



North Dakota Broadband Plan

Empower People, Improve Lives, Inspire Success

2019 (last updated May 15, 2019)

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Introduction

North Dakota is the 19th largest state in terms of land area with more than 70,000 square miles yet is the 3th smallest in terms of population with fewer than 800,000 residents. As a state with a larger footprint, one could assume a challenging environment as it relates to broadband capabilities. Despite these challenges, North Dakota is ranked #2 for internet access by US News and World Report (<https://www.usnews.com/news/best-states/north-dakota>) where it also receives a #2 ranking for overall infrastructure and leads the nation for quality of life. North Dakota is also highly ranked among regional peers (see appendix Northern Region States). The journey to achieve this nationwide status includes a robust, innovative, and determined provider community; a long standing understanding on the value of broadband that is embedded in a number of smart policies and strategies employed by government and business leaders throughout the state; and a relentless spirit that is the culture of those citizens who call North Dakota home.

Although there is a great deal of gratitude and appreciation for the abundant broadband resources that exist within the state, there is much more work that needs to be done in order for the state to continue to grow and prosper and to ensure the broadband infrastructure is available to support the state's efforts to Empower People, Improve Lives, and Inspire Success. As a leader in many business sectors, including agriculture and energy, a robust broadband infrastructure is necessary to maintain and grow these leadership positions. As we look to every industry that exists across the state, each has a strong dependency on broadband, which will increase as technology continues to permeate every industry and every aspect of our citizens' lives and our economy. As such, a thoughtful and strategic broadband plan is necessary.

Why broadband?

Broadband in the 21st century is akin to electricity in the 20th century. Whether meeting consumer or business needs, it is imperative to successfully navigate today's increasingly digital world.

- Consumers rely on broadband for communications and entertainment. Maintaining relationships with family and friends becomes exponentially more possible with broadband. Increasingly, Internet of Things (IoT) devices are expanding into more homes and communities for safety and convenience. Streaming audio and video services, along with social media engagement, is dependent on high-speed broadband services. Current weather, road conditions and construction efforts in a four-season state like North Dakota can be critical for survival.

- An informed citizen is a greater contributor to our society, and the ability to consume content from any global news source is a tangible broadband benefit.
- Our education system is relying more and more on broadband to educate our students across the state. Content and curriculum are being delivered via online resources. The technologies that we use to maintain student information such as student grades, attendance, and communications between students, parents, and teachers is done online. The information we publish through ND Insights to hold our education systems accountable is online and our students require online access to do research and complete homework assignments.
- Businesses rely on broadband in multiple manners. Online store fronts, brick and mortar transactions, tracking inventory, marketing, information technology support and “free wireless” services are just a few businesses uses.
- Collaboration and effective communication tools are critical to a successful telecommuter. Employment opportunities as a remote worker are wholly based on the opportunity to consume high-speed, reliable bandwidth for the home.
- Telehealth services do not exist without high speed broadband. Virtual office visits, immediate transfer of test results, education and remote patient monitoring drastically improve in quality with high speed broadband services.
- First responder’s provide protection and life-sustaining services via broadband. The FirstNet national network and Next Generation 911 services are based on ubiquitous high-speed data services.
- Agriculture continues to be a significant factor on the overall economy and culture of the state and North Dakota is a national leader in several agricultural commodities. Our farmers and ranchers are also leading the country in the adoption of new technologies and innovations that will shape the future of precision agriculture and autonomous farming that is all dependent on a robust broadband infrastructure.

Goals

1. More work remains to increase the availability and affordability of high-speed broadband for the constituents, businesses, and public entities of the State. The Federal Communications Commission (FCC) standard for availability is defined as 25 Mbps download and 3 Mbps upload (25/3). For constituents, businesses, and public entities that currently do not have access to broadband, achieving this standard is a priority. Unfortunately, the current standard falls short of meeting the real needs for many of

these stakeholders. Today, over 75% of North Dakota citizens already have access to Gigabit broadband delivered in more than 325 communities (TechND.org – state of technology 2019). As we look to close the gap for the unserved and underserved throughout the state, our objective is Gigabit connectivity versus the national standards established by the FCC. We will strive to influence this higher goal for every resident.

2. In order to achieve our primary objective of having available broadband, North Dakota must provide a business-friendly environment that allows industry to thrive. North Dakota is already recognized as the best state to start a business which provides tremendous opportunity.
[\(https://www.commerce.nd.gov/news/NorthDakotaRanked1asBestStatetoStartaBusiness/\)](https://www.commerce.nd.gov/news/NorthDakotaRanked1asBestStatetoStartaBusiness/)
3. Continue to promote an anchor tenant model leveraging public resources to help drive innovation and growth throughout the state. North Dakota has leveraged this model for well over 20 years which has been instrumental in broadband growth throughout the State. This past year, [North Dakota announced the 100 Gigabit upgrade](#) to support all public entities throughout that state. This announcement included providing every K-12 district in the state with a minimum of 1 Gigabit of connectivity making North Dakota the first state to achieve this milestone.
4. Continue to provide support for programs that accelerates infrastructure investment in throughout North Dakota. North Dakota has supported a variety of programs over the years that promote infrastructure investment. One example is HB 2040 of the 61st legislative assembly that provided for a sales and use tax exemption for investments in telecommunications infrastructure. There are also a variety of federal programs administered by the FCC, USAC, and USDA to name a few that support rural broadband deployment. North Dakota broadband providers have taken advantage of these programs with more than \$330 million invested since 2009 through the USDA alone. While these programs are extremely beneficial, the number of programs and the differing requirements and criteria create a challenging environment for potential providers to fully leverage.
5. Although all citizens can benefit greatly from a robust broadband ecosystem, supporting the needs of the public safety community is a high priority for North Dakota. The public safety community provides all citizens, businesses and public entities with critical response capabilities in rural and urban locations. Ensuring they have the broadband connectivity that will that will enable them to perform their duties at the highest level is paramount.

Opportunities

As we seek to achieve our objectives, we must understand our environment and what opportunities are before us. By capitalizing on our strengths and leveraging opportunities we can build upon the strong foundation that exists to help fulfill our goals.

Business / Broadband Friendly State

North Dakota is ranked number one as the best state to start a business:

<https://www.commerce.nd.gov/news/NorthDakotaRanked1asBestStatetoStartaBusiness/>

North Dakota does not set any limitations on who can deploy broadband services. The vast majority of broadband services are offered by the traditional telecommunications and content provider organizations; however, anyone including utility companies have the opportunity to offer services if they choose to do so.

North Dakota has a long history of implementing policies that support broadband deployment. The state recognizes the important work done by regulatory entities while supporting policies that can expedite the process including right of way and environmental reviews. The following is a sampling of such policies:

- 1999: SB 2043 - Bill establishing the creation of the North Dakota Information Technology Department which included statutory language codifying an existing practice for required use of the state network for all public entities. This effort formally established in state law an anchor tenant model of providing broadband capabilities to virtually every community throughout the state.
<https://www.legis.nd.gov/assembly/56-1999/session-laws/documents/SL9STATG.pdf#CHAPTER483>
- 2009: SB 2040 providing for a sales and use tax exemption to deploy telecommunications services.
<https://www.legis.nd.gov/assembly/61-2009/session-laws/documents/TAXES.pdf#CHAPTER558>
- 2017: SB 2012 – Provided for a study to determine the benefits of allowing wireless telecommunications infrastructure within the state highway right of ways and what, if any, requirements of allowing the installation may be in the public interest.
<https://www.legis.nd.gov/assembly/65-2017/session-laws/documents/APPRO.pdf#CHAPTER37>

- 2019: HB 1362 – Legislation passed relating to the right of utilities to cross over and under a railroad right of way.
<https://www.legis.nd.gov/assembly/66-2019/documents/19-0623-05000.pdf>

High quality infrastructure

- North Dakota is ranked #2 by US News and World Reports overall for infrastructure which includes a number 2 ranking for internet access.
<https://www.usnews.com/news/best-states/north-dakota>
- North Dakota is a leader in fiber infrastructure throughout the state. Today every K-12 school district, county courthouse, higher education campus, and state government building receives internet access via fiber. According to broadbandnow.com, North Dakota is the sixth best state in terms of fiber penetration in the state.
<https://broadbandnow.com/report/fiber-optic-availability-map/>

Strong Unmanned Aircraft Systems Community

The exciting and innovative advancements in this industry requires a strong and robust broadband environment and as this industry advances will serve as a motivation for more investment in broadband infrastructure.

North Dakota is a proven leader in Unmanned Aircraft Systems (UAS) with the experience, resources and leadership to help drive the industry's growth. The state is one of seven Federal Aviation Administration (FAA) UAS test sites conducting research to determine how to best integrate UAS into the national airspace.

North Dakota, along with its stakeholders and partners, is committed to creating an environment where private enterprise, public and private research organizations, and educational institutions may pursue new and exciting opportunities in the UAS industry.

The state's continued financial investment also demonstrates statewide commitment to advancing this industry, including a recently approved \$28 million investment in a statewide UAS network.

The statewide UAS network will support drone flights beyond visual line of sight, helping to safely integrate unmanned aircraft into the National Airspace System. Gov. Burgum proposed funding the network in his executive budget recommendation in December, and the Legislature

approved it last month. Lawmakers also appropriated \$2 million to the Northern Plains UAS Test Site and \$3 million to upgrade infrastructure at the Grand Sky UAS flight center.

The \$33 million commitment brings North Dakota's total investment to approximately \$77 million to advance UAS research and development in the state.

North Dakota, through the Department of Transportation, was also selected as one of 10 participants in the Unmanned Aircraft Systems (UAS) Integration Pilot Program (IPP), an initiative aimed at shaping the future of drones in America. The program is an opportunity for state, local, and tribal governments to partner with private sector entities, such as UAS operators or manufacturers, to accelerate safe UAS integration.

Wireless/Mobile Potential

With so much focus on fixed broadband, the conversation and significance of mobile broadband does not seem to garner the attention it deserves. North Dakota is again fortunate with both the quality and quantity of mobile broadband capabilities throughout the state. In fact, according to broadbandnow.com, North Dakota has mobile broadband capabilities providing 100% of our citizens with access and 47.7% with the ability to procure fixed wireless solutions. As citizens, we deeply appreciate the breadth of service offering but also know this information is overstated in how we consume these service in our everyday lives (see Accurate and Quality Broadband Data section).

As we address the mobile needs of the state, we see opportunities on the horizon. The FCC is working on establishing and launching a \$4.53B Mobility Fund Phase II reverse auction to expand 4G LTE wireless coverage in rural America. North Dakota is monitoring this program as it evolves for potential opportunities within the state and will support providers as necessary to ensure our citizens and businesses receive the maximum possible benefit from this program.

Another area of opportunity is TV White Space technology (TVWS) which has the potential to deliver broadband service to rural areas at lower costs than traditional wired infrastructure. The FCC has not taken final action since communicating a tentative decision to reserve a third "vacant" channel for TVWS and other unlicensed uses in FCC 15-68, a 2015 notice of proposed rulemaking. We appreciate the efforts by local providers in testing of this new technology and continue to seek out opportunities to support their efforts.

FirstNet is also an area for opportunity as it relates to mobile broadband deployment. In 2018, North Dakota chose to "opt-in" to the proposed plan presented by FirstNet. The primary objective of the nationwide public safety mobile broadband network is to meet the demands of the public safety community and provide them with public safety grade services. One key attribute of meeting the needs of these stakeholders is to provide a solution that meets their

coverage needs. Traditionally mobile broadband networks have been deployed in areas where sufficient demand exists to support the network. If FirstNet is successful in meeting the needs of the public safety community, coverage will be expanded and augmented in areas that traditionally would not meet that model. As FirstNet continues to build their network to meet these needs, we are optimistic that the coverage will be expanded in the more rural and remote areas of the state to also serve those stakeholders that live and do business in these remote areas.

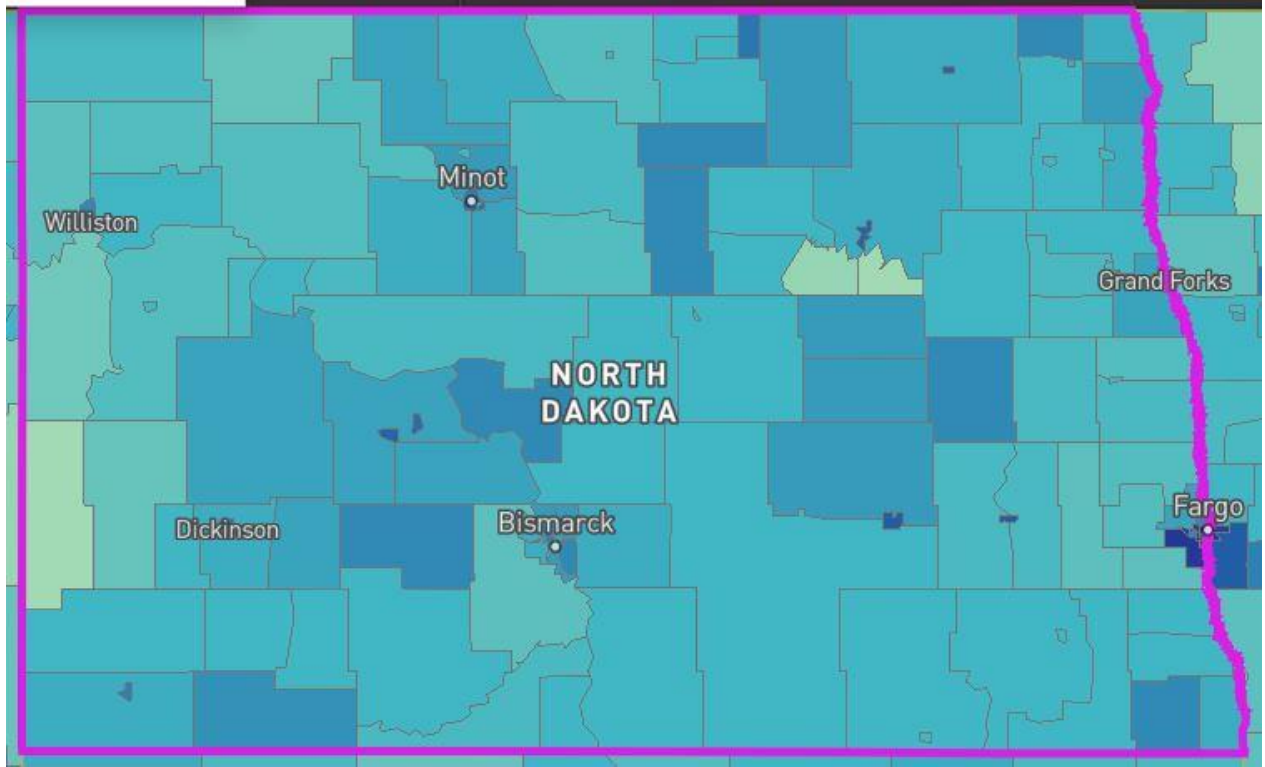
Challenges

As we look at achieving the broadband goals of the state, we must understand the challenges that exist and develop strategies that will mitigate and overcome those hurdles.

Accurate and Quality Broadband Data

In order to support smart strategies and smart policies that will enable a robust broadband environment, we must have quality data. The primary data source supporting the variety of federal programs is predicated on the data gathered by the FCC's Form 477. The data is self-reported by the provider community, using census blocks as the reporting metric, and is based on the maximum advertised speeds. The reliance on census block data provides opportunities for significant inaccuracies in rural areas where census blocks are particularly large whereby a single resident in the census block is served, leaving other residents unserved or underserved. The reporting of maximum advertised speeds provides a situation that does not accurately portray reality with many broadband consumers choosing to procure a solution less than the maximum advertised offering.

The following map would lead you to believe that all consumers in North Dakota has access to at least one provider offering 25/3 broadband services while at the same time we know that is simply not true.



North Dakota



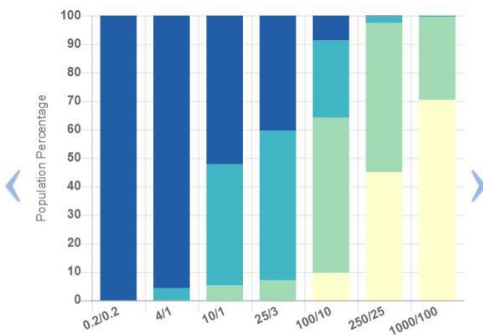
Number of Fixed Residential Broadband Providers



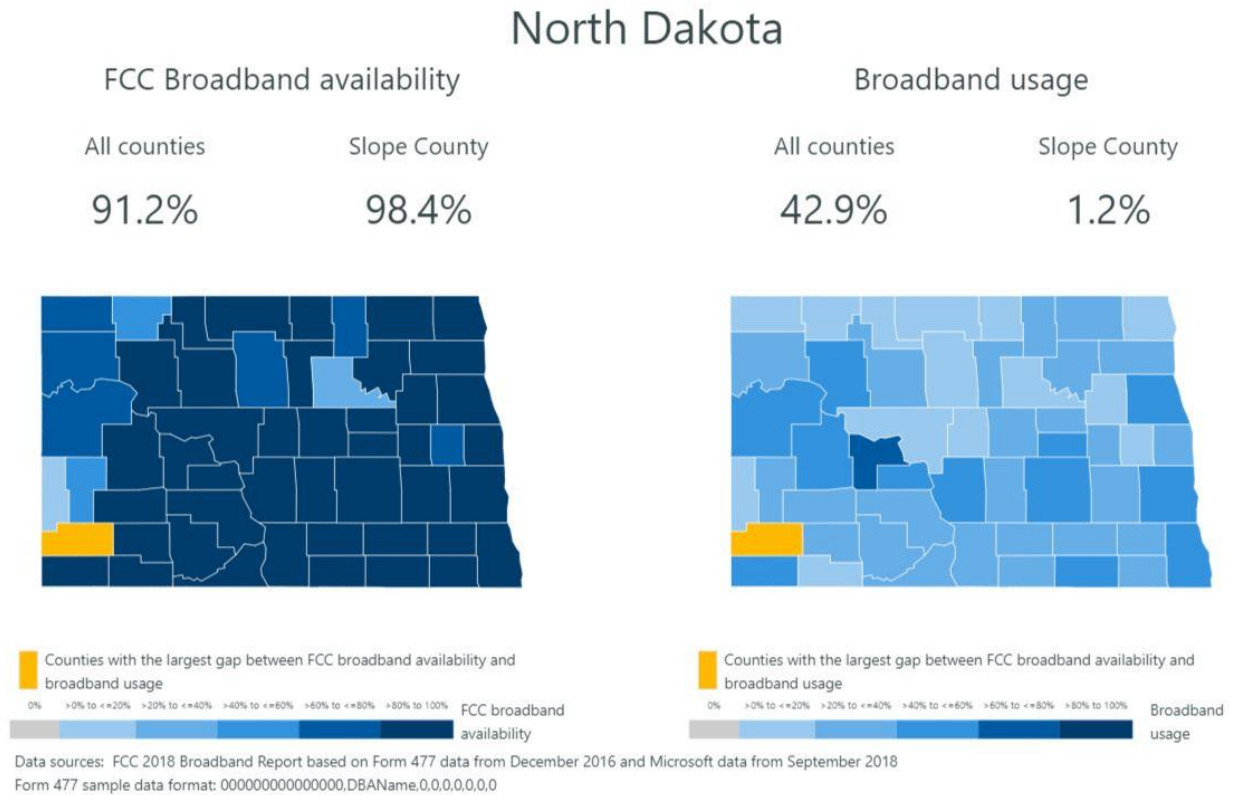
Broadband



Technology ADSL, Cable, Fiber, Fixed Wireless, Satellite, Other
Speed ≥ 25/3 Mbps
Date Dec. 2017 (latest public release)



Another perspective to understand is broadband usage or adoption versus what is reported as being available. The following map portrays an example and one source of information regarding what is *believed* to be available vs. what is being consumed in N.D.



As we look to overcome the broadband challenges for the unserved and underserved of the state, we must strive to obtain quality data and information to support forward-looking policies and strategies. We must also understand there is a vast difference between what is currently available and what is currently being utilized by consumers. This clear delineation will support programs and policies that will improve broadband availability as well as broadband adoption. Being clear about the differences between availability versus adoption will have significant impacts on how we proceed.

Mobile broadband is another area where data is abundant, but the quality and accuracy of that data is often viewed as questionable. According to broadbandnow.com, 100 percent of North Dakota residents have access to mobile broadband services with 47.7% of residents having access to fixed mobile broadband options. As citizens and business consumers in the state we are exceedingly grateful for the abundant mobile broadband that exists however we also know those statistics are overstated as we have areas where our residents continue to be unserved or underserved.

Nationwide LTE Coverage - YE 2017



Geographic and Demographic Inequities

Although the data that currently exists is less than ideal, it does present some clear and obvious challenges that exist throughout the state that require direct and focused strategies to overcome. North Dakota is a very rural state whose economy is highly dependent on the agricultural and energy industries. In many cases, these industries require broadband capabilities in some of the most rural areas of the state. For obvious reasons the rural areas of the state typically have fewer choices. This presents challenges for our leading industries that must be overcome.

North Dakota



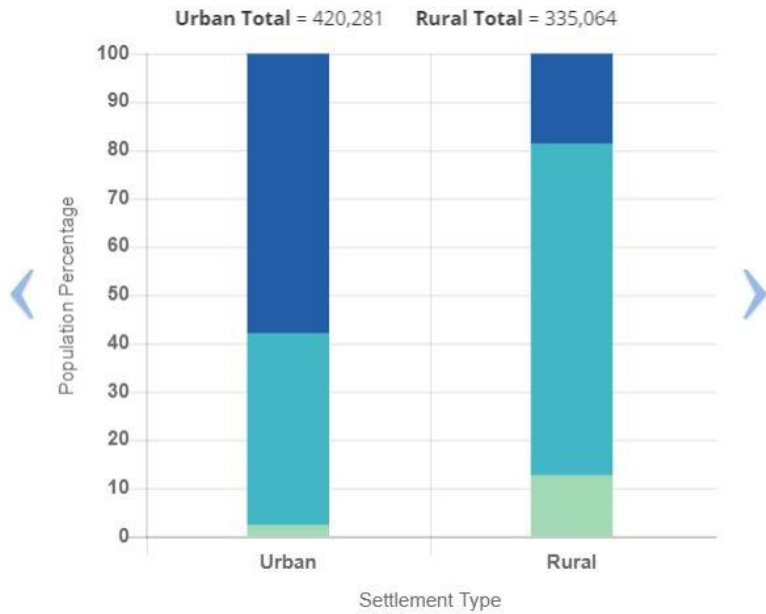
Number of Fixed Residential Broadband Providers



Broadband



Technology ADSL, Cable, Fiber, Fixed Wireless, Satellite, Other
Speed ≥ 25/3 Mbps
Date Dec. 2017 (latest public release)

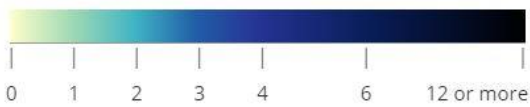


Another significant community that is lagging in broadband availability is the state's tribal communities. Tribal communities have the same issues as any other area; however, they also have some unique challenges that include archaeological and cultural site preservations. Nationwide the FCC estimates that at least 35 percent of tribal residents' lack access to fixed broadband and a recent Government Accountability Office report argues that figure is much higher. Based on the FCC data below, tribal communities in North Dakota fair significantly better than the national average; however, the number of choices they have demonstrate clear disparities compared to other areas of the state providing clear opportunities for improvement.

North Dakota



Number of Fixed Residential Broadband Providers



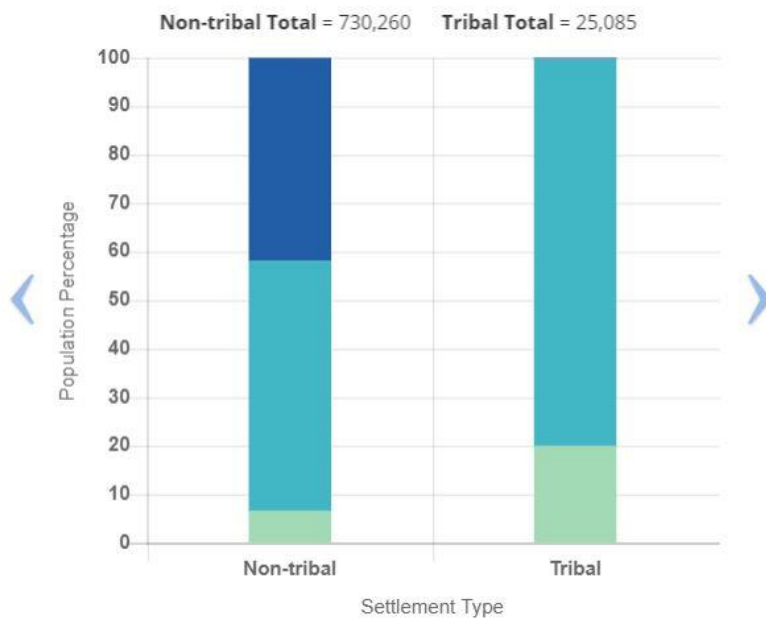
Broadband



Technology ADSL, Cable, Fiber, Fixed Wireless, Satellite, Other

Speed ≥ 25/3 Mbps

Date Dec. 2017 (*latest public release*)



The need for mobile

North Dakota is making considerable progress towards the goal of ensuring every citizen, business and public entity has high speed, quality broadband. Until that goal is fully realized, we must not lose focus. However, as we near that objective, we must begin to refocus our energies on ensuring the broadband capabilities that exist in the future will support citizens and industries as they embrace and incorporate smart technologies and sensors within everything they do. Gov. Burgum and Chief Information Officer Shawn Riley have stated a goal of having over one billion sensors in the state. North Dakota has numerous examples of sensors that do everything from track wildlife movement for habitat preservation to monitor environmental

quality, so while that may initially seem like a lofty goal, even a high-level understanding of the internet of things (IoT) and how it is already impacting our lives, may mean it is understated.

As citizens we are embracing and consuming new technologies at unprecedented levels. Today, many of us carry a smart phone that has significant computing capabilities and is changing how we interact with one another with social media, how we get information from online news sources, and how we are entertained with online media. It is also the device that we use to interact with our smart homes as we begin to utilize smart appliances, lights, and virtual assistants.

We also see sensors and IoT devices becoming more pervasive across industries. In the agricultural industry we see autonomous vehicles, sensors that monitor moisture and nutrition. In the energy industry, sensors monitor production, performance and safety of many operations. In virtually every small business, we see technologies enabling virtually all aspects of operations, sales and marketing. There is literally no industry that exists in the state – or nation – that is not already and will not continue to benefit from high quality broadband and multitude of intelligent machines and sensors that will augment the quality of a service or product for that business.

With this significant change happening with how technology is embedded throughout our lives both personally and throughout our economy, it is paramount that mobile broadband capabilities exist to support these efforts.

Appendix:

Federal Funding Opportunities

In order to support a robust broadband environment, particularly in a state with vast areas of rural and remote areas, funding is a critical component. For many of these areas of the state North Dakota has relied on federal funding to augment the ability to meet the needs of these areas.

In June 2017, BroadbandUSA published a guide to federal funding of broadband projects. They identified seven different agencies that, in one way or another, financially support the deployment, adoption, and use of broadband.

These agencies are:

- Federal Communications Commission (FCC)
- US Department of Agriculture, Rural Utilities Services (USDA, RUS)
- US Department of Commerce, Economic Development Administration
- US Department of Housing and Urban Development
- US Department of Labor, Employment and Training Administration
- Institute of Museum and Library Services, Office of Library Services
- Appalachian Regional Commission

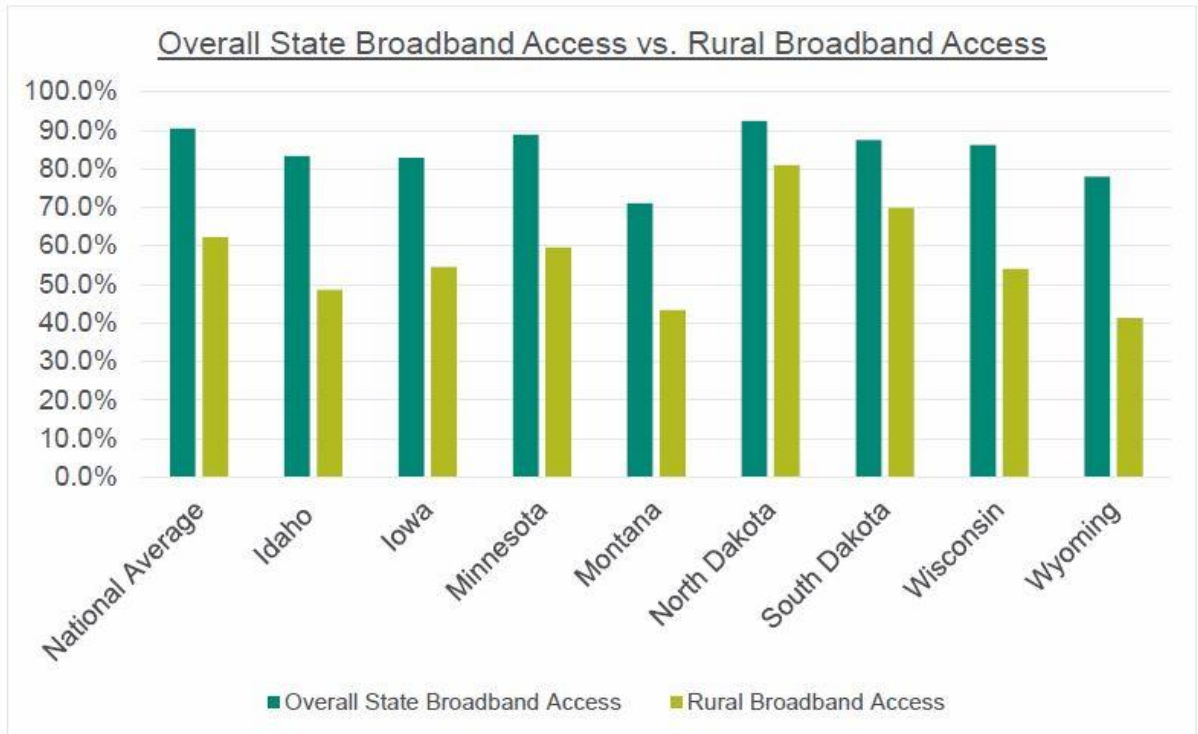
Full report is available at https://broadbandusa.ntia.doc.gov/sites/default/files/resource-files/ntia_guidetofedfunding_062317.pdf

Minimum Broadband Requirements

| Activity | Minimum Download Speed (Mbps) |
|--|--------------------------------------|
| General Usage | |
| General Browsing and Email | 1 |
| Streaming Online Radio | Less than 0.5 |
| VoIP Calls | Less than 0.5 |
| Student | 5 - 25 |
| Telecommuting | 5 - 25 |
| File Downloading | 10 |
| Social Media | 1 |
| Watching Video | |
| Streaming Standard Definition Video | 3 - 4 |
| Streaming High Definition (HD) Video | 5 - 8 |
| Streaming Ultra HD 4K Video | 25 |
| Video Conferencing | |
| Standard Personal Video Call (e.g., Skype) | 1 |
| HD Personal Video Call (e.g., Skype) | 1.5 |
| HD Video Teleconferencing | 6 |
| Gaming | |
| Game Console Connecting to the Internet | 3 |
| Online Multiplayer | 4 |

<https://www.fcc.gov/reports-research/guides/broadband-speed-guide>

Broadband Access in Northern Region States



Percentage of the overall state population vs. the rural population with fixed access to the Internet at speeds of 25 megabits per second (Mbps) download and 3 Mbps upload or higher. (Data Source: FCC data, 2017)