,000 Mbps x 10,000 Mbps) to businesses and homes. In Superior we are recommending initial residential connections of 1 Gigabit symmetrical (1,000 Mbps x 1,000 Mbps). The commercially viable capacity of Fiber today is 25 Tbps (25,000,000 Mbps x 25,000,000 Mbps). And in a laboratory setting researchers have documented speeds of 156 Tbps (156,000,000 Mbps x 156,000,000 Mbps) over a 50-mile distance.

Fiber is the only communications medium that researchers have not reached the maximum limitation. They continue to develop electronics that expand the capacity and speed of Fiber.

What are the advantages of Fiber over, cable, DSL, wireless, 5G ultra-wideband, or satellite connections? Why does Fiber matter?

Why Fiber? – Comparison by Medium
Current Maximum Download Speeds

DSL Cable

Starlink 5G

Fiber
25 Tbps
(25,000,000 Mbps)

Technology	Maximum Speeds
Starlink	50 – 150 Mbps (download – shared)
DSL	100 Mbps (download – shared)
Cable	940 Mbps (download – shared)
5G	2,000 Mbps (download – shared)
Fiber	25,000,000 Mbps (symmetrical – not shared)
Fiber (Lab)	156,000,000 Mbps (symmetrical – not shared)

Implementation / Construction Timeline

How long of a time frame do they estimate it would take to integrate the service across our community?

How many estimated years would it take for the municipal network to expand to cover the service areas of the existing ISPs?

Will our bonding support those increased costs for an extended period of time? I understand it's hard to predict level of interest, but there's got to be some averages and assumptions to base it off of…

The proforma financials in the Superior Broadband Master Plan are calculated using a 3-year construction timeline. It is possible the network could be built faster, but we wanted to be conservative in the report's projections. If the network is built in a 2-3 years, we do not anticipate there will be significant materials or construction cost increases.

Ongoing Operations of the Fiber Infrastructure

How do you envision this integrating into our current utility system? In other words, will this become a new City Department to manage/maintain or would it fall under Public Works? Or IT Dept?

Would we hire additional people to maintain or would all of the work would be contracted out?

How many additional city employees will be needed to administer and maintain the network including office and field staff?

What service equipment would be needed to maintain the network?

The city has two options related to the ongoing operations of the network infrastructure. First, the city can create a Fiber Department as an extension of public works and/or the IT department. Option two, is to outsource network operations to a third-party.

What is the financial impact to the city if the actual take-rate falls short of the 60% projection?

The short answer is none. The structure being proposed requires 2,500 – 3,000 active subscribers to cover the costs of operating the network. This represents a 20% - 25% take rate of existing homes and businesses in Superior.

Infrastructure Financing

How is the broadband fiber infrastructure paid for?

Under the model being proposed, subscribers that opt-in to the network agree to pay a fractional portion of the overall cost to deploy (build) the network. This is treated as a "utility connection fee".

What is the expected time frame for a project like this to become profitable?

The proforma financial projections in the Broadband Master Plan shows network operations cashflow positive in year 4.

When will this debt be paid off?

The infrastructure deployment cost calculations in the Broadband Master Plan are based upon a 20-year finance schedule. However, under the proposed financing model home owners and business owners can pay off their "utility connection fee" at any time without penalty.

What is the total or max dollar amount the City would need to bond for?

The cost of deployment outlined in the Superior Broadband Master Plan is based upon a 60% take rate and is projected at $31,085,859.97. If the take rate is higher than 60% (7,800 subscribers) the overall cost of deployment will increase, while the cost to each subscriber will decrease. So ultimately the overall cost of constructing the network will vary depending upon the final take rate.

Grants and Other Funding Sources

Are there any state/federal grants available that the consultant could guide us towards to help offset the cost for the residents? (from what I can tell is at one time there were quite a few out there in the past - not sure if they are dwindling or still available?)

Yes.

Are there grants or funding available to offset install costs?

There will likely be a number of Federal and State grant opportunities. Wisconsin has discussed $200 Million in possible State funding in 2021. https://potsandpansbyccg.com/2021/02/16/states-get-serious-about-broadband-funding/

Choice and Taxes

Will I be forced to have this fiber connected to my home or business?

The model being proposed gives each homeowner and business owner the choice to opt-in or opt-out of joining the network.

Will I be taxed to pay for this fiber infrastructure buildout even if I do not have it installed to my home or business?

Is this a new tax?

Under the proposed model, if you do not join the network you have no financial obligation related to the network.

Where will the money come from and will my taxes go up?

Funding if the network deployment and ongoing operations is provided by the subscribers that opt-in to the network. Under the model being proposed there will be no tax increases associated with the fiber infrastructure.

If I do not opt-in early can I sign up later?

Yes. However, the low interest – long term financing will not be available to you.

For community buy in, should this go to referendum? Can we send a question in some kind of statement that the city sends to H/O worded in a way that we are very transparent on potential costs?

Under the model being proposed there is no need for a community referendum, because each homeowner and business owner "vote" to opt-in or opt-out.

Opt-in = Yes
Opt-out = No

(Just like a referendum.)

Automated Open Access

If I do not like a specific ISP on the network, how long does it take to switch ISPs?

With Automated Open Access you can switch ISP's in 30 – 60 Seconds

Would there be any imposed data caps, traffic shaping, quality of service that may slow down my connection? This project seems to be built like an open marketplace for services and ISPs, do other ISPs offer this freedom of choice?

No data caps, no traffic shaping, no quality of services issues.
Yes, the Open Access network creates an open marketplace for services (just like the internet).
No, other ISPs do not offer this freedom of choice in their proprietary (closed) networks.

Most traditional ISP's charge for their internet connections at multiple sites and additional VPN connection fees to interconnect multiple offices. With this city's fiber infrastructure will this also be the case, and how much would it be?

Can I sign-up for more than one ISP for a backup/failover connection?

In the Automated Open Access model, a subscriber can have a single ISP service or multiple ISP services running simultaneously over the single fiber connection in their home or business. Additionally, private network LAN and WAN connections (off internet) can be created dynamically at no additional cost.

How will the automated open access Fiber Internet succeed when other Municipal Models have failed? How do we know this won't be a failure?

Traditional municipal fiber networks typically following the incumbent model of a closed network with a single ISP offering. This model is challenging because it competes directly the incumbent networks. The model being proposed in Superior is different because it changes the fundamental value proposition to subscribers. The network facilitates services far beyond fast internet. Additionally, the model being proposed addresses all the financial and operational challenges that municipal fiber networks have suffered from in the past.

Municipal fiber network failures of the past have largely been related to infrastructure financing and service fee collections. The model being proposed separates the infrastructure financing, the network operations funding, and the service fees of the network. The separation ensuring the financial solvency of the network infrastructure and operations, without being dependent upon the services (ISPs).

If this is such a great alternative, why aren't other cities doing it?

Other cities are "doing it". Superior is one of 15 cities actively researching, planning, and/or deploying the type of municipal fiber infrastructure being proposed in Superior.

Can the city network function without Entry Point and their Network Management software?

Are there alternatives to Entry Point in the event that Entry Point went out of business or the city chose to no longer partner with them? The viability of a city utility can't be dependent on the existence of a single outside vendor.

Yes, the automated provisioning and other network functions would simply be done manually.

What if ISPs choose not to participate in the city's broadband network and continue to use their existing networks?

Spectrum and CenturyLink will likely not offer ISP services on the Superior fiber infrastructure initially. They will likely choose to continue offering services over their Coax and DSL networks.

What other types of services can run on this infrastructure outside of ISP internet services?

Many unique and powerful services will be developed to run over the fiber infrastructure. Services and solutions in the areas of:

Telehealth – Home Hospital
Distance Education – Remote Classroom
Distributed Electric Grid Management
Emergency Communications – Emergency Response

Comparable Municipal Networks

Are there comparable cities where this has worked well?

Yes, the first city to deploy the Automated Open Access model is the City of Ammon, Idaho. The results have been compelling...

October 2019, *Fast Company Magazine* named the Ammon Network as **"The Best Fiber Optic Network in America"**.

July 2020, the *Open Technology Institute* released a comprehensive report documenting "The Cost of Connectivity 2020" globally. Ammon, Idaho is listed as having **the lowest cost of fiber-optic broadband in the entire world**... ahead of Bucharest, Riga, Paris, Seoul London, Zurich, Copenhagen, Tokyo, Toronto, etc.

[1] https://www.fastcompany.com/90416863/the-city-with-the-best-fiber-optic-network-in-america-might-surprise-you

[2] https://www.newamerica.org/oti/reports/cost-connectivity-2020/

What about comparable cities where it's struggled/failed – any lessons learned from them?

So far, we have not had any municipal deployments where the proposed model has "struggled/failed". In addition to the City of Ammon networks are currently being deployed in the following municipalities:

Elkhart County, IN
Mountain Home, ID
McCall, ID
Redding, CA

Benefits to the Community

What are some of the benefits to the community that this fiber infrastructure would provide?
What are top 3 benefits to the city?

Benefits to Subscribers
Increased speeds
Lower costs
Increased competition
Increased reliability
Lower latency

Other Benefits
Increased home values
Increased business expansion

Economic growth
Private network connection options
Increased service offerings
Increased innovation
Smart City innovations
Local resiliency
Local control
Local choice

Will this fiber infrastructure to my home or business add value to the property?

Yes, the average appraised value of a home increases 3% - 7% with fiber connectivity.

How will this impact local businesses, the economy and development?
Does having fiber help community development and businesses?

Dramatically lowering the cost of connectivity, while increasing capabilities and functionality for businesses will lead to a growth in your business community. As businesses grow more people are hired, leading to higher employment rates and increased incomes. A natural consequence of this growth is a broadening of Superior's tax base, benefiting everyone in the community.

In 2017 an independent economic study of the Ammon Fiber Network was conducted by Strategic Network Group. Their report documented an average broadband subscriber savings of 56% and a GDP impact of $4.7 million annually. The full report can be read here: https://sngroup.com/broadband-economic-case-ammon/

Today it is estimated that Superior residents and businesses are paying $12,720,000 annually for internet connectivity (most of which is going to Spectrum in Connecticut). What would be the economic impact if most of that money stayed in Superior?

    $12,720,000 – Annually
    $63,600,000 – Over 5 Years
    $127,200,000 – Over 10 Years
    $254,400,000 – Over 20 Years

This assumes Spectrum does not raise internet rates over the next 20 years.
(11,000 x $70 per month | 2,000 x $145 per month)

How will this impact education and solving the digital divide?

By dramatically lowering connectivity costs for everyone in Superior, especially connectivity costs to low-income residents of the community.

How will this impact coverage to segments of the city that does not have coverage?

It will give all areas of the city coverage, as long as the initial take-rates support the network infrastructure deployment.

ISP Behavior

Have existing ISPs blocked community efforts like this to improve Internet when access or service was lacking?

There are 21 states that have legal barriers to community networks. The incumbents have active lobbying efforts at every state legislature. Superior is exercising caution in its process to make sure it complies with Wisconsin statutes.

What will the city do if current ISPs drop their prices so low that customers are not interested in this platform? How do we know the internet providers won't just undercut costs?

The model Superior is pursuing is one where subscribers voluntarily participate. The goal is to offer significant value for both speed and total monthly price. In return, we want participants to treat the fiber optic infrastructure as an improvement to their property and to accept responsibility to pay off that infrastructure (utility fiber connection) over time. This strategy will block the common ISP strategy of temporarily dropping their price.

I see my current internet bill going up every year, what will internet prices be in 5 years and what will the price be for this network in that time?

If Superior does nothing, in five years the basic internet connection (100 Mbps / 10 Mbps) from Spectrum is likely to exceed $100.00.   https://potsandpansbyccg.com/2021/01/12/100-broadband/

If Superior follow the proposed model and operates the fiber infrastructure as a utility, in 5 years the cost to residential subscribers will likely be around $55.00 for a 1 Gig connection.

Why not just wait for other ISP's to improve their networks and coverage?

The reason Superior is pursuing this project is to offer significant value for both speed and total monthly price, and to offer connectivity to everyone in the city. That is not the objective of the incumbents and there is no indication that the incumbents will ever share these objectives.

I read that the City of Madison tried this same model and was undercut by a local ISP and lost millions of dollars. How can we know this same thing won't happen to us?

The model Madison attempted to deploy was nothing like the model being proposed in Superior.

Competition

Have you worked with other City's that had to compete with Charter? If so, what percentage of the time has that been successful?

What is an example of a City that had to compete with Charter and was successful?

Redding, CA will likely be the first Automated Open Access municipal fiber network deployed in Charter territory. Currently this model is being deployed in Comcast territories and Sparklight territories, with great success.

Potential Risk Factors

What are the top 3 concerns to this project?

Please refer to the Risk Analysis section of the Superior Broadband Master Plan.

What happens if the take rate comes in lower than is initially predicted?

It is anticipated that Superior will not move forward with the fiber infrastructure if the initial take-rate is not sufficient to cover projected deployment costs.

What is the risk of this project failing, would it be too big to fail?

We have no way of quantifying the "risk of this project failing". The size of the network does not impact the risk of failure.

Infrastructure Policy

If I sell my house and move out of the coverage area do, I still need to pay for the infrastructure. How does that work if I move?

This depends upon the negotiations with the new homeowner. The fiber connection stays with the home.

What happens when you move to a different house within the city and that house does not have the service? Then you're paying another $3000 or whatever it may cost.   That becomes a lot of money that you'll never recoup.

This depends upon the negotiation with the person you are buying the property from. Under the proposed model all infrastructure investments should be recouped.

If I move from one home or rental inside the coverage do I get a credit for what I already paid?

Yes and No, depending upon how you look at it. Yes, if you consider a 3% - 7% increase in the value of the home you are selling and the saving you have experience in connectivity costs, a "credit for what you have already paid".

Who pays for the service in an apartment building?

This is typically negotiated between landlord and tenant.

Investment Recoup

Speed aside, if each resident will have to pay (for example) $3000 to obtain service in their home, how long will it take for the resident to recoup that money? Even if ISP rates drop by half, it'll take many years.

Depends on how you calculate costs and savings. For close to the same speeds with a $3,900 connection fee, the numbers calculate as follows:

Residential Payback = 3.43 Years / 39 months

Business Payback = 0.38 Years / 4.59 months

[Residential – Spectrum 940 Mbps @ $145 per month, with a $200.00 install fee. Annual savings of $1,080 / $3,700]
[Business – CenturyLink Fiber 500 Mbps @ $925.00 per month, 60-month contract.   Annual savings of $10,200 / $3,900]

Miscellaneous

Would you consider fiber to fall under any green initiatives, and what are the environmental impacts?

Yes, advanced fiber networks will be necessary for the transition to transactional (renewable) energy and next generation grid management. Additionally, fiber networks make it possible to reduce many carbon-based activities (i.e., commuting).

Can I use my existing modem?

No, because your current modem has a DSL or Coax input, not fiber. Your modem will be replaced with an upgraded Virtual Broadband Gateway.

Do I need to buy or rent a modem?

No, the cost of the Virtual Broadband Gateway is included in the overall fiber connection cost.

Can I bring my own firewall or routers?

Yes.

Can I have more than one fiber connection to my home or business, and if so, what is the cost?

Yes, but with the virtualization capability of the Automated Open Access system you do not need multiple fiber connections. You will get the functionality of multiple fiber connections automatically.

We don't have any financial cost projections for a second home fiber connection.

What is the service life (replacement cycle) of broadband fiber?

Fiber Infrastructure = 50 – 100 years
Electronics = 7 – 10 years (estimated)

The average household does not need this service. A single person, or a couple without children certainly do not.   From my personal experience, streaming movies or surfing the internet doesn't need any more speed than I already have. I don't have any problems. I have had CenturyLink for years. I'm also happy with the cost. I am locked in for life at $48/month. That includes all taxes and 'fees'!

This is not a question… it is a statement.   The circumstance described of only needing a 5 Mbps / 1 Mbps connection is extremely rare and unusual.[1] If you are happy with your current service great, keep it. No one is forcing you to upgrade. Your price is locked in for life, as long as CenturyLink offers the service. The DSL

platform they are providing your service over is at least 50 years old. It will eventually degrade to the point CenturyLink cannot not longer offer services over it. This has happened in many communities through the west where CenturyLink has stopped providing residential services.

[1] Techspot Article: "Internet usage is surging to new heights: when 1 terabyte is no longer enough bandwidth"
https://www.techspot.com/news/88605-internet-usage-surging-new-heights-when-1-terabyte.html