SDTA
South Dakota Telecommunications Association

SDTA's membership is comprised of South Dakota's cooperative, small commercial, municipal, and tribal telecommunications companies. In an industry where technology and service demands constantly change, the South Dakota Telecommunications Association is an essential resource for its members in regulatory and legislative advocacy.

South Dakota Telecommunications Association
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CONNECTING
SOUTH DAKOTA'S FUTURE

A Report on the Deployment & Impact of Rural Broadband

Compiled by the South Dakota Dashboard for the
South Dakota Telecommunications Association
and SDN Communications

2018 REPORT

South Dakota has a rich history of leading the way

with visionary thinking.

PREFACE

Rich Coit
Executive Director
South Dakota
Telecommunications Association

From the Executive Director

Connecting Communities to Create Opportunity

For nearly 120 years, rural South Dakotans have been working together to meet the communications needs of their communities, from the first telephones installed in the city of Armour in 1899 to the high-speed fiber optic networks of the 21st century.[1] Throughout the years, communications have played a vital role in promoting community and prosperity.

The 18 companies that belong to the South Dakota Telecommunications Association (SDTA), many of whom are also investor/owners of SDN Communications, believe that broadband infrastructure and services are revolutionizing life in small cities and rural communities throughout the state. Working together with our customers and partners, we are making that revolution possible.

At SDTA, we support the development and adoption of public policies that allow our member companies to deploy and use the newest and best technologies and to provide South Dakotans affordable access to state-of-the-art communications services, including high-quality and high-speed broadband.

Since good public policy depends on solid facts, we engaged a team of economic and data analysts from the South Dakota Dashboard to help us learn more about the economic and social impact of broadband communications in non-metropolitan areas in South Dakota. The report that follows summarizes their findings.

"The internet is the platform for learning, engaging, and creating in the digital world. The more robust and secure our networks are the more prosperous our country will be."

Senator John Thune
State of the Net internet policy conference,
January 23, 2017

Introduction

LIVING IN A HIGH-SPEED, DIGITAL WORLD

More than ever before, information and ideas power our economy. The internet is the central marketplace for the exchange of goods and services. It is also the space in which we socialize and the resource we turn to for entertainment. Increasingly, it is and will be ubiquitous in the internet of things (IoT), driving the performance of tractors in the field, heating systems in our homes, and monitors in our clinics.

Americans generally agree that having access to broadband internet at home is either essential or important in society today. In a recent Pew Research national survey, 49 percent said it was essential, and an additional 41 percent agreed it was important.

For a variety of reasons, however, many people in South Dakota and across the United States do not have access to or cannot afford broadband. Social and economic conditions play a part in this disparity. The Pew Research study, for example, found that among households with at least one member who has a college degree, 91 percent have home broadband, compared to only 34 percent of those who do not have a high school diploma.[2]

In this connected world, rural broadband telecommunications companies seek to help people—no matter how physically isolated or economically challenged—to engage in commerce and society online.

This report seeks to measure the extent and the impact of non-metropolitan wireline broadband in South Dakota and to identify key sectors in which broadband is expanding the horizon of opportunities for everyone in the state.[3]

The State of the State

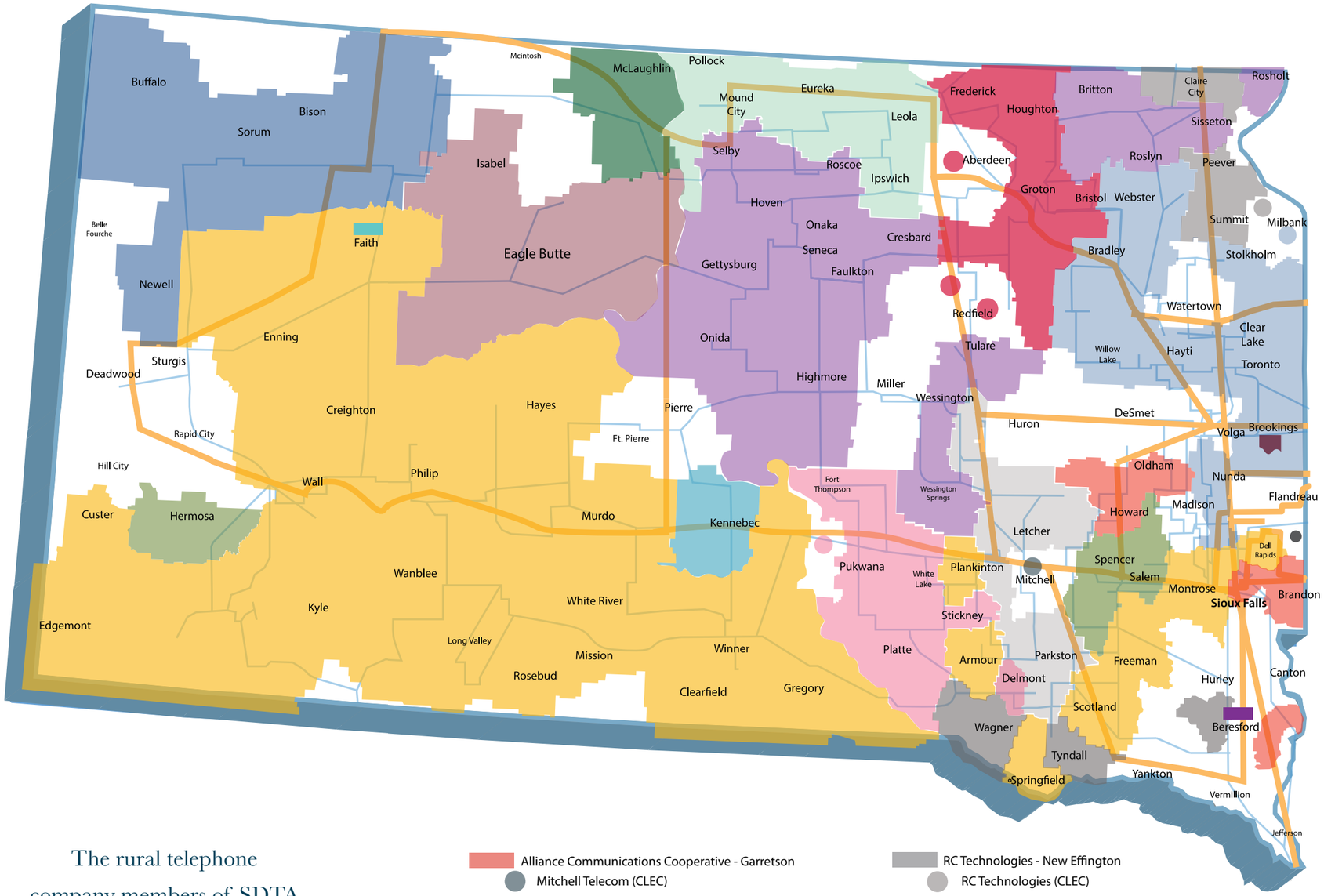
MEETING THE NEEDS OF RURAL SOUTH DAKOTA

In the 21st century, most South Dakotans are able to select a broadband provider that meets their needs. In 2017, there were nearly 40 companies that provided facilities-based wireline telecommunications services to both residential and business customers in South Dakota.[4] In urban South Dakota, these companies included large regional or national carriers and cable companies such as Midco, VAST, and CenturyLink as well as smaller, competitive local exchange companies. In rural parts of the state, residents relied primarily on the 18 members of the South Dakota Telecommunications Association (SDTA), which included municipal, cooperative, tribal, and family-owned companies.

At the end of 2016, according to data filed with the South Dakota Public Utilities Commission, incumbent local exchange carriers (ILECs) provided 169,578 wired lines to customers in South Dakota.[5] Competitive local exchange carriers (CLECs) maintained another 119,742 lines.[6]

Rural telephone companies, including SDTA's members, covered more than 76 percent of the geography of the state.[7] At the end of 2017, these companies provided more than 108,804 wired lines.[8] More than three-quarters of the customers subscribing to these lines had access to broadband at 25 MB download/3 MB upload speeds or higher.[9]

In addition, SDTA members and SDN Communications have deployed extensive fiber optic facilities throughout the state to connect many K-12 schools, libraries, county government locations, and public safety facilities. SDTA members and SDN have also created the Research, Education and Economic Development (REED) fiber optic network, which connects the state's public universities, the EROS Data Center, the Sanford Lab at Homestake, and state government facilities to advanced communications services.[10] Fiber transport facilities provided by SDTA members and SDN Communications also play a key role in supporting wireless service, which depends on fiber optic lines to carry calls and data from cell towers through the switched network to their ultimate destination. SDN and the SDTA member companies serve 580 cell tower locations for the state's three major wireless carriers (Verizon, AT&T, and T-Mobile), as well as 290 locations operated by the state's Bureau of Information and Telecommunications.[11]



The rural telephone company members of SDTA

cover more than 76%

of the geography of the state.

- Alliance Communications Cooperative - Garretson
- Mitchell Telecom (CLEC)
- Beresford Municipal Telephone Company - Beresford
- Cheyenne River Sioux Tribe Telephone Authority - Eagle Butte
- Faith Municipal Telephone Company - Faith
- Fort Randall Telephone Company - Wagner
- Golden West Telecommunications - Wall
- Interstate Telecommunications Cooperative - Clear Lake
- ITC (CLEC)
- James Valley Telecommunications - Groton
- Northern Valley Communications (CLEC)
- Kennebec Telephone Company - Kennebec
- Midstate Communications - Kimball
- Midstate Communications (CLEC)
- RC Technologies - New Effington
- RC Technologies (CLEC)
- Santel Communications Cooperative - Woonsocket
- Swiftel Communications - Brookings
- TrioTel Communications - Salem
- Mitchell Telecom (CLEC)
- Valley Telecommunications Cooperative - Herreid
- Venture Communications Cooperative - Highmore
- Mitchell Telecom (CLEC)
- West River Cooperative Telephone Company - Bison
- West River Telecommunications Cooperative - Hazen, ND

An Overview of Non-Metropolitan South Dakota

MAKING IT WORK IN SMALL CITIES, TOWNS, AND THE COUNTRYSIDE

Just over half of all South Dakotans live in non-metropolitan areas, including small towns and cities with fewer than 50,000 people.[12] In 2018, these communities face significant challenges and opportunities driven by ongoing changes in demographics and the economy. While the state's metropolitan population has grown by nearly 21 percent over the past decade, many rural communities have lost residents.[13] Today, nearly one in five people in rural South Dakota are over the age of 65.[14] Rural South Dakotans, including nearly 70,000 residents of the state's nine American Indian reservations, are almost twice as likely to have incomes below the federal poverty level compared to their urban counterparts, and their economic insecurity is often aggravated by booms and busts in agricultural commodity prices.[15]

Despite these challenges, rural communities play a major role in the state's economy. In 2016, the non-metropolitan areas of South Dakota had a gross domestic product (GDP) of approximately $22.9 billion, which accounted for 47.6 percent of the state's total GDP.[16] Non-metropolitan areas also provided 196,826 nonfarm payroll jobs—46.8 percent of the state's nonfarm payroll employment.[17]

Investments by telecommunications companies for infrastructure and operations create good jobs in many rural communities in South Dakota. Between 2013 and 2017, SDTA member companies' capital expenditures for fiber optic lines, switches, equipment, buildings, and other long-term assets were almost $392 million.[18] The total economic impact of this spending was nearly $480 million.[19]

$391,681,670[20]

Total capital investment by SDTA members 2013-2017

All of this investment in infrastructure and service gives rural consumers and businesses the ability to move information, products, and ideas from even the most remote corners of the state to the far reaches of the globe. **This investment in the information super highway is transforming lives and creating new opportunities in an increasingly connected world.**

Highmore, SD

Building a Broadband Network

INCREASING SPEEDS TO MEET TODAY'S NEEDS

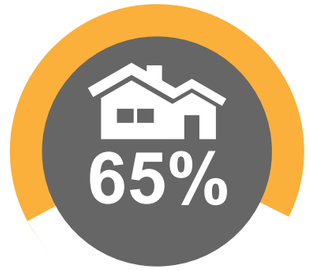
In a world where speed is increasingly important to many uses of the internet, access to high-speed broadband is critical. In the 1990s, when many people first began going online, dial-up connections over the existing copper network were sufficient for email and other basic services. But as more people began using the internet for video and images, much higher speeds and fiber optic networks became necessary. In 2011, the FCC said that 4 megabits per second (MB) download and 1 MB upload qualified as "high-speed" broadband. In 2017, the FCC updated that definition to 25 MB download and 3 MB upload. Some providers are moving to download speeds that exceed 1 gigabit per second (GB) in order to meet the needs of particular customers.[21]

Across the country, rural areas are far less likely to have access to broadband speeds of 25 MB or more. While only 4 percent of urban areas are not covered by 25 MB download/3 MB upload service, 39 percent of rural areas do not have access to this level of service. For Americans who live in tribal lands, this figure rises to 68 percent.[22]

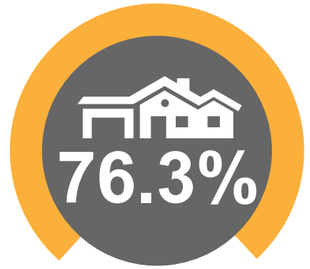
According to a recent study, South Dakota ranked 35th in the nation for average or mean download speeds at 17.38 MB, compared to number one Rhode Island with an average speed of 36.69 MB and Maine in 50th place with an average of 11.73 MB. In practical terms, this means that it takes roughly twice as long (59 minutes) to download a large, high-definition movie (7.5 GB) in South Dakota than Rhode Island.[23]

Increasingly, customers are getting broadband delivered at the speed of light over fiber optic lines with electronic and softswitch technologies. Fiber optic lines as thin as a human hair offer the potential to deliver virtually unlimited bandwidth. Rural telecom customers in the United States are often the greatest beneficiaries of fiber deployment, despite the high costs of constructing broadband infrastructure in sparsely populated communities.[24] Two recent surveys suggest that as of 2016, more than 40 percent of customers served by rural telecommunications companies throughout the United States were being served by fiber-to-the-premises connections.[25]

In South Dakota, rural telecommunications companies are on a faster track to build out fiber-to-the-premises networks. Across the state, almost two-thirds of all SDTA customers had access to fiber-to-the-premises at the end of 2017.[26] As rural telecommunications invest in fiber optic lines and enhanced switching to expand the capacity of their networks, history shows that customer demand will rise as well.[27] In this digital age, almost everyone wants a faster, clearer signal.



SDTA customers served by fiber-to-the-premises[28]



Percent of SDTA customers with speeds of 25/3[29]

The Cost of Serving Rural Communities

SPARSITY AND DISTANCE: THE CHALLENGES WE FACE

South Dakota is a big, geographically diverse state. In some areas, especially western South Dakota, companies have to traverse great distances with wirelines and signals to ensure that all citizens are served. Because the costs to serve rural customers are higher and the benefits of a telecommunications network that is able to reach everyone accrue to all customers, the federal government collects fees from telecommunications companies and customers throughout the country to assist with network investments and provide affordable "universal service."

This Universal Service Fund (USF) provides resources to help telecommunications companies deliver services to locations in high cost areas, reduce the cost of telecommunications services for low-income households, increase access to telemedicine and rural health programs, and connect schools and libraries to the internet.[30] Because non-metropolitan telecommunications providers serve a smaller and relatively more dispersed customer base, they also incur higher costs per line.

Resources provided by USF help play a critical role in keeping telecommunications affordable in rural communities. Across the country, total expenditures for the four USF programs totaled $8.75 billion in 2016.[31] Of this total, telecommunications companies in South Dakota received nearly $100 million.[32]

Rural communities in South Dakota also receive support from the US Department of Agriculture's Rural Utilities Service (RUS), which provides loans, loan guarantees, and grants to help build telecommunications infrastructure. Between 2010 and 2017, broadband infrastructure investments in service areas of SDTA member companies financed through the RUS totaled $122.5 million. This included $93.4 million in loans under the Telecommunications Infrastructure Program and another $26.2 million in grants and loans provided under the American Reinvestment and Recovery Act's Broadband Investment Program. South Dakota companies have been particularly enterprising in taking advantage of available RUS funding. In FY 2017, approved RUS loans to South Dakota's rural telecommunications carriers totaled $116.7 million and accounted for 17 percent of all dollars allocated nationally under the related RUS programs.[33]

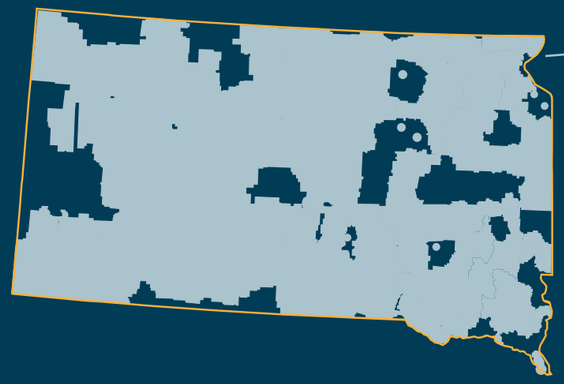
Meeting the Challenges

95% of Venture customers have been converted to fiber.

In 2011, Venture Communications began upgrading infrastructure with fiber-optics-to-the-home technology. Areas that were addressed initially included the Wessington Springs, Faulkton, Highmore, and Harrold communities which had some of the most antiquated plants. Six years later, by the end of 2017, Venture had replaced old copper plant with fiber optics for more than 95 percent of its customers.

According to Venture Communications spokesperson Rod Kusser, the company's fiber-to-the-home program gives customers far more options when it comes to download speeds and services. "In many areas customers can choose an offering that approaches gigabyte speeds," says Kusser. For year-round rural customers, fiber-based broadband provides a vital connection for information, entertainment, and communications. For customers who summer on the lakes in the northeastern part of the state or along the Missouri River, they can work remotely with broadband service that often exceeds what they get in their offices in major metropolitan areas.[34]

BY THE NUMBERS: RURAL AND METRO SOUTH DAKOTA



60,159[35] **square miles**
served by SDTA members

SDTA Coverage Area

RURAL	METRO
$16,000[36] **average per-mile** cost of installing backbone fiber in rural South Dakota	**$60,000**[37] **average per-mile** cost of installing backbone fiber in metro Sioux Falls
4.48 residents[38] **per square mile** areas served by SDTA members	**2,490 residents**[39] **per square mile** Sioux Falls metro area
$3,571[40] **average per resident** cost of installing fiber in rural South Dakota	**$25.54**[41] **average per resident** cost of installing fiber in metro Sioux Falls

Connecting Rural Schools

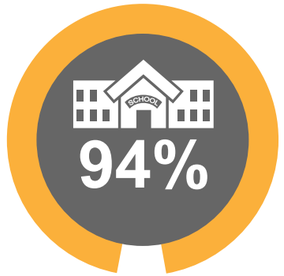
EDUCATION AT THE SPEED OF LIGHT

Around the world, distance no longer needs to be a barrier to learning. While schools connect classrooms to give students access to new curriculum and information resources, libraries provide opportunities for individuals to master new skills and further their education with distance learning programs. Broadband allows students and teachers to take virtual field trips, interacting with scientists, for example, who are working nearly a mile beneath the surface of the earth at the Sanford Underground Research Facility.

In other parts of the United States, rural schools face significant challenges when it comes to getting broadband. According to a recent report, an estimated 2,049 schools lack access to high-speed fiber connections—77 percent are in rural communities.[42] Even when schools are connected, high costs can be an issue.

South Dakota's commitment to broadband in schools exceeds the nation as a whole. The state began its Wiring the Schools project in 1997 and connected 170 school districts and universities. Over the past two decades, these services have been expanded and upgraded. Today, SDTA member companies and SDN Communications provide connections to 402 school buildings and locations, and 94 percent of these locations are served by fiber optic lines.[43]

High-speed connections play a key role in promoting distance learning. In 1999, South Dakota created its Digital Dakota Network (DDN) to provide high-speed email, web hosting, and technical support to public schools in the state. Access to DDN services and to the wealth of educational materials available on the internet has helped teachers find the curriculum they need to be effective.[44] The DDN service also became a platform for delivering curriculum to students in remote schools, as did the Department of Education's South Dakota Virtual School for middle and high school students. Over the past five years, course registrations for the South Dakota Virtual School have averaged more than 4,000 a year.[45] In addition, the Department of Education provides various teacher training programs online through its Technology for Teaching and Learning initiative. The benefits of broadband are also important in higher education.[46] A recent report by the Urban Institute noted that nearly 3 million Americans lack access to higher education because they live more than 25 miles from a public university or don't have a broadband connection.[47] With fiber optic connections, South Dakotans are bridging this gap. According to the National Center for Education Statistics, better than one in five college students in South Dakota was enrolled exclusively in distance education courses. Another 13.7 percent were taking some portion of their classes online. Only seven other states had higher rates of participation in distance education. Between the fall of 2012 and 2017, for example, the number of students enrolled in distance education courses offered by South Dakota regental institutions increased by 36.3 percent from 11,581 to 15,790.[48] **With today's technology, distance is no longer a barrier to learning; students young and old across the state are investing in themselves and their future.**



Percent of rural South Dakota school locations served by SDTA and SDN that had fiber connections at the end of 2017 [49]

Enhancing Opportunities in Native Communities

Dupree, SD

The Cheyenne River Sioux Tribe Telephone Authority (**CRSTTA**) is one of a handful of tribal telecommunications companies serving Native communities in the United States. Like many rural telcos, it serves a sparsely settled region; in this case more than 3,868 square miles. As demand for internet services materialized in the late 1990s and early 2000s, the company worked to provide Digital Subscriber Lines (DSL) access over its existing copper lines. DSL quality was so poor on the existing lines, however, that the CRSTTA board resolved in 2008 to apply for and received a $37.8 million USDA Rural Utility Service Loan to finance the deployment of fiber-to-the-home in the five exchanges CRSTTA served.

"We faced some challenges throughout the Fiber-to-the-Home project," says Mona Thompson, CRSTTA's general manager, "but completed nearly 1,500 miles of fiber optic construction on the Cheyenne River Sioux Tribe Reservation in December of 2017. We are very proud that our customers, including tribal and non-tribal members, now have access to high-speed broadband services."

Remote Learning from Deep Underground

A South Dakota elementary class visits the Sanford Lab on a field trip. Field trips do not go underground, but classes are able to participate in real-time video conferences with scientists working in underground laboratories. *Photo by Matthew Kapust, Sanford Underground Research Facility.*

At the **Sanford Underground Research Facility** in Lead, scientists from around the world are seeking to answer basic questions about the universe. Located nearly a mile underground in the refurbished shafts of the old Homestake Gold Mine, the facility is not easily accessible to students. Thanks to the REED fiber optic network provided by SDN Communications, however, students in K-12 science, technology, engineering, and math (STEM) classes are able to peek inside the Majorana cleanroom and ask questions and interact with scientists working deep underground. K-12 teachers use curriculum modules developed by the Sanford Lab's Education and Outreach team—led by Black Hills State University—to inspire students from around the state to learn about physics, biology, and other sciences.

Work in a Digital World

NEW FRONTIERS FOR ENTREPRENEURS

With broadband, distance is no longer a barrier to entrepreneurs and employees in rural America. It makes remote work possible, allows rural businesses to reach customers around the world, lowers costs, and increases quality in many businesses. Indeed, access to broadband has become critical to the day-to-day activity of many commercial operations in rural America, including grocery stores, banks, insurance agents, retailers, grain elevator operators, pharmacies, newspapers, veterinary clinics, convenience stores, livestock auction markets, hunting lodges, manufacturers, and more.[50]

Broadband is transforming the idea of the traditional nine-to-five office. In 2016, for example, 22 percent of American workers did some or all of their work at home on the days they worked, up from 19 percent in 2003. In addition, the amount of time they spent working at home also increased, from 2.6 hours to 3.1 hours.[51] Another study by Gallup determined that telecommuting has risen even more dramatically, from 9 percent in 1995 to 37 percent in 2015.[52] Nearly one in ten workers telecommutes more than ten workdays in a typical month.

A decade ago, most telecommuters simply brought work home from the office to work in the evenings or on weekends; now the majority are working at home during regular business hours. These workers and their bosses are discovering that generally, telecommuters are as productive as other workers—sometimes more so. People who study trends in the workplace predict that by 2020 half of all workers will be working remotely at least part of the time.[53]

In South Dakota, rural telecommunications companies report that teleworkers they serve are providing medical transcriptions and billing services, insurance adjusting, website development, telemarketing, and architectural drafting.[54] Remote workers and entrepreneurs in South Dakota include physicists, graphic artists, writers, computer programmers, marketers, lawyers, film location scouts, teachers, management consultants, accountants, and more. Broadband infrastructure has enabled the growth of many new businesses ranging from fulfillment services to medical practice management.

In agriculture, rural telecommunications companies in South Dakota are serving more than 1,600 different agricultural producing or processing businesses with fiber connections.[55] Sensors connected to wired broadband allow farmers to monitor conditions in grain bins, fuel tank levels, the location of livestock, security cameras, and energy consumption. Broadband also gives agricultural producers and traders access to global markets and prices. Livestock auction markets can reach potential customers hundreds and thousands of miles away. Retailers can manage inventory and place orders for product. **With all of these connections, business moves at the speed of light, even in the most remote corners of the state.**

Jenn Reecy, Remote Work and Golden West Telecommunications Cooperative

In today's economy, information and ideas move over broadband connections just as cattle and grain have crossed the country in railroad cars for more than a hundred years. Producers today aren't tied to cities in the way that mills and stockyards were in the past. In the knowledge economy, workers such as Jenn Reecy of Dell Rapids can live in the country and collaborate with colleagues hundreds and thousands of miles away. Reecy is the Chief Learning Officer for N2Growth, a global management-consulting firm whose clients include Microsoft, eBay, Ford, and Visa. She is one of many remote workers who rely on broadband from Golden West Telecommunications Cooperative to "telecommute" to work. Telecommuting makes it easier for workers and entrepreneurs who want to live in rural communities to participate in the global economy. It also offers rural communities a whole new path to economic development.[56]

Golden West, Dell Rapids, SD

In 2016, **22% of American workers** did some or all of their work at home.

Better Health at a Distance

WITH TELEMEDICINE, THE FUTURE IS NOW

In South Dakota, like much of rural America, access to health care is challenging. People who live far from major medical centers in urban areas have been hurt by cost cutting that has led to the closure of many rural hospitals and clinics. It's been estimated by 2020, there will be 45,000 fewer doctors in rural communities.[57] Rural residents also tend to be older. In 2016, 18.7 percent of non-metropolitan residents were 65 years or older, compared to 14.6 percent of metro area residents.[58] They also have lower incomes. In 2015, for example, median household income in non-metropolitan South Dakota was $45,988 compared to $57,773 in the metropolitan parts of the state.[59] They are also more likely to suffer from disability or chronic disease. Fourteen percent of individuals in non-metropolitan areas had a disability compared to 11.4 percent in metro areas.[60] For seniors, this ratio increases to 37.2 percent, compared to 33.3 percent in metro areas.[61] Similarly, rates for diabetes are higher in non-metropolitan South Dakota, with 11.2 percent of adults diagnosed in non-metropolitan areas compared to 8 percent in metropolitan communities in 2013.[62]

Telehealth offers the potential to address the needs of non-metropolitan residents and enable older residents to remain in their homes by delivering important health services remotely, including consultations, patient monitoring, and information sharing, as well as teaching and education for health care providers. These options can enhance the quality of health care services in rural communities and improve patient outcomes and long-term quality of life.[63]

One recent study estimated that the potential savings from rural telehealth are substantial, allowing patients and families to avoid travel expenses and lost wages and reducing costs for hospitals. Telehealth also enhances opportunities for local pharmacies and labs in micropolitan and rural communities to continue serving their local customers.[64]

For many customers, the benefits of telemedicine seem so significant that a recent survey found that 20 percent of people polled would switch to a different primary care physician if that doctor offered telehealth services. Meanwhile, nearly three out of four parents who have young children said they would also make this change. Customer preferences and the search for operational efficiencies help explain why rural hospitals are outpacing their urban counterparts in telehealth adoption.

In South Dakota, SDN Communications, SDTA members, and other rural local exchange companies provide high-speed broadband to 188 clinics and hospitals.[65] With reliable, high-speed broadband connections, individuals and families in rural South Dakota are better able to care for themselves and their loved ones and have greater confidence that they can reach a professional for diagnostics and advice.

Increasing Access to Health Care

Avera Health's eCARE has become a national leader in providing virtual hospital services to rural and reservation communities. Launched in 2009, the comprehensive program provides telehealth services from a technologically advanced hospital hub based in Sioux Falls. SDN Communications and SDTA member companies provide the broadband connections for the interactive technology and the Leona M. And Harry B. Helmsley Charitable Trust provides funding assistance.

Avera Health eCARE reports more than one million patients served, 330 connections in 14 states, 13 percent of the nation's critical access hospitals served, and $188 million saved through the video "house calls."

In South Dakota, Avera Health eCARE supplies remote pharmacy services to rural communities and virtual nurses to schools located far from professional medical help. Its eCARE Specialty Clinics allow patients to see health care professionals for issues relating to behavioral health, cardiology, obstetrics, kidney care, pain management, and more.

Building Social Capital

PROMOTING A CONNECTED SOCIETY

Increasingly, the internet is the public square. On social media and in reader responses, citizens express their opinions and share information regarding the public policy debates of the day. Through email and social media, virtual connections complement the face-to-face interactions that sustain our friendships and sense of community.

There is growing evidence that these online interactions can help build social capital that allows communities to solve problems and take advantage of opportunities.[66] Broadband also helps individuals feel they are connected to the world, even if they are separated by distance or disability.

Broadband plays a particularly important role in connecting communities and individuals who have suffered historically from a lack of access to markets, services, and social contacts. On the Cheyenne River and Pine Ridge Indian Reservations, for example, tribal lifeline services ensure that low-income residents are able to take advantage of broadband by making it more affordable.[67]

Rural broadband providers in South Dakota work to help their customers make these connections. Interstate Telecommunications Cooperative in eastern South Dakota, for example, offers its ITC University where individuals and families can learn to use the tools of the digital age, including the basics of social media, word processing, online shopping, managing photos, and protecting their personal information.[68]

The social connections provided by broadband are especially important to elderly residents of rural America hoping to remain in their homes. Many rely on broadband enabled home security devices, online shopping, and social networks to feel safe, provided for and connected to family and friends.[69]

Connecting the Generations

Older residents of Grant County often bring their Christmas presents to the library in January: computers, tablets, and smart phones. “It’s a busy month for us,” says librarian Jody Carlson. On “Tech Tuesdays,” relying on broadband connections provided by Interstate Telecommunications Cooperative (ITC), Carlson and her staff help local residents open and configure Facebook accounts, download and print pictures, upload and navigate ebooks from the library’s website, and text or Facetime grandchildren from their smart phones. “As they become more comfortable with the technology,” Carlson says, “it helps them stay connected to family and friends.”

In rural communities across South Dakota, broadband provides older adults with unprecedented opportunities to remain socially engaged while living independently at home. Technology can also bring generations together. With funding from the Margaret A. Cargill Foundation, for example, SDSU Extension launched its TeachSD pilot program in Lake Andes and Britton. Recruiting young people to teach older adults how to access the online world, the program provides an important social bridge between the generations and helps to promote greater empathy and understanding. According to Leacey Brown, a gerontology field specialist for Extension, “these internet-based technologies provide an ideal way to connect people from different generations for mutual learning.”

“Covering the vast, diverse landscapes of South Dakota can be challenging.

The members of SDTA are committed to overcoming those challenges.”

Mark Shlanta
CEO, SDN Communications

WIRELESS TECHNOLOGY ADVANCEMENTS PLUGGED INTO SOUTH DAKOTA’S FIBER FOR THE LONG HAUL

Overall, city dwellers vastly outnumber rural Americans. However, 85 percent of all U.S. cities have a population of fewer than 10,000 people. That’s significant.

We must make sure rural populations do not get passed over in a coming wave of telecommunications development. SDN and its owners–largely the same companies as SDTA’s membership–play a pivotal role in making sure that doesn’t happen. Collectively, our companies have plowed almost 45,000 miles of fiber optics into even the most remote prairies and hills of this state. Strung end-to-end, that fiber could circle the earth two times!

That commitment demonstrates SDN’s mission in action: To provide QUALITY SERVICE, create new and INNOVATIVE SERVICES, and RETURN VALUE to member companies and customers.

That mission motivated SDN and its members to create the extensive fiber backbone offering distance education, telemedicine, secure banking transactions, video conferencing, and instant connections around the world supporting commerce and families. Those services represent what the fiber network does today. The network will only become more utilized as 5G creates additional broadband reliant devices, such as driverless cars, medical devices, and more.

Implementing 5G will require better and more tower coverage, and therefore more backhaul on our fiber investment. Thanks to the vision of these South Dakota companies, our infrastructure stands ready to serve its citizens in a global economy.

SDTA MEMBERS

SDTA’s membership is comprised of South Dakota’s cooperative, small commercial, municipal, and tribal telecommunications companies. These companies provide broadband, telephone, and video services to approximately three-quarters of South Dakota’s land mass.

Alliance Communications
www.alliancecom.net

Beresford Municipal Telephone
www.bmtc.net

Cheyenne River Sioux Tribe Telephone Authority (CRSTTA)
www.crstta.com

Faith Municipal Telephone
www.faithsd.com

Fort Randall Telephone Company
www.hcinet.net/fortrandall/

Golden West Telecommunications
www.goldenwest.com

Interstate Telecommunications Coop.
www.itc-web.com

James Valley Telecommunications
www.jamesvalley.com

Kennebec Telephone Co.
www.kennebectelephone.com

Midstate Communications
www.midstatesd.net

RC Technologies
www.tnics.com

Santel Communications
www.santel.coop

Swiftel Communications
www.swiftel.net

TrioTel Communications, Inc.
www.triotel.net

Valley Telecommunications Coop.
www.valleytel.net

Venture Communications Coop.
www.venturecomm.net

West River Coop. Telephone Co.
www.sdplains.com

West River Telecom Coop.
www.westriv.com

Missouri National Recreational River, SD

Notes & Sources

[1] South Dakota Association of Telephone Cooperatives, *Dakota Lines: 'A History of Service'* (Garretson: Sanders Printing Company, [1991]), 10.

[2] Andrew Burger, "Broadband Attitudes Survey: 90% Say It's Essential or Important," *Telecompetitor*, April 12, 2017, http://www.telecompetitor.com/broadband-attitudes-survey-90-say-its-essential-or-important/

[3] In today's world, when people think of telecommunications, they think of a combination of services that were, historically, quite distinct: local telephone, long-distance, cable television, and wireless. Increasingly, these services are provided by integrated companies that provide a combination of these services. Generally, this report does not cover the wireless providers such as Verizon or AT&T, nor cable companies like Midco. Instead, the focus is on the rural telephone companies working to meet the needs of customers and members in non-metropolitan South Dakota.

[4] South Dakota Public Utilities Commission, *2016 Annual Report*, 3.

[5] Ibid., 6.

[6] Ibid., 9.

[7] Ibid., 10.

[8] South Dakota Dashboard, followup SDTA Member Survey, Dec. 2017-Feb. 2018.

[9] For this report, broadband service is defined as 25MB download/3MB upload or higher. South Dakota Dashboard, followup SDTA Member Survey, Dec. 2017-Feb. 2018.

[10] Built in 2007, the Research, Education and Economic Development (REED) Network initially connected all six public universities, the EROS Data Center and Sanford Lab at Homestake. In 2009, with a $20 million federal broadband stimulus grant, the network was expanded to serve hospitals, schools, libraries, public safety centers, and state government facilities in the state. The REED Network is capable of delivering data at up to 50,000 MB. See https://sdncommunications.com/who-we-are/historyownership/.

[11] Email from Ryan Punt, SDN Communications, January 8, 2018.

[12] http://www.southdakotadashboard.org/population#0-6549-d.

[13] https://www.southdakotadashboard.org/population#0-6550-d

[14] In 2016, persons aged 65 or more in non-metropolitan South Dakota accounted for 18.7 percent of the population. https://www.southdakotadashboard.org/age#0-6995-g

[15] The poverty rate for metropolitan South Dakota was 10.2 percent in 2016, compared to 19 percent in non-metropolitan areas. https://www.southdakotadashboard.org/poverty#0-8039-g. In 2010, the population of the state's reservations was 67,330. https://www.southdakotadashboard.org/population#0-6533-d

[16] Non-metro GDP is calculated as follows: Total SD 2016 Current-dollar GDP $48.1 billion – Metro area GDP (Rapid City, Sioux Falls combined; Sioux City was not included since most of this economic activity takes place in Nebraska/Iowa) = $22.88 billion.

[17] Total non-metropolitan nonfarm payroll jobs = South Dakota total 420,469 - Metro total 223,643 = 196,826. https://www.southdakotadashboard.org/jobs#0-11151-d

[18] South Dakota Dashboard, followup SDTA Member Survey, Dec. 2017-Feb. 2018.

[19] Multiplier is 1.2125 based on Hanns Kuttner, "The Economic Impact of Rural Broadband," Hudson Institute Briefing Paper, April 2016, 25.

[20] South Dakota Dashboard, followup SDTA Member Survey, Dec. 2017-Feb. 2018.

[21] Hanns Kuttner, "The Economic Impact of Rural Broadband," Hudson Institute Briefing Paper, April 2016, 11.

[22] Patrick Hemen, "Introduction to the USDA and Overview of Rural Utilities Service Programs," Presentation to SDTA, August 21, 2017, 9.

[23] https://www.cable.co.uk/media-centre/release/new-united-states-broadband-speed-league-unveiled. Speeds measured over a testing period of 12 months, concluding in May of 2017.

[24] Email from Mike Haskins, SDN Communications, to Rich Coit, November 9, 2017.

[25] Joan Engebretson, "Rural Telecom Economics: Telergee Report Finds Revenues Up, Profits Down," *Telecompetitor*, September 19, 2017. http://www.telecompetitor.com/rural-telecom-economics-telergee-report-finds-revenues-up-profits-down/. According to NTCA, 41 percent were being served by fiber-to-the-home and 9 percent had access to fiber to the node. See NTCA, "NTCA 2016 Broadband/Internet Availability Survey Report, July 2017," 3.

[26] As of April 2018, more than half of SDTA's member companies had deployed fiber-to-the-premises (FTTP) to 80 percent or more of their customers. Six SDTA members had deployed FTTP to 100 percent of their customer locations. South Dakota Dashboard, SDTA Member Survey, follow up SDTA Member Survey, Dec. 2017-Feb. 2018.

[27] CCG Consulting, "Pent-up Customer Demand."

[28] South Dakota Dashboard, followup SDTA Member Survey, Dec. 2017-Feb. 2018.

[29] South Dakota Dashboard, followup SDTA Member Survey, Dec. 2017-Feb. 2018.

[30] Hanns Kuttner, "The Economic Impact of Rural Broadband," Hudson Institute Briefing Paper, April 2016, 22.

[31] Universal Service Administrative Co., *2016 Annual Report*, 62.

[32] This money included more than $98 million in High Cost Support from the Universal Service Administrative Company (USAC), along with $1.1 million in Lifeline and Link-Up monies. Funds were provided to Eligible Telecommunications Carriers (ETCs) operating in the state. South Dakota Public Utilities Commission, *2016 Annual Report*, 3. These numbers differ slightly from the *2016 Annual Report* from the USAC, which showed $102.657 million in Authorized Support for all four programs in 2016. Universal Service Administrative Co., *2016 Annual Report*, 62.

[33] Patrick Hemen, "Introduction to the USDA and Overview of Rural Utilities Service Programs," Presentation to SDTA, August 21, 2017, 23. Also, phone interview with Patrick Hemen, November 29, 2017.

[34] https://venture.coop/why-venture/history and Interview with Rod Kusser, November 29, 2017 by Eric John Abrahamson.

[35] Data on customers and square miles provided by Vantage Point Solutions, Mitchell, SD.

[36] Mike Haskins, SDN Communications.

[37] Ibid.

[38] Total population in SDTA service areas = 269,745 / 60,159 square miles = 4.48 residents per square mile. Data on customers and square miles provided by Vantage Point Solutions, Mitchell, SD.

[39] Sioux Falls population 2018, per City of Sioux Falls: 183,200/78 square miles = 2,349 residents per square mile.

[40] SDN Communications estimates that costs to deploy fiber are $16,000 per mile/4.48 residents per square mile = $3,571.43 per resident per square mile. Per customer costs are even higher. In SDTA areas, the cost per square mile is $16,000 / 2.03 customers per square mile = $7,894.81.

[41] Sioux Falls population 2018, per City of Sioux Falls: 183,200/78 square miles = 2,349 residents per square mile. $60,000 cost per mile/2,349 residents = $25.54.

[42] https://s3-us-west-1.amazonaws.com/esh-sots-pdfs/educationsuperhighway_2017_state_of_the_states.pdf

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Badlands National Park, SD

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