WHITE PAPER

Exploring the Benefits of High-Speed Broadband for Pierce County.

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Introduction

Local units of government, including counties, are often asked by residents how they can accelerate the deployment of broadband. Although counties are often unable to be involved directly with the financing of a project or business, they are frequently left holding the bag in addressing the problem. Herein lies the problem. County governments are not positioned to act as investment bankers, but they often hold significant amounts of capital that could be used to help expand broadband through grants or other programs. In addition, they hold taxing authority that could assist with replacing the investment, even without increasing the existing rates.

For a standard business, return on investment is often thought of as the financial return of the money invested plus a rate of return directed back to the investors. County governments should have a different view of their rate of return. County governments do need to recoup investments; however, the value of resident satisfaction, economic growth, regional stabilization, and political capital may be of equal or greater value. Specifically, in looking at high speed internet, the value of a connected county brings educational, telemedicine, and agricultural benefits that will far exceed a simple financial return.

This white paper explores the value created by reliable, high-speed broadband for Pierce County and discusses simple steps the county could undertake to address the challenge.

Value of Reliable High-speed Synchronous Broadband for Pierce County

The essential nature of quality synchronous high-speed broadband has been driven home during the COVID-19 environment. A service that was "nice" to have for social media, movie watching, and occasional e-mail became a critical piece of community infrastructure and to everyone's lives. The lack of broadband made it difficult to perform essential functions such as working from home, educating children, and conducting business. The sheer volume of internet traffic affected the quality of services that otherwise seemed acceptable. No longer could those functions be performed because the infrastructure was inadequate. It became impossible for one person to watch a movie, another to conduct a Zoom meeting while others were trying to do homework.

> High-speed broadband is an essential service. It's no longer a nicety - it's a necessity.

The inability to have access to quality and reliable service still impacts the lives of many in our community today. Those impacts carry costs. Having adequate broadband service is a value to Pierce County and its residents.

A 2018 study by Purdue University estimates the benefit/cost ratio of four with government tax revenues and health care savings amounting to 25 percent of the total net benefits of broadband[1]. The study used detailed data from the Tipmont Rural Electric Cooperative (REC) supplemented with data from six other Indiana RECs to estimate statewide impact. The study also attributed the share of these benefits 30 percent to telemedicine; K-12 education two percent; consumer savings 14 percent; increased farm income one percent; system revenue 14 percent and 25 percent to multiplier effects. Data in the same study estimates a $25,000 net present value of broadband to the members of the RECs.

A research review by Brian Whitacre, Oklahoma State University concludes broadband does matter across an array of economic outcome measures[2]. Here are the key findings:

Broadband Research Key Findings

- Rural areas with high broadband adoption had higher income growth.
- Broadband is associated with two percent increase in employment rate and lower unemployment rates. Positive correlation between broadband expansion and local employment growth.
- Broadband access has positive effect on firm relocation decisions.
- Broadband speed has impacts on rural entrepreneurship.
- Farmers without broadband access willing to pay more in property taxes to support broadband investments.
- Broadband increases civic engagement and enhances gathering of civic information. It is a significant benefit for disadvantaged residents in communicating with friends and family.
- Broadband increases urban housing values by three percent.

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[1]Research and Policy INsights – Estimation of the Net Benefits of Indiana Statewide Adoption of Rural Broadband ; Larry DeBoer,Alison Grant,Wallace E. Tyner https://pcrd.purdue.edu/wp-content/uploads/2018/12/006-RPINsights-Indiana-Broadband-Study.pdf

[2]Measuring the Economic Impact of Broadband", September 18 2019NTIA Broadband USA Webinar Series; https://broadbandusa.ntia.doc.gov/webinar_190918#contententarea

Gabor, Savage and Sicker in their report "High-Speed Internet Access and Housing Values" found single-family homes with access to a 25 Mbps broadband connection have a price that is about $5,977, or three percent, more than similar homes in neighborhoods with 1 Mbps[3]. The estimated underserved area of Pierce County lacking high speed broadband has a Total Assessed Value - $177,044,350. This breaks down to:

Land Value - $52,926,650

Improved Value - $124,117,700

Applying the following percent increase in improved values to the real estate improved value would be:

Improved value with three percent increase - $ 127,841,231

Improved value with two percent increase - $ 126,600,054

This translates into a $2.48 million to $3.72 million increase in property values due solely to improved access to broadband.

The business case for any provider will depend upon on the take rate or the percentage potential users who sign up for broadband, including an understanding of residents that are underserved at a more granular level than is provided by the State of Wisconsin or FCC. The lower the take rate the lower rate of return for the broadband provider and desire to make the required investment. Education and awareness need to be a part of a broadband development and deployment strategy. Community engagement, including messaging on the part of local government and leadership, needs to be part of this strategy. This includes educating constituents on why legacy technologies such as DSL are not long-term solutions. This is also true of trendy solutions such as satellite or fixed wireless, which may meet the short-term needs of residents but will become obsolete as growing amounts of data and bandwidth are needed by residents.

[3]Gabor Molnar, Scott J. Savage & Douglas C. Sicker (2019) High-speed Internet access and housing values, Applied Economics, 51:55, 5923-5936, DOI: 10.1080/00036846.2019.1631443

Challenge with Current Solutions

It's been suggested the silver bullet to bridging the digital gap is fixed wireless. Access by fixed wireless is like fixed satellite but instead the subscriber's dish is pointed to a tower where the fixed access point is located. Wireless transmitters generally require a fiber backhaul. These access points are usually located on water towers, grain silos, or other radio infrastructure. Subscribers must have clear line of sight, which also means extending a tower into the area or running cable to a clearing that can see the tower.

From a technical perspective, the radio frequencies that have the ability to penetrate buildings and ground covers such as trees do not have the capacity to meet the data transmission needs of consumers and businesses. The frequencies that can carry the data do not have the ability to penetrate building and tree cover. Clear line of sight is required and difficult to manage with the rolling hills, valleys, and tree cover found in Pierce County.

Subscribers can generally request speeds up 30 Mbps, but rarely see these speeds at optimal times because towers are constrained to the number of users accessing data at the same time. As AT&T states on its website, "Service performance may be affected by the customer's proximity to a cell site, the capacity of the cell site, the number of other users connected to the same cell site, the surrounding terrain, radio frequency interference, applicable network management practices, and the applications used."

As the number of users and volume of data increases, speed decreases and latency (delay in transmission) increases. Upload speeds are becoming as critical as download speeds whether it is being able to load your security video footage to the "cloud" or engage in a video conversation such as needed for work, education, or telemedicine. Current offerings have upload speeds one-quarter to one-sixth of the download speeds.

Fixed Wireless Key Points and Challenges

- Access provided by fixed satellite point from base to tower.
- Towers are located on water towers, silos, or tower structures.
- Supported by fiber backbones.
- Subscribers must have a clear line of sight, weather and precipitation will impact performance.
- Bandwidth concerns and latency.

- Marketing is out in front of actual technology.
- Fiber is the backbone of a wireless network.
- Would require significant investment and approval of new towers (NIMBY) due to the above issues.
- Intermediate solution at best as technology will not keep up with demand and needs.
- BevCom conducted a feasibility study of fixed wireless for its Pierce County service area in 2013 and concluded building out FTTP was the correct business decision for them and their customers.

In addition to fixed wireless, there are some that believe 5G will solve all the needs of access to the internet. Undoubtedly, 5G has a role in the future especially in areas where high density, high volumes of users need unparallel access to a data network. Venturing to downtown Minneapolis for football or baseball games with 40,000 or 50,000 people trying to access the latest news, scores, replays, and social media absolutely is a great business case for 5G. However, the challenge with 5G is the cone in which a 5G tower can serve at high-speed is relatively small. It would take hundreds of new 5G towers with little to no canopy interference for all Pierce County residents to see the benefit. It's unlikely that residents will approve of many new towers, not to mention the additional fiber buildout needed to support those towers.

Both 5G and Fixed Wireless have their place and will be around for a period of time; however, almost every industry expert agrees that fiber to the premises solves and fixes many of the long-term needs of bringing data and access to the premises. In addition, fiber has a long shelf life and speeds/bandwidth can be upgraded by changing the electronics without having to change the actual fiber strand.

Simple Steps to Accelerate Broadband Growth

Steps to Broadband Growth

1. Support and apply for the **Broadband Forward!** certification offered by the State of Wisconsin Public Service Commission.
2. Support and work with public right of way easements with broadband providers to reduce the administrative overhead of building fiber either overhead or underground.
3. Utilize a portion of the county reserve fund to provide grants to telecommunication providers to build fiber to the home.
4. Develop a comprehensive map of locations that have access to high-speed broadband.
5. Promote fiber to the premises as a long-term solution.

Broadband Forward! Certification

This certification requires the county to adopt a resolution and provide the Wisconsin Public Service Commission a copy of that resolution. The PSC provides a model template that can be used by local governments in adopting their own resolution. In addition to adopting the resolution, the PSC proposes local governments streamline applications, appoint a single point of contact, charge reasonable fees for applications and permits, and streamline approval processes.

Support Public Right of Way and Easement Restrictions

Currently the State of Wisconsin does not have statutes that streamline easements relative to the building of fiber networks when it comes to private landowners. Legislation is being proposed in the next legislative session to help ease these restrictions when existing electric distribution lines have an easement on property. The county should model similar language to help ensure that telecommunication companies have access to existing infrastructure that is on publicly owned lands and rights of way.

Utilize the County Reserve Fund to Support Grants

Access to capital is the single biggest factor in delivering high speed internet to county residents. High-speed fiber networks are costly, range between $12,000 - $60,000 per mile of fiber depending on whether the fiber is constructed overhead or underground. The typical rural density in the county is less than six residences per mile. Simply put, the investment for each home passed is $10,000, meaning it takes nearly 25 years of service to recover the initial investment.

As illustrated above in the studies, a connected home increases the value of the property. The county offering grants to providers would be a mechanism in which the provider recovery could be reduced. The investment by the county would pay back long-term dividends through economic recovery based on the benefits of high-speed broadband access. More specifically, the county would receive a quicker rate of recovery for the investment in high-speed broadband grants by increasing the overall property values, seeing new residential homes built, and retaining homes and businesses in the county. These grants should be targeted to delivering fiber which provides long-term benefit and availability without data or speed constraints.

Data Collection of Broadband Availability

The county intrinsically has data on every parcel that exists in the county, including whether or not there is a business, farm, or commercial entity located on the property. The current method that is coordinated with the FCC is based on census tracts and is unreliable. The WI PSC uses this data in coordinating their designation of unserved or underserved areas. The data is available through the various telecommunication entities that serve the county. Having more granular data will allow the county to better target where additional support is needed to connect homes and businesses.

Priority should be Fiber to Premises (FTTP)

FTTP is the most expensive method of delivery of broadband. It provides capability of identical download and upload speeds (synchronous) of up to 1 gigabit critical in today's environment and it is adaptable to changing technology necessitating only the upgrading of the components at each end. In other words, it's built for the future. While there are other technologies such as satellite or fixed wireless, these technologies have shortcomings.

Conclusion

The COVID-19 pandemic brought a necessary spotlight to an issue that exists throughout Pierce County. High-speed broadband is no longer a nicety, it's an essential service, a necessity. People who are looking to build new homes, buy homes, or looking to locate their businesses first and foremost evaluate their opportunity to have a connection to high-speed broadband. There is tangible evidence that real benefits will be recognized by the county, both in the short and long term. It's imperative that local units of government take action to help ensure that high-speed broadband is made available. Supporting the Broadband Forward! certification, reviewing easements, collecting data, and tapping into funding sources for grants are straightforward solutions that can help bring long-term value.

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