

**Rural Broadband - Rural Economy, Education and Healthcare: The
Case for Acquiring Broadband in Liberty Grove**

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Abstract:

Rural economy, education quality and healthcare are disadvantaged by the absence of broadband. About 57 million Americans live in rural areas (Health Resource & Service Administration, 2021). According to the Federal Communications Commission about 1/3 of rural households do not have broadband access at home.

Private company providers of broadband are reluctant to supply broadband in rural areas because they are less populated, require greater distances to reach customers and may not have as many customers who can afford to pay for the broadband service. In Wisconsin for example, Charter Communications has made a \$668 million dollar investment into broadband in underserved areas.

While these efforts show progress, this still leaves many areas out of the infrastructure development. As private providers are expanding, rural areas are often left out of the expansion. The Federal Communications Commission (FCC) has an on-going campaign to encourage rural broadband and there are many programs to support that campaign. The State of Wisconsin Public Service Commission offers financial support to increase broadband access.

Liberty Grove will benefit from accessible broadband because broadband creates jobs, provides access to remote education, improves student academic performance, is positively related to higher individual earnings, and enables better healthcare through telemedicine.

I. Overview of Rural Broadband Internet

a. What is Rural?

Research and policy makers do not have a single definition for rural areas (Cromarite, 2019). There are many definitions of rural areas. Often, rural areas are compared to urban areas or defined by population density or geographic isolation. (Cromarite, 2019). However, thresholds for communities often depend on the definition (Cromarite, 2019). The U.S. Census Bureau defines rural as what is not urban—that is, after defining individual urban areas, rural is what is left (Ratcliffe, 2016). As you can tell, this makes it difficult to determine what ‘rural’ really means. This essentially avoids the question of what is ‘rural’ and defines urban populations and leaves the rest as rural. Determining the difference between urban and rural can be a challenging task. Since 1950, The U.S. Census Bureau created criteria to consistently define urban areas.

Historically, the first definition of urban area was a population of 50,000 or more (Ratcliffe, 2016). This definition would not be relevant today. In 2000, the Census Bureau expanded urban and rural to include urban clusters, which are areas with 2,500 people but less than 50,000 people (Ratcliffe, 2016). Urban areas must have a density of 1,000 per square mile (Ratcliffe, 2016). The Census Bureau now uses these main criteria to determine if the land is urban: density, land cover, airports, distance and the concept of ‘hop and jumps’. A ‘hop and jump’ will allow in some circumstances for an area to be called urban because it is a close hop from an urban area.

For purposes of consistency and relevancy to the topic, this paper relies on the expertise of the Federal Communications Commission categorization of rural population. (Reference to rural in FCC 2020 Deployment Report). By any definition, Liberty Grove is rural.

b. What is Broadband Internet?

Broadband is the term commonly used to refer to high-speed internet that is faster than traditional dial-up access (Types of Broadband Connections, 2014). This includes several types of technologies including digital subscriber line (DSL), cable modem, fiber, wireless, satellite and broadband over powerlines (BPL) (Types of Broadband Connections, 2014). Highspeed internet is at least 25 Mbps download and 3 Mbps upload speed (2018 Broadband Deployment Report, 2018). Streaming Ultra HD 4K Videos is said to take 25 Mbps and general browsing or email is 1 Mbps (2018 Broadband Deployment Report, 2018).

In practical terms, broadband has the capacity to handle multiple, coincidental home users of the internet, including Zoom-type meetings and telemedicine appointments with two-way visual communication and charts used in the conversation. While ‘highspeed’ may be considered 25 Mbps by FCC, this is likely an outdated standard. Today’s broadband and some applications have 100+ Mbps downstream.

c. Broadband in Rural America: The Digital Divide

Our country is divided between those that have broadband and those that are cut off from this important 21st century tool. Broadband in rural areas is still behind urban access. The Federal Communications Commission study indicates that about 31% of rural households do not have broadband access at home (In Touch Health, 2019). In Wisconsin, broadband coverage varies by counties with some as low as 51% in 2021 (Internet Access in Wisconsin, 2021).

II. Why Broadband Internet is Important

a. Economic Impact

Broadband access has a demonstrated positive impact on the communities where it is installed and used (Telecommunications Development Sector, 2012). Basically, the construction of the broadband infrastructure (i.e., the physical structures needed to install and use the network) creates jobs. For example, Charter Communications estimates hiring 2,000 employees and contractors in its expansion efforts in Wisconsin.

After installation, the use of the network promotes productivity gains. This may be in the form of more efficient business processes, such as inventory management. A study by economists Atrostic and Nguyen showed a 5% productivity gain in the manufacturing sector where broadband was accessible (Telecommunications Development Sector, 2012).

Further, innovation increased with broadband access. For example, new forms of commerce were developed or expanded, such as telemedicine and call centers. There is also a documented link to business expansion. One study showed a 6% increase in the manufacturing sector and a 7.5% increase in the service sector (Telecommunications Development Sector, 2012).

As to the effects on rural employment, one study showed that jobs were created in the financial services area, wholesale trade and health sector. This is the result of enterprise relocation to the area (Telecommunications Development Sector, 2012).

b. Healthcare

Broadband access significantly improves rural healthcare through use of telemedicine. The U.S. rural healthcare system does not provide equitable care to rural residents. Health care is significantly less accessible to rural residents as compared to urban residents. (*About Rural Health*, 2017). This difference and inequity affect about 75% of rural Americans (*About Rural Health*, 2017). There is a greater risk for disease and premature death for rural Americans than for the American urban population (*About Rural Health*, 2017).

Currently, there are significant problems with healthcare accessibility in doctor deserts. These deserts happen when a population has inadequate access to doctors; while the rural population of the U.S. is about 20%, only 10% of U.S. doctors are serving this population (*Health Care Deserts: Nearly 80 Percent Of Rural U.S. Designated As 'Medically Underserved,'* 2019). Currently 80% of rural areas are underserved by doctors, the key healthcare provider. (*Health Care Deserts: Nearly 80 Percent Of Rural U.S. Designated As 'Medically Underserved,'* 2019).

Adding to this doctor desert problem is the physical distance between patient and health care provider. A 2006 Study by South Carolina Rural Health Research Center found that it takes on average an additional 9 miles more for people in rural communities to access health/dental care than patients in urban areas (Probst Ph.D. et al., 2006). This distance adds to longer commute times to see providers, less frequent visits and more challenges for people in rural communities.

Since 2013, there have been over 100 rural hospital closures resulting in patients traveling a median of 20 miles farther for hospital healthcare than their urban counterparts (*GAO: Rural Hospital Closures Reduce Access to Care / AHA News, 2021*). A combination of factors contribute to closures including difficulty recruiting physicians, diminished reimbursement rates, merging of hospitals, desire for specialized care and dwindling patient volume. Medicare does not have the statutory authority to pay for telehealth (Morse, 2020). During the COVID-19 Pandemic, President Trump's Executive Order allowed for telehealth reimbursement and encouraged use of telehealth and other innovative supplemental benefits. (National Archives and Records Administration, 2019). Continuing the executive order would allow for rural hospitals to receive reimbursement and continue to employ staff in their local community.

The distance to specialty care is even more of a problem in rural areas. For example, coronary care access went from a median of 4.5 miles to 35.1 miles from 2012 to 2018 (*GAO: Rural Hospital Closures Reduce Access to Care / AHA News, 2021*).

Without broadband, patients must rely on telephone communication. They have no immediate and reliable access to test results, or doctor written instruction by health care provider app, nor even data heavy email. This limits commonly used electronic medical records (such as Epic or Cerner) to access patient information. For example, large medical systems like UW Health utilize MyChart by Epic Systems as a way to communicate with patients. The use of MyChart is an excellent way for most patients with basic computer experience to communicate with doctors and providers but depends on broadband infrastructure that is accessible to rural communities.

Broadband companies are an element of the healthcare system. Broadband provides an important indirect contribution to the healthcare system by making access to care available to rural residents that may be far from a hospital or specialist, but can use telemedicine to get top quality care.

Telemedicine by doctors is available only if broadband companies make their product available. Currently, many insurance companies do not reimburse for telehealth at the same rate or at all for services provided using broadband. Broadband operators' connection to the rural community is often linked to the demand for its services. Health care institutions located in a rural area rather than individual providers, have more patients. It is the healthcare institutions' patients that create demand for broadband access. Adequate insurance company reimbursement for telemedicine also influences access demand. Currently, Door County Medical Center has been utilizing telehealth services. According to the Chief Information Officer, while they were quick to implement telehealth overnight, they ran into many problems with connectivity for patients. Door County Medical Center estimates that both the provider and the patient need a minimum speed of 25 Mbps download and 3 Mbps upload. The CIO estimates that in the area, that unless the patient has fiber internet the upload speed is not strong enough to sustain a connection.

Another example of telehealth benefit is more frequent patient consults with the doctor. If a telemedicine extended doctor consultation is close to the reimbursement for an in-person visit, because of its convenience and better time management opportunity, it is likely to encourage telemedicine use by the patient and the doctor.

Door County Medical Center has been combating the broadband problem with a soon to be implemented asynchronous telehealth service. The service is aimed to allow patients to fill out a questionnaire and submit a photo, or visit for some medical conditions. Then, within a few hours the documentation will be reviewed by a physician, and he or she may be able to provide a diagnosis.

In summary, the problem with rural medicine is the inability to attract, train and retain specialty care doctors and the distance to clinics and hospitals. Broadband access from home would significantly help overcome that problem by use of telemedicine. Doctors can efficiently consult with patients by video type calls and patients do not have to travel great distances for appointments.

c. Education

Broadband access is recognized as a key technology necessary to U.S. educational achievement (*Broadband*, 2021).

A recent study by Michigan State University Quello Center with a focus on rural areas, including our neighbors on the U.P., concluded that poor broadband access severely disadvantaged the present and future education of students (Hampton, 2018). Michigan's rural population of 20% is comparable to Wisconsin's 23% rural population. (Hampton, 2018).

In the study, like most of rural America, rural students had slower internet connection and limited access from home. The study showed that students with internet access at home had significantly better digital skills, which are closely related to performance on the SAT and PSAT (Hampton, 2018). As to the SAT and other standardized tests, those with poor access scored about 7 percentiles lower than those with broadband access (Hampton, 2018). Further, students with no home internet access had approximately 0.5 lower GPA than students with internet access. Students without high-speed internet at home were 20% less likely to have an interest in attending college (Hampton, 2018).

Beyond educational disadvantages, poor digital skills mean less access to technology related, better paying jobs. This also affects the community because the new digital economy seeks locations with broadband infrastructure and near workers with digital skills.

In sum, broadband enabling high speed internet is vital to student educational achievement, advancement to higher education and learning of digital skills necessary to obtain better paying jobs.

III. Rural Broadband Internet in Liberty Grove

Liberty Grove is home 1,780 residents and 2,372 housing units located in Door County with approximately 26,788 residents (US Census Bureau, 2019). Currently FCC reports that internet in Door County, and specifically Liberty Grove, meets the high-speed standard of 25 Mbps download and 3 Mbps upload (Federal Communications Commission, 2020). This appears to be a misleading impression. While the report focuses on certain data, it fails to include all residents. For example, if one resident in the area internet has high speed internet, the area is reported as having high-speed internet. Additionally, this data can also count an area as having high speed

internet just because it is offered, but in fact may not be used for a variety of reasons, including access to a particular location or cost.

Consultants working on a feasibility study for Door County and Liberty Grove found that a majority of the area failed the 25/3 Mbps speed tests. A study was conducted to survey Door County residents about the impact of broadband in the community. In 2014, the study showed that on average, part-time residents would spend 12.1 more days at their vacation homes if there was reliable broadband internet access (Kashian, 2014). The survey also found that 20% indicated that speed or reliability was a barrier that prevented them from staying at their homes for longer periods of time (Kashian, 2014). On average, part-time residents spend \$117.83 dollars per day at their vacation homes, providing a greater economic impact to the community (Kashian, 2014). Multiplying the daily spending average and the extra number of days residents would stay at their seasonal home, reliable high-speed internet would bring \$1,425.74 per household to the local economy (Kashian, 2014). According to tax records, in 2019 there were 995 unique seasonal rental properties in Liberty Grove (Kashian, 2014). Accounting also for a variety of activities in the community such as entertainment, dining, healthcare, construction, shopping this increase is estimated to be \$4,290,998.20 per year (Kashian, 2014).

IV. Case Study Examples of Rural Broadband

Chippewa County

Chippewa County, located outside of Eau Claire, WI was home to a failing business park. The absence of reliable broadband made it unattractive to new business. A partnership of state, county and service provider, Wisconsin Independent Network, created a fiber broadband network and soon attracted new business (Frequently Asked Questions regarding the Broadband Expansion Grant Program, 2019).

North Dakota

Rural North Dakota investment in broadband is a success. It has been observed that North Dakota is more likely to have access to fiber broadband than urban Americans. Currently 77% of the state rural areas have access to fiber internet compared to just 44% of the access to fiber in urban areas in the United States. Now it has superior internet service because the money was spent to create a fiber infrastructure. North Dakota is an example of the collaboration of local communities, the state and most importantly a collaboration of 15 independent broadband providers including private, public and cooperatives.

Beltrami County, Minnesota

Beltrami County had a population of 47,188 in 2019. The local telecommunications company borrowed \$100 million dollars in federal funds to bring broadband internet to the community (Treacy, 2017). The community saw an increase in business including a viral post that attracted new customers to the community. Further, main street shops now see up to 90% of sales online, their local healthcare system offers e-visits and cost saving solutions to healthcare needs, and lastly their local college offers 15-18% of their courses online (Treacy, 2017). Beltrami has seen an increase in the economy, healthcare, and educational value in the community as a direct result of the new high-speed internet.

Crow Wing County, MN

Crow Wing County has a population of 62,500 in 2019. Their efforts began as early as 1999 (Treacy, 2017). In 2001, the school system levied for funding for school technology (Treacy, 2017). As a result, the local government worked with a local telephone company to extend broadband into the community (Treacy, 2017). In 2016 the community sought funding to promote it as a tech-ready community (Treacy, 2017). Now, they have been able to replace papermill jobs with tech service companies employing over 1,000 people. The community also has mobile hotspots to upload selfies at their favorite lake, a quality of life service. Crow Wing has seen an increase in full-time residents from seasonal homeowners and an increase in people working from home because of their internet connections (Treacy, 2017).

Red Wing, Minnesota

Red Wing Minnesota is home to BIC, a pen manufacture (Treacy, 2017). To keep the facility in their community, they needed to build a symmetrical 300 Mbps access (Treacy, 2017). Without this speed, BIC would have had to move or stop growing (Treacy, 2017). This is the case with many large companies demanding high speed internet much faster than FCC minimums = to stay within a community.

V. Recommendations

1. Obtain Broadband necessary for high-speed internet access.

This is a rough summary of the benefits of each of the standard broadband internet options.

	Fiber	Cable	DSL	Satellite
Reliability	High	Moderate	Moderate	Low
Download Speed	Very High	Medium to High	Low	Low
Dedicated Connection	Yes	No	Yes	Yes
Data Caps	No	Yes	Yes	Yes

The combination of reliability and speed make fiber the best choice. Fiber delivered broadband, once built, increases through put. Recognizing, however, the practical difficulties and distances involved, a hybrid approach with expert technical advice would be beneficial. This would allow existing infrastructure to be utilized and continue to promote fiber internet which is likely to outperform and outlast other existing technologies.

2. Seek Funding to obtain Broadband.

There are many (and sometimes conflicting) funding programs offered by the FCC and the Wisconsin Public Service Commission. For example, a program may not permit money to be spent on upgrades of existing systems if the system meets an outdated high-speed definition of 25mbps/3mbps, even though it is obvious that for educational and healthcare purposes, this minimal standard is out of date.

As an example of the programs to pursue, I recommend:

1. FCC Rural Digital Opportunity Fund (RDOF)- expand rural broadband by grants to service providers for infrastructure build out
2. American Rescue Plan Funds – broadband infrastructure support, which Liberty Grove is presently pursuing
3. Wisconsin Public Service Commission – grants for telemedicine equipment (e.g., video conferencing equipment)

Additional candidate programs to consider:

1. CARES Act – Dept. of Agriculture: loan for broadband expansion
2. Department of Commerce, National Telecommunications and Information Administration, Broadband Technology Opportunities Program (BTOP): high speed broadband construction and sustainable broadband deployment
3. FCC Universal Service Fund (USF): encourage universal service, including rural areas, including support to schools, library and low-income user support.
4. Rural Healthcare Program (FCC): encourage broadband rural healthcare
5. Emergency Connectivity Fund (FCC): connections to existing broadband
6. Bridge Act (new legislation proposed): \$40 billion program aimed at broadband access and affordability, administered through the states with 50% devoted to rural areas;
7. American Jobs Plan: broadband for all

There is a significant amount of funding available, some of which seems uncoordinated and difficult for small users to access. This argues for a collaboration of local communities with potential grantees (e.g., broadband service providers; telemedicine providers) to seek as much funding as can be efficiently pursued and used.

There is reason for optimism because President Biden's negotiated, revised American Jobs Plan now being debated in Congress, seems likely to become law (The United States Government, 2021). The American Jobs Plan:

- Recognizes the need for reliable broadband internet, and particularly recognizes this need in rural areas
- Aims at 100% coverage
- Encourages local government collaboration with private companies to supply the broadband service, and would let these private/public collaborations compete with another broadband supplier
- Provides for financial support to those who cannot afford the service
- Has \$65 billion available to complete these tasks

Based on rural disparities for access to broadband it is important for Liberty Grove to peruse funding and advocate for increased broadband access with Wisconsin and federal political leaders.

VI. Conclusion

Rural economy, education quality and healthcare can be improved by broadband access. Liberty Grove would benefit from accessible broadband because broadband creates jobs, encourages new business, provides access to remote education, improves student academic performance, is positively related to higher individual earnings, and enables better healthcare through telemedicine.

Liberty Grove should consider pursuing funding broadband access through FCC and Wisconsin Public Service Commission grants. A collaboration with a local broadband provider, the local public school district and the local health network would be useful because of their technical and financial expertise and natural interest in broadband. Further, Liberty Grove should seek the assistance of federal elected officials:

- Representative Mike Gallagher has made education one of his top issues and states on his published issues list that “every child regardless of zip code. . . [have] access to high quality education.”
- Senator Tammy Baldwin has a special interest in rural communities, and she is on the Senate Appropriations Subcommittee on Rural Development
- Representative Joel Kitchens has an interest in virtual learning

A new source of funding will be the American Jobs Plan. It will provide \$65 billion for broadband accessibility and specifically provides support rural areas. Liberty Grove fits the funding profile, especially if it collaborated with a private provider. However, there will be many rural areas competing for this money. To assure it is not overlooked, as may have happened in the past, Liberty Grove should be first to seek the support of federal elected officials. The influence of Members of Congress should not be underestimated as they are the source of oversight and budget control of the agencies that will be spending the \$65 billion.

State and national funding opportunities must be financially supported by Liberty Grove Town Electors and coordinated by Liberty Grove Special Committee or Economic Development Committee. The community of Liberty Grove would benefit by working together to address this disparity with citizens, businesses, healthcare systems and schools from high-speed internet access.

Resources

2018 Broadband Deployment Report. Federal Communications Commission. (2018, February 5). <https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2018-broadband-deployment-report>.

A \$668 million initiative to expand broadband availability to unserved Wisconsin homes and small businesses. Charter Communications . (2021, March 3). <https://policy.charter.com/RDOF-Wisconsin-Initiative>.

About Rural Health. (2017, August 17). Center for Disease Control. <https://www.cdc.gov/ruralhealth/about.html>

Broadband. Office of Educational Technology. (2021, April 9). <https://tech.ed.gov/broadband/>.

Centers for Disease Control and Prevention. (2017, August 2). About rural health. Centers for Disease Control and Prevention. <https://www.cdc.gov/ruralhealth/about.html>.

Cromartie, J. (2019, October 23). *What is Rural?* USDA ERS - What is Rural? <https://www.ers.usda.gov/topics/rural-economy-population/rural-classifications/what-is-rural/>. Federal Communications Commission . (2020, June). *FCC Broadband Map* . FCC Fixed Broadband Deployment. https://broadbandmap.fcc.gov/#/location-summary?version=jun2020&place_name=Door%20County%20Brewing%20Company,%208099%20WI-57,%20Baileys%20Harbor,%20Wisconsin%2054202,%20United%20States&lat=45.064405&lon=-87.123792&tech=acfosw&speed=25_3&vlat=45.251150589063144&vlon=-87.08218566709616&vzoom=11.772239577805426.

Forbes Magazine. (2021, April 9). *How 5G will bring high-speed internet to underserved communities*. Forbes. <https://www.forbes.com/sites/tmobile/2021/04/09/how-5g-will-bring-high-speed-internet-to-underserved-communities/?sh=23483be41ac7>.

Frequently Asked Questions regarding the Broadband Expansion Grant Program. Public Service Commission of Wisconsin. (2019, September). <https://psc.wi.gov/Documents/broadband/bbFAQ.pdf>.

GAO: Rural hospital closures reduce access to care | AHA News. (2021, January 21). American Hospital Association | AHA News. <https://www.aha.org/news/headline/2021-01-21-gao-rural-hospital-closures-reduce-access-care>

Hampton, K. N., Fernandez, L., Robertson, C. T., & Bauer, J. M. Broadband and Student Performance Gaps. James H. and Mary B. Quello Center, Michigan State University. <https://doi.org/10.25335/BZGY-3V91>

Health Care Deserts: Nearly 80 Percent Of Rural U.S. Designated As ‘Medically Underserved.’ (2019, October 1). Kaiser Health News. <https://khn.org/morning-breakout/health-care-deserts-nearly-80-percent-of-rural-u-s-designated-as-medically-underserved/>

Health Resource & Service Administration . (2021, January 12). *Defining Rural Population*. Official web site of the U.S. Health Resources & Services Administration. <https://www.hrsa.gov/rural-health/about-us/definition/index.html>.

Internet access in Wisconsin: Stats & figures. BroadbandNow. (2021, September 7). Retrieved September 20, 2021, from <https://broadbandnow.com/Wisconsin>.

Kashian, R. (2014, October). *Broadband and Vacation Properties in Wisconsin, An Economic Impact Study* . Lecture.

Kienbaum, K., Razafindrabe, N., Andrews, M., & Mitchell, C. (2020, May). *How Local Providers Built the Nation’s Best Internet Access in Rural North Dakota*. Institute for Local Self Reliance . <https://ilsr.org/wp-content/uploads/2020/05/2020-05-North-Dakota-Internet-Access-Case-Study.pdf>.

Morse, S. (2020, December). *Congressional action is needed FOR telehealth not to return to a Rural benefit, CMS ADMINISTRATOR Seema VERMA SAYS*. Healthcare Finance News. <https://www.healthcarefinancenews.com/news/congressional-action-needed-telehealth-not-return-rural-benefit-cms-administrator-seema-verma>.

National Archives and Records Administration. (2019, October 3). *Executive Order on Protecting and Improving Medicare for Our Nation’s Seniors*. National archives and Records Administration. <https://trumpwhitehouse.archives.gov/presidential-actions/executive-order-protecting-improving-medicare-nations-seniors/>.

Probst Ph.D., J., Laditka, Ph.D., S., Wang, Ph.D., J., & Johnson, MPH, A. (2006, May). *Mode of Travel and Actual Distance Traveled For Medical or Dental Care By Rural and Urban Residents*. South Carolina Rural Health Research Center. https://sc.edu/study/colleges_schools/public_health/research/research_centers/sc_rural_health_research_center/documents/61modeoftravelandactualdistancetraveled2006.pdf#page=20

Ratcliffe , M., Burd, C., Holder, K., & Fields, A. (2016, December). *Defining Rural at the U.S. Census Bureau*. U.S. Census Bureau . https://www2.census.gov/geo/pdfs/reference/ua/Defining_Rural.pdf.

Telecommunication Development Sector. (2012, April). *Impact of Broadband on the Economy*. International Telecommunication Union . https://www.itu.int/ITU-D/treg/broadband/ITU-BB-Reports_Impact-of-Broadband-on-the-Economy.pdf.

The Importance of Broadband in Rural Communities in 2019.” *InTouch Health*, 5 Sept. 2019, intouchhealth.com/how-broadband-will-help-telemedicine-reach-its-full-potential/

The United States Government. (2021, May 4). *FACT sheet: The American jobs plan*. The White House. <https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/31/fact-sheet-the-american-jobs-plan/>.

Treacy , A., & Coleman, B. (2017, November 1). *Broadband's impact in five communities*. Broadband Communities Magazine . <https://www.bbcmag.com/rural-broadband/broadbands-impact-in-five-communities>.

Types of Broadband Connections. Federal Communications Commission. (2014, June 24). <https://www.fcc.gov/general/types-broadband-connections>.

US Census Bureau. (2019). *Liberty Grove Town Profile* . Explore census data. <https://data.census.gov/cedsci/all?q=Liberty+Grove%2C+WI+>.

Vantage Point Solutions, Inc. . (2021, May). *Future Proof: Economics of Rural Broadband* .

Wisconsin Public Service Committee . (2021). *Broadband Grants*. PSC. <https://psc.wi.gov/Pages/Programs/BroadbandGrants.aspx>.

Yslas, E., & Stephens, B. (2021, August 5). Rural Healthcare . personal.

Appendix – ReConnect Program

Grants for Fiber internet

<https://www.rd.usda.gov/sites/default/files/08.11.2021reconnectnewsreleasechart.pdf>

ReConnect Program August 11, 2021



State	Sen.	Rep.	Recipient	Loans	Grants	Project Description
AK	Lisa Murkowski, Dan Sullivan	Don Young (At Large)	Nushagak Electric & Telephone Cooperative Inc.		\$16,783,726	This Rural Development investment will be used to deploy a fiber-to-the-premises network in rural Alaska. The funded service area includes 944 households, 2,604 people, nine educational facilities, eight essential community facilities, three health care facilities and 223 businesses spread over 49 square miles.
AZ	Kyrsten Sinema, Mark Kelly	Tom O'Halleran (01)	Gila Local Exchange & Carrier Inc.		\$14,888,466	This Rural Development investment will be used to deploy a fiber-to-the-premises network in rural Arizona. The funded service area includes 5,547 households, 22,645 people, an educational facility, nine essential community facilities, a health care facility, six farms and 142 businesses spread over 59 square miles.
CO	Michael Bennet, John Hickenlooper	Lauren Boebert (03)	Delta-Montrose Electric Association		\$10,595,446	This Rural Development investment will be used to deploy a fiber-to-the-premises network in rural Colorado. The funded service area includes 2,410 households, 6,877 people, three educational facilities, 89 businesses and 115 farms spread over 126 square miles.
GA	Jon Ossoff, Raphael Warnock	(10), Jody Hice Allen (12) Rick	Altamaha Electric Membership Corporation	\$10,592,082	\$10,592,082	This Rural Development investment will be used to deploy a fiber-to-the-premises network in rural Georgia. The funded service area includes 6,665 households, 18,789 people, 25 educational facilities, 17 essential community facilities, 10 health care facilities, 573 businesses and 207 farms spread over 246 square miles.
ND	Kevin Cramer, John Hoeven	Kelly Armstrong (At Large)	Halstad Telephone Company	\$2,380,882	\$2,380,882	This Rural Development investment will be used to deploy a fiber-to-the-premises network in rural North Dakota. The funded service area includes 458 households, 1,225 people, 19 businesses and 98 farms spread over 201 square miles.
ND	Kevin Cramer, John Hoeven	Kelly Armstrong (At Large)	Polar Communications Mutual Aid Corporation		\$3,944,111	This Rural Development investment will be used to deploy a fiber-to-the-premises network in rural North Dakota. The funded service area includes 209 households, 607 people, 14 businesses and seven farms spread over 11 square miles.
MO	Roy Blunt, Josh Hawley	Vicky Hartzler (04), Blaine Luetkemeyer (03)	Kingdom Telephone Company		\$4,222,260	This Rural Development investment will be used to deploy a fiber-to-the-premises network in rural Missouri. The funded service area includes 906 households, 2,369 people, an essential community facility, 39 businesses and 107 farms spread over 81 square miles.
MO	Roy Blunt, Josh Hawley	Vicky Hartzler (04)	Gascoage Electric Cooperative		\$701,985	This Rural Development investment will be used to deploy a fiber-to-the-premises network in rural Missouri. The funded service area includes 163 households, 416 people, and a farm spread over a square mile.
OK	James Inhofe, James Lankford	Tom Cole (04), Markwayne Mullin (02)	Texhoma Fiber LLC		\$2,648,931	This Rural Development investment will be used to deploy a fiber-to-the-premises network in rural Oklahoma. The funded service area includes 353 households, 890 people, three educational facilities,

						two essential community facilities, two health care facilities, 60 businesses and a farm spread over one square mile.
OK	James Inhofe, James Lankford	Tom Cole (04)	Southern Plains Cable LLC	\$2,228,689	\$2,228,689	This Rural Development investment will be used to deploy a fiber-to-the-premises and hybrid-fiber-coax network in rural Oklahoma. The funded service area includes 123 households, 293 people, an essential community facility, seven farms, and five businesses spread over five square miles.
OK	James Inhofe, James Lankford	Stephanie Bice (05), Tom Cole (04)	Terral Telephone Company		\$1,854,675	This Rural Development investment will be used to deploy a fiber-to-the-premises network in rural Oklahoma. The funded service area includes 105 households, 255 people, two educational facilities, three essential community facilities, a health care facility, 11 businesses and 74 farms spread over 132 square miles.
OK	James Inhofe, James Lankford	Markwayne Mullin (02)	Oklahoma Western Telephone Company		\$23,344,336	This Rural Development investment will be used to deploy a fiber-to-the-premises network in rural Oklahoma. The funded service area includes 947 households, 2,459 people, an educational facility, two essential community facilities, 17 businesses and 301 farms spread over 297 square miles.
SC	Lindsey Graham, Tim Scott	Ralph Norman (05), Joe Wilson (02)	TruVista Communications Inc.		\$3,254,703	This Rural Development investment will be used to deploy a fiber-to-the-premises and hybrid-fiber-coax network in rural South Carolina. The funded service area includes 755 households, 1,881 people, four businesses and 15 farms spread over 23 square miles.
SC	Lindsey Graham, Tim Scott	Tom Rice (07)	Horry Telephone Cooperative Inc.		\$9,833,035	This Rural Development investment will be used to deploy a fiber-to-the-premises network in rural South Carolina. The funded service area includes 2,889 households, 7,636 people, 11 educational facilities, three essential community facilities, 41 farms and 80 businesses spread over 184 square miles.
TN	Marsha Blackburn, Bill Hagerty	Scott Desjarlais (04), Mark Green (07)	United Communications Inc.		\$1,768,646	This Rural Development investment will be used to deploy a fiber-to-the-premises network in rural Tennessee. The funded service area includes 711 households, 1,890 people, 10 farms and four businesses spread over four square miles.
TX, OK	John Cornyn, Ted Cruz (TX), James Inhofe, James Lankford (OK)	Louie Gohmert (TX 01), Tom Cole (OK 04)	Tatum Telephone Company		\$4,488,894	This Rural Development investment will be used to deploy a fiber-to-the-premises network in rural Texas. The funded service area includes 986 households, 2,657 people, three educational facilities, two essential community facilities, a health care facility, 67 businesses and 60 farms spread over 41 square miles.
UT	Mike Lee, Mitt Romney	John Curtis (03), Blake Moore (01)	UBTA-UBET Communications Inc.		\$24,563,757	This Rural Development investment will be used to deploy a fiber-to-the-premises network in rural Utah. The funded service area includes 3,472 households, 10,501 people, 32 businesses and 39 farms spread over 119 square miles.
VA	Tim Kaine, Mark Warner	Bob Good (05), Abigail Spanberger (07)	Central Virginia Services Inc.		\$14,123,917	This Rural Development investment will be used to deploy a fiber-to-the-premises network in rural Virginia. The funded service area includes 37 educational facilities, three health care facilities, 14 essential community facilities, 4,139 households, 13,886 people, 193 businesses and 65 farms spread over 65 square miles.
			TOTAL	\$15,201,653	\$152,218,541	