CENTER *for* RURAL AFFAIRS

MAP TO PROSPERITY

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I. INTRODUCTION

Connectivity is the defining aspect of our 21st century economy. It determines the work we do, the markets we access, and our financial prospects, while also shaping our education, health care, and overall quality of life.

Not everyone is able to participate in this evolution. In much of rural America, resources are scarce and technology nascent. Providers lack incentive to extend service to low-population areas. State and local governments remain unable or unwilling to assist. Entire communities are being left behind.

This paper begins by underscoring the ability of broadband technology to revitalize the rural economy. The farm and small business sectors are just two areas where this potential is already being realized. Manufacturing and ecommerce are others.

We then consider obstacles to broadband expansion. As expected, geography emerges as the most formidable barrier. However, improvements in both adoption rates and literacy can provide a needed boost at the household and community levels.

Finally, we explore solutions. Federal stimulus, including the American Recovery and Reinvestment Act of 2009, has expanded service and spurred innovation. This has also created momentum at the next level where states, such as Minnesota, have built upon and enhanced what federal support was initially able to achieve. When paired with leadership and commitment on the part of states, continued funding at the federal level is essential to closing the digital divide.

Broadband defined

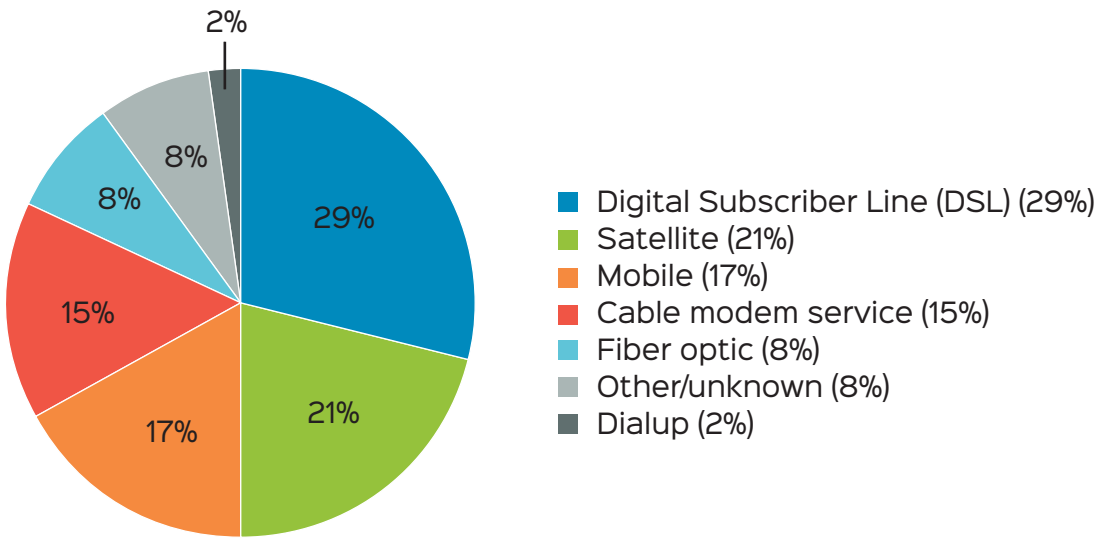
In 2015, the Federal Communications Commission (FCC) upgraded the definition of broadband speed to 25 Megabits per second (Mbps) for content download and 3 Mbps for content upload.

Also essential is an improved approach to gathering, analyzing, and employing broadband data. Today, the Federal Communications Commission (FCC) and its state-based counterparts are making critical decisions based on erroneous and incomplete information. This has resulted in an overstatement of broadband availability and continued misallocation of funds. Any serious policy effort to extend broadband to unserved areas must include a fix.

II. BROADBAND AND THE RURAL ECONOMY

Broadband access is a key driver in today's economy. One study indicated that increasing broadband access by 10 percentage points translates to an estimated 1 percent

FIGURE 1: PRIMARY METHOD OF INTERNET ACCESS ON FARM OPERATIONS IN THE U.S.: 2017



increase in gross domestic product (GDP). The same study shows doubling broadband speeds in an economy can add 0.3 percent to GDP growth. Approximately 80 new jobs are created for every additional 1,000 broadband users.[1]

Benefits also accrue at the household level. On average, increasing residential broadband speeds by 4 megabits per second (Mbps) raises household income by $2,100 per year.[2] Job seekers find employment 25 percent faster online than through traditional searches.[3] As a result, broadband access is associated with higher employment rates, especially in rural counties.[4]

Farms and small businesses continue to drive economic growth in rural communities across the Midwest and Great Plains. Each sector has evolved in response to widespread adoption of new technologies. A similar evolution has taken place in manufacturing and retail.

A. FARMS

The development and use of on-farm technology applications have grown exponentially since 2009. From field to home office, farm operators depend on access to manage equipment, track moisture and nutrient rates, and engage with the broader economy. This is accompanied by an increased dependence on internet.

According to the U.S. Department of Agriculture (USDA), 71 percent of farms have internet access. Of these, only 8 percent use fiber optic technologies. Approximately 17 percent depend on mobile internet service and 29 percent rely on a digital subscriber line (DSL). Of farms with internet, 21 percent rely on a satellite connection, while 15 percent count on cable modem service. At least 2 percent depend on dial-up service. Others report not knowing their primary source.[5] See Figure 1.

1 Little, Arthur D. "Socioeconomic Effects of Broadband Speed." Ericsson ConsumerLab and Chalmers University of Technology, September 2013, nova.ilsole24ore.com/wordpress/wp-content/uploads/2014/02/Ericsson.pdf. Accessed February 2018.

2 Ibid.

3 Kuhn, Peter and Hani Mansour. "Is Internet Job Search Still Ineffective?" July 29, 2013, econ.ucsb.edu/~pjkuhn/Research%20Papers/NLS_NetSearch.pdf. Accessed February 2018.

4 Atasoy, Hilal. "The Effects of Broadband Internet Expansion on Labor Market Outcomes." Vol. 66, No. 2, p. 315-345, Cornell University Industrial and Labor Relations Review, February 2013, papers.ssrn.com/sol3/papers.cfm?abstract_id=1890709##. Accessed February 2018.

5 "Farm Computer Usage and Ownership." U.S. Department of Agriculture, National Agricultural Statistics Service, August 2017, usda.mannlib.cornell.edu/usda/current/FarmComp/FarmComp-08-18-2017_correction.pdf. Accessed February 2018.

Not all farms with internet access use this tool to advance their farm-based businesses. In 2017, only 52 percent of crop producers and 42 percent of livestock producers reported accessing a computer for use in their farm business. Of all farm operators, 39 percent reported using a smartphone or tablet for this purpose.[6]

The purposes for which internet is used also vary. In 2017, 23 percent of farm operators purchased inputs such as seed, chemicals, or fertilizer online. Only 18 percent used the internet to conduct marketing activities. An identical 18 percent report accessing the internet for USDA and other government websites. A full 44 percent report conducting business online using non-agricultural websites.[7]

In addition, USDA tracks growth in computer use and ownership. In 2017, 73 percent of farms report having access to a computer. Access is typically determined by sales class. For example, 76 percent of farm operations in the $100,000 to $249,000 sales class report having access to a computer. This grows to 85 percent for those with sales of $250,000 or more.

Likewise, access to internet and use of internet as part of a farm business also grow consistently with reported sales.[8] See Figures 2 and 3 on the following page.

B. SMALL BUSINESS

The most effective economic development strategy for many rural communities is small entrepreneurship. These businesses are especially important today, as opportunities to attract large employers to remote rural areas diminish. Small entrepreneurship has been proven to work in rural areas that have not been successful in attracting manufacturers or other large employers from the outside.

Fast and reliable internet access creates a new opportunity for small businesses to thrive. An entrepreneur is more likely to start a business in their home community with broadband access. Similarly, availability of adequate broadband has a positive and significant effect on a new firm's decision to locate in rural areas.[9]

The perception that high speed internet access is an essential tool for small business success and management is especially prevalent among youth. For example, one poll found 95 percent of individuals ages 19 to 29 "believe having high speed internet is important for doing work from home or managing a home-based business."[10] Along with facilitating entrepreneurship, encouraging youth to return to rural areas is an important economic growth strategy for many small communities.

The likelihood of a business using internet as part of its daily operation often depends on its size and sector. Firms of 50 or more employees are 6 percent more likely to utilize the internet than firms with 19 or fewer employees. The type of business also matters. Retail, food, and lodging businesses are 14 percent less likely to rely on internet access than professional and finance firms.[11]

Internet access does not always translate to dependable use, especially for smaller businesses. Some have access to higher speeds but are unable to afford the premium required.

6 Ibid.

7 Ibid.

8 Ibid.

9 Kim, Younjun and Peter F. Orazem. "Broadband Internet and New Firm Location Decisions in Rural Areas." Bureau of Business Research, University of Nebraska at Lincoln, January 2016, cba.unl.edu/outreach/bureau-of-business-research/academic-research/documents/kim/broadband.pdf. Accessed February 2018.

10 Vogt, Rebecca, Cheryl Burkhart-Kriesel, Randolph Cantrell, Bradley Lubben, and Larry R. McElravy Jr. "Broadband and Mobile Internet Services in Nonmetropolitan Nebraska." 2016 Nebraska Rural Poll Results." Rural Futures Institute at the University of Nebraska, 2016, digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1013&context=rfipubs. Accessed February 2018.

11 "2014 Broadband and Business Survey Results." Connected Nation, 2014, connectednation.org. Accessed February 2018.

FIGURE 2: ACCESS TO THE INTERNET ON FARM OPERATIONS IN THE U.S.: 2013, 2015, AND 2017

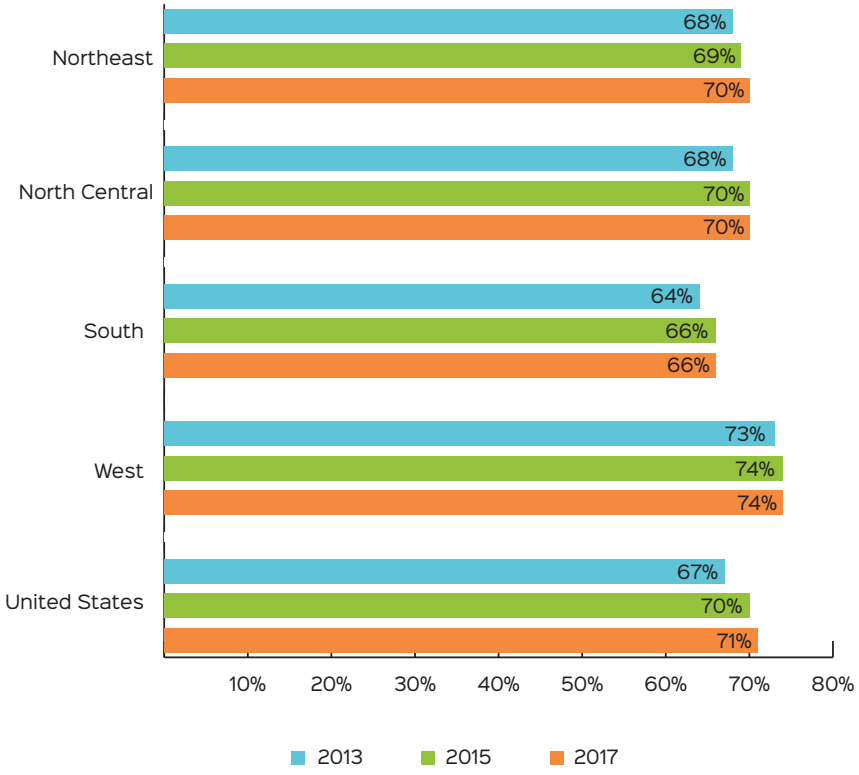
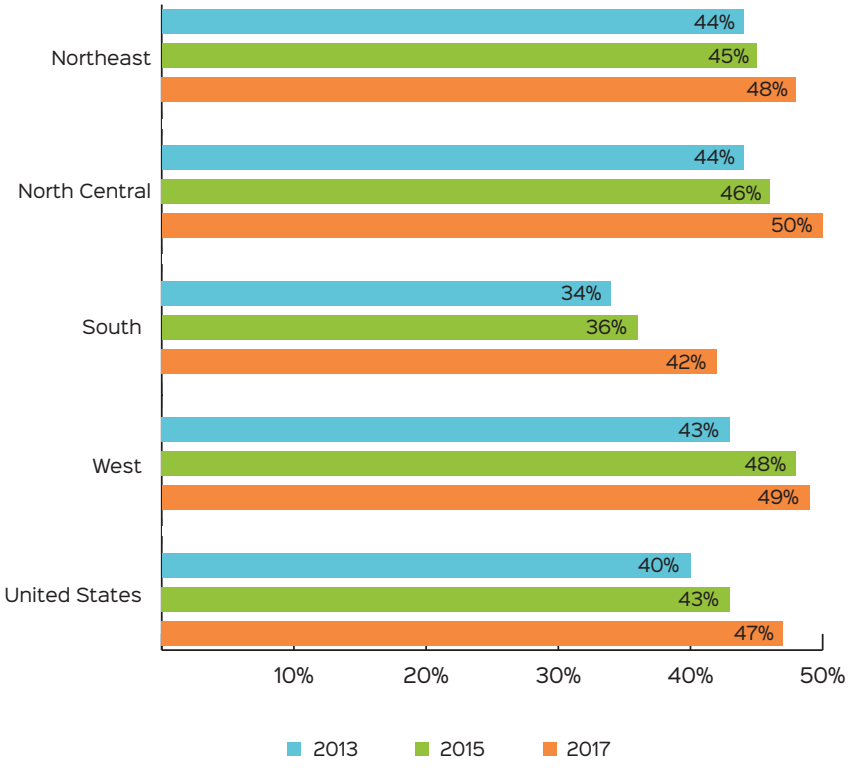


FIGURE 3: USE OF COMPUTER AS PART OF A FARM BUSINESS IN THE U.S.: 2013, 2015, AND 2017



Others lack the training or exposure to take full advantage. On average, smaller businesses are less likely than larger counterparts to fully understand and embrace the benefits of internet access.[12]

C. OTHER

Manufacturing and retail also account for a substantial portion of economic activity in rural communities. According to the U.S. Census Bureau, more than $100 billion of ecommerce sales were facilitated by rural broadband in 2013.[13] Similarly, approximately $9.2 billion of retail ecommerce sales were facilitated by rural broadband in 2015. An estimated additional $1 billion would have taken place that same year had rural broadband penetration been equivalent to that in urban areas.[14]

III. BROADBAND ACCESS IN RURAL AREAS

Broadband access and adoption remains higher in urban areas than rural areas. The lack of fast, dependable, and affordable options also influences consumer choice regarding technology adoption. Additional determinants include education, technological literacy, and culture.

Overall, rural Americans are 12 percent less likely to own a smartphone, tablet, or computer than their urban or suburban counterparts. They are also less likely to own multiple devices. While 29 percent of rural residents report owning a smartphone, computer, tablet, and have access to broadband, 40 percent of urban and 42 percent of suburban adults report adoption of all four.[15]

A lack of access and dearth of tools with which to utilize broadband translates to less frequent reliance on internet. While 80 percent of urban and 76 percent of suburban residents report using the internet on a daily basis, only 58 percent of rural individuals report the same. Slightly less than 20 percent of rural adults say they never go online.[16]

A. GEOGRAPHY

In 2015, the FCC upgraded the definition of broadband speed to 25 Mbps for content download and 3 Mbps for content upload.[17] Today, more than 24 million Americans lack access to broadband as measured by this standard.[18] Overall, 31 percent of rural households and 35 percent of Americans on Tribal lands do not have access, compared to only 2 percent of those in urban communities.[19]

In total, 19 million of 25 million households without broadband access live in rural areas. Though no more than 10 percent of urban households lack broadband access in any individual state, this number is much higher in rural communities.

12 Curri, Michael. "Small Businesses and the Digital Divide." Broadband Communities Magazine, November/December 2015, bbpmag.com/Features/1115SmallBusinesses.php. Strategic Networks Group. Accessed February 2018.

13 "E-Stats 2013: Measuring the Electronic Economy. Economy-Wide Statistics Brief." U.S. Department of Commerce Economics and Statistics Administration, U.S. Census Bureau, May 28, 2015, census.gov/content/dam/Census/library/publications/2015/econ/e13-estats.pdf. Accessed February 2018.

14 Kuttner, Hanns. "The Economic Impact of Rural Broadband." Hudson Institute, April 2016, s3.amazonaws.com/media.hudson.org/files/publications/20160419KuttnerTheEconomicImpactofRuralBroadband.pdf. Foundation for Rural Service. Accessed February 2018.

15 Horrigan, John B. and Maeve Duggan. "Home Broadband 2015." Pew Research Center, Dec. 21, 2015, pewinternet.org/files/2015/12/Broadband-adoption-full.pdf. Accessed February 2018.

16 Ibid.

17 "2015 Broadband Progress Report and Notice of Inquiry on Immediate Action to Accelerate Deployment." Federal Communications Commission, Feb. 4, 2015, apps.fcc.gov/edocs_public/attachmatch/FCC-15-10A1.pdf. Accessed February 2018.

18 "2018 Broadband Deployment Report." Federal Communications Commission, Feb. 2, 2018, fcc.gov/reports-research/reports/broadband-progress-reports/2018-broadband-deployment-report. Accessed February 2018.

19 Ibid.

More than 60 percent of rural areas lack broadband access in Wyoming, Oklahoma, New Mexico, Nevada, Montana, Missouri, Mississippi, California, Arizona, and Alaska.[20, 21]

In Nebraska

According to the Nebraska Information Technology Commission, counties with populations greater than 20,000 residents have an average advertised fixed download speed of 36.5 Mbps and an average advertised fixed upload speed of 16.2 Mbps.

In comparison, counties with fewer than 20,000 residents have an average advertised fixed download speed of 16.8 Mbps and an average advertised fixed upload speed of 6.8 Mbps.[22]

Geography often determines the number of internet service providers available. In urban communities, 44 percent have access to more than one provider. This number falls to 13 percent in rural areas.[23]

Availability of providers can also be assessed by speed. Only 31 million households have at least one provider offering download speeds of 10 Mbps; nearly 7 million have none at all. Similarly, nearly 20 million households have only one provider offering upload service at 3 Mbps, while 4.9 million have none.[24] When using FCC defined speeds of 25 Mbps down/3 Mbps up, more than 46 million households and nearly 75 percent of Census blocks[25] have access to just one provider, while 10.6 million have none at all.[26]

For some rural households, the 25/3 standard speed set by the FCC is unimaginable. Here, broadband access at speeds lower than the 25/3 standard has improved only modestly since 2011. In that year, 21 percent of rural Americans lacked access to speeds of 4 Mbps down/1 Mbps up; in 2016, the number was 20 percent. In 2011, 35 percent of rural Americans lacked access to speeds of 10 Mbps down/1 Mbps up; in 2016, the number was 31 percent.[27]

20 Ibid.

21 The 2018 Broadband Deployment Report is the first such report that relies primarily upon FCC Form 477 deployment data. Because this data only report service at the census block level, and not the household level, "A whole census block is classified as served if the Form 477 or SBI data indicate that service is being provided anywhere in the block." The Commission acknowledges "the possibility that this analysis may therefore overstate or understate the deployment of services." It is likely, therefore, that the statistics reported in this section overstate the number of individuals or households reported to have access to broadband services.

22 Byers, Anne. "Nebraska Broadband Special Report: Nebraska and the Digital Divide Index. Digital Divide Index shows broadband availability improving, but Nebraska lagging in download and upload speeds and adoption." Nebraska Information Technology Commission, April 2017, nitc.ne.gov/community_council/documents/newsletters/Nebraska_and_DDI-April2017.pdf. Accessed February 2018.

23 Horrigan, John B. and Maeve Duggan. "Home Broadband 2015." Pew Research Center, Dec. 21, 2015, pewinternet.org/files/2015/12/Broadband-adoption-full.pdf. Accessed February 2018.

24 This analysis does not include satellite services, focusing only on wireline and fixed wireless technologies.

25 See section IV D on page 10 for a more complete definition of Census blocks.

26 Singer, Hal. "Assessing the Impact of Removing Regulatory Barriers on Next Generation Wireless and Wireline Broadband Infrastructure Investment." Economists Incorporated, June 2017, ei.com/wp-content/uploads/2017/06/SingerAssessingImpact6.17.pdf., Ed Naef and Alex King. CMA Strategy Consulting. Accessed February 2018.

27 Ibid.

While geography dictates options, it does not determine willingness to subscribe. Rural communities are typically eager to embrace this technology when available. Urban households are only 2 percent more likely to adopt broadband than rural residents.[28]

Internet access at speeds that qualify as broadband is available to 5 percent or fewer residents in 18 of 93 Nebraska counties. Of these, 10 counties do not have even one household with broadband access.[29]

B. ADOPTION AND LITERACY

Low-income households adopt broadband at below average rates, even when access to high-speed internet is available. Fewer than 36 percent of families with incomes less than $25,000 subscribe to broadband at home, compared to 92 percent with incomes more than $75,000.[30] Overall, adults ages 65 and older and individuals with less than a high school education are least likely to utilize broadband technology.[31]

Cost is the principal reason households with available broadband have not adopted this technology. While 73 percent of households subscribe to a paid internet plan, only 37 percent subscribe to service with speeds that are considered broadband, according to FCC standards. Of the households that have access, but subscribe to a lower speed or do not subscribe at all, 33 percent cite an inability to pay the monthly cost of service.

An additional 10 percent cite the cost of a computer. Other respondents report reliance on a smartphone and access outside the home.[32]

This initial barrier to adoption creates repercussions that can affect an individual's future prospects. Entrepreneurship and continuing education may be too onerous without high-speed access. A full 69 percent of Americans recognize that not having in-home broadband access would be a major disadvantage to finding a job, getting health information, or accessing other key information.[33]

Due, in part, to this relationship, increasing broadband penetration can boost a state's economy. One study showed for every 1 percent increase in broadband access, a state's employment is projected to increase 0.2 to 0.3 percent per year.[34] This investment is especially effective in states that have a large rural population.

28 "2016 Broadband Progress Report." Federal Communications Commission, Jan. 29, 2016, apps.fcc.gov/edocs_public/attachmatch/FCC-16-6A1.pdf. Accessed February 2018.

29 Ibid.

30 Ryan, Camille and Jamie M. Lewis. "American Community Survey Reports. Computer and Internet Use in the United States: 2015." U.S. Department of Commerce Economics and Statistics Administration, U.S. Census Bureau, September 2017, census.gov/content/dam/Census/library/publications/2017/acs/acs-37.pdf. Accessed February 2018.

31 Ibid.

32 Horrigan, John B. and Maeve Duggan. "Home Broadband 2015." Pew Research Center, Dec. 21, 2015, pewinternet.org/files/2015/12/Broadband-adoption-full.pdf. Accessed February 2018.

33 Ibid.

34 Crandall, Robert, William Lehr, Robert Litan. "Issues in Economic Policy. The Effects of Broadband Deployment on Output and Employment: A Cross-sectional Analysis of U.S. Data." No. 6, The Brookings Institution, July 2007, brookings.edu/wp-content/uploads/2016/06/06labor_crandall.pdf. Accessed February 2018.

IV. SOLUTIONS

Dozens of initiatives meant to expand broadband access and adoption in rural areas have been implemented over the past two decades. The most common of these provides funding and technical assistance at the federal or state level. More recent proposals have focused efforts on effective and efficient use of available funding. A growing number of states now look to detailed mapping as a way to maximize limited resources.

A. FUNDING AND TECHNICAL ASSISTANCE – ARRA

The American Recovery and Reinvestment Act of 2009 (ARRA) created new programs to facilitate broadband expansion. The law also included more than $7 billion in grants and loans to achieve this purpose.[35] New funding was managed by the Rural Utilities Service and National Telecommunications and Information Administration.

The Rural Utilities Service managed $2.5 billion of this total. In areas served by a project receiving these funds, no less than 75 percent could be in a rural region without access to broadband at speeds sufficient to facilitate economic development. Funding priority was given to areas with no broadband service at all.[36]

An additional $4.7 billion was distributed by the National Telecommunications and Information Administration. A significant portion of this was used to fund a competitive grants program. Eligible uses included grants to encourage sustainable adoption of broadband service and developing and maintaining a broadband inventory map.[37]

B. FUNDING AND TECHNICAL ASSISTANCE – POST ARRA

Though funding under ARRA has been fully expended, its legacy remains. Today, the Rural Utilities Service manages three programs committed to expanding broadband access and adoption in rural areas. The FCC pursues a similar objective through the Universal Service Fund.

Of the three programs managed by the Rural Utilities Service, only the Rural Broadband Access Loan and Loan Guarantee Program require farm bill reauthorization. This was last completed in 2013 and will be considered again in 2018. Additional programs include Telecommunications Infrastructure Loans and Loan Guarantees, and the Community Connect Grant Program. A fourth program, Distance Learning and Telemedicine, provides support for purchase of broadband-dependent tools and equipment.[38]

The FCC's facilitation of broadband expansion is accomplished through four primary programs under the Universal Service Fund. These include the Low-Income Program, Schools and Libraries Program, Rural Health Care Program, and the Connect America Fund. Previously referred to as the High Cost Program, Connect America Fund is the largest of the four, and is now used to offset the high cost of providing broadband access in remote rural areas.[39]

Federal funding is widely recognized as a capable catalyst of broadband development. While current programs at the Rural Utilities Service and FCC serve important functions, it is unlikely these alone will be enough to bridge the digital divide. Investments in infrastructure, regional partnerships, and community-based grantmaking will all be necessary.

35 American Recovery and Reinvestment Act of 2009. Pub. L. 111-5. 123 Stat. 115. Feb. 17, 2009. "U.S. Government Publishing Office." gpo.gov/fdsys/pkg/PLAW-111publ5/pdf/PLAW-111publ5.pdf. Accessed February 2018.

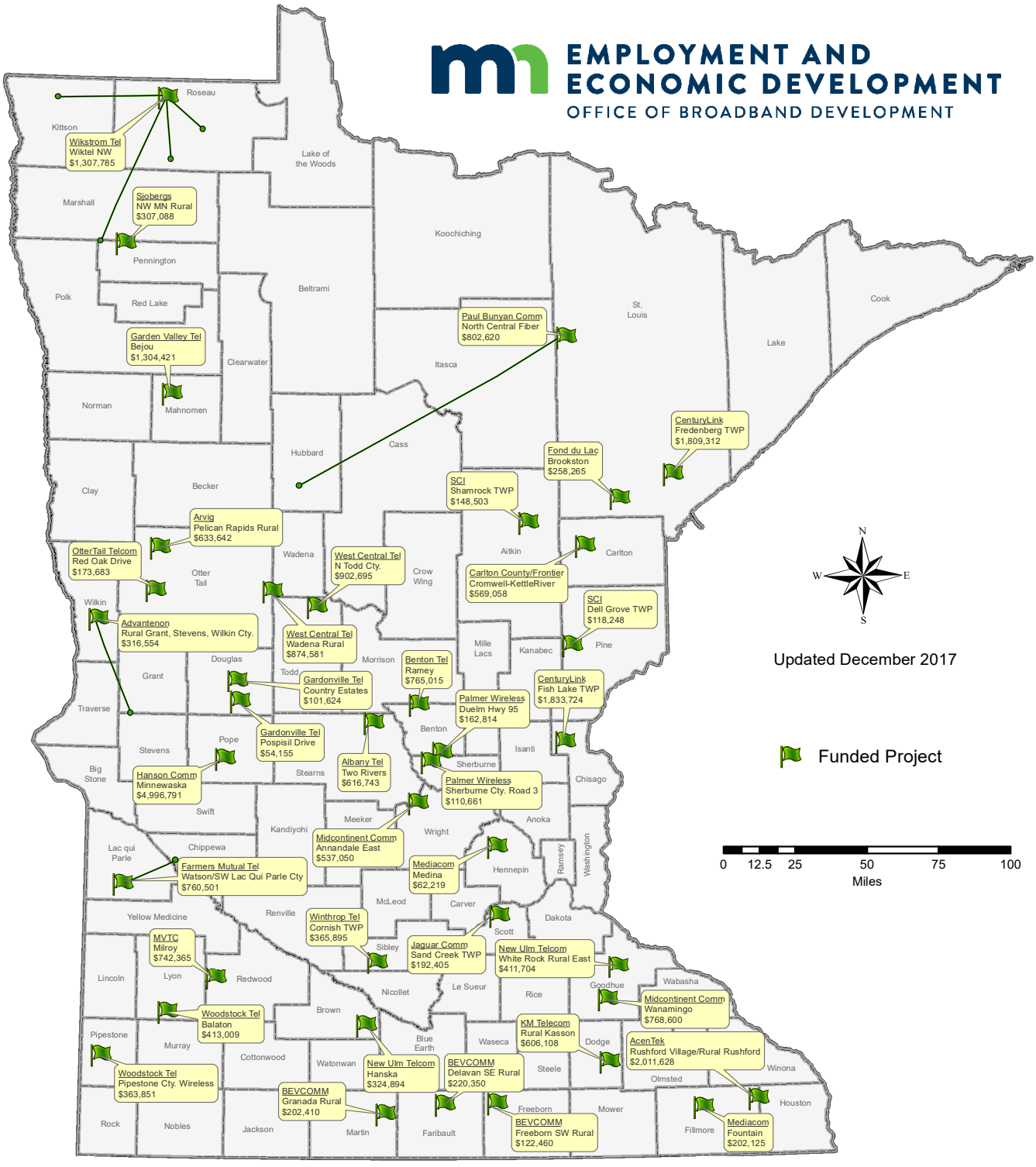
36 Ibid.

37 Ibid.

38 Kruger, Lennard G. "Broadband Loan and Grant Programs in the USDA's Rural Utilities Service." Congressional Research Service, Aug. 1, 2017, fas.org/sgp/crs/misc/RL33816.pdf. Accessed February 2018.

39 "Building the Foundation: 2015 Annual Report." Universal Services Administrative Company, 2015, usac.org/_res/documents/about/pdf/annual-reports/usac-annual-report-2015.pdf. Accessed February 2018.

FIGURE 4: MINNESOTA BORDER-TO-BORDER BROADBAND DEVELOPMENT GRANT PROGRAM, 2017 PROJECT AWARDS



Source: Minnesota Office of Broadband Development

Over the past decade, several stand-alone bills have been introduced in both the U.S. House and U.S. Senate that would provide funding needed to spur additional investment. However, all have suffered from a lack of support. Therefore, any discussion regarding broader infrastructure investment must include broadband. Moving forward, congressional leaders and advocates alike will recognize this as a key opportunity for progress.

C. FUNDING AND TECHNICAL ASSISTANCE – STATE LEVEL

Across the country, states have implemented innovative policies in an effort to spur rural broadband expansion. For example, Maryland has convened a task force, while Wisconsin established a matching grants program. More recently, Maine passed legislation to create the Maine Broadband Initiative, which would provide $6.25 million annually to help providers expand services and bond for infrastructure improvements.

Perhaps the most successful policy can be found in Minnesota. The state's Border-to-Border Broadband Development Grant Program was first authorized in 2014. Since then, state lawmakers have invested $85 million, resulting in broadband access for 3,852 households, 5,189 businesses, and 300 community institutions.[40] See Figure 4 on the previous page for Minnesota's 2017 Border-to-Border awards.

State-based funding is used to meet Minnesota's goal of universal access to broadband by 2022. Border-to-Border operates by making grants available to internet providers willing to expand service to underserved or unserved areas of the state. Grant dollars are used to offset upfront costs of infrastructure for fiber optic, cable, fixed wireless, and DSL technologies.[41]

Each recipient must be able to provide matching funds. To qualify, each project must be financially and technically viable. Recipients must also prove the project is capable of being scaled to 100 Mbps, a speed that administrators expect all Minnesotans to have access to by 2026.[42]

The most recent round of grants was announced in late 2017. A total of $26 million was distributed to 39 projects, leveraging an additional $34 million in local and private funding. This is estimated to secure broadband access for 9,973 households, 2,169 businesses, and 60 community institutions across the state.[43]

Minnesota took advantage of momentum created by the federal stimulus and built framework to meet the unique needs of its population. The result is a program that stands out as a model of success. Once enough data was compiled to determine underserved and unserved areas across the state, leaders developed clear and ambitious goals, identified a key source of funding, and leveraged partnerships to carry that investment forward. Leadership from the governor's office was unwavering, and allies in both the Senate and House provided necessary support.

Other states would be wise to glean lessons from this experience. Chief among these is the value of developing a robust expansion program, including clear metrics and guidelines, and embracing public-private partnerships. Capitalizing on federal investment was important, but a big part of Minnesota's success came from an ability to utilize local actors and larger market forces to achieve state-based goals.

In nearly all jurisdictions, it is impractical and unworkable for the state to contribute unlimited funds to rural broadband expansion. Where funding isn't the answer, it is important for leaders to recognize that smart and innovative policy can be effective. However, successfully implementing that policy requires the support of

40 Davies, Phil and Ann Harrington. "Border-to-Border Dreams." FedGazette, Federal Reserve Bank of Minneapolis, Aug. 15, 2017, minneapolisfed.org/publications/fedgazette/border-to-border-dreams. Accessed February 2018.

41 "Broadband Grant Program." Minnesota Office of Broadband Development, Minnesota Employment and Economic Development, 2018, mn.gov/deed/programs-services/broadband/grant-program/. Accessed February 2018.

42 Ibid.

43 "Lt. Governor Tina Smith, Department of Employment and Economic Development Announce $26 Million for 39 Broadband Projects Across Greater Minnesota." Office of Governor Mark Dayton, State of Minnesota, Nov. 21, 2017, mn.gov/governor/blog/?id=1055-318563. Accessed February 2018.

key stakeholders, many of which may have differing and, at times, competing views. In these cases, states will find, as many have already, that there is no substitute for strong leadership.

D. IMPROVED MAPPING

In addition to providing essential funding for infrastructure and programmatic support, the ARRA also established a comprehensive, nationwide map of existing broadband availability. Managed by the National Telecommunications and Information Administration through the State Broadband Initiative, this effort was bolstered by a total of $293 million awarded to 56 grantees. This included one each from the 50 states, five territories, and the District of Columbia.[44]

A significant portion of this funding was used to assist states in gathering and verifying data concerning the availability, speed, and location of broadband services. This data was made publicly available and allowed policymakers and other stakeholders to allocate resources in a way that most effectively expanded broadband access to unserved areas. This information was also used to create and update the National Broadband Map, first released in 2011.

Maintenance of that map, along with the State Broadband Initiative as a whole, ended in 2015. Once federal funding and support expired, states no longer had the data necessary to identify broadband availability at the point of service. Since then, the question of, "who has broadband and where?" has been impossible to accurately answer.

Census blocks

The U.S. Census Bureau divides the nation into census tracts. These are small, permanent divisions of a county. Each tract contains between 1,200 and 8,000 people. Tracts are then divided into block groups. Each block group contains between 600 and 3,000 people. Block groups are further divided into blocks. This is the smallest unit used by the U.S. Census Bureau for data tabulation. Boundaries are determined by the Census Bureau but usually follow visible features. The 2010 Census identified 11,078,297 separate blocks.[45]

The FCC and state-based commissions now rely on FCC Form 477 results for data and mapping of broadband service and availability. Twice per year, each internet service provider is required to file Form 477 that summarizes the Census blocks they serve. For mobile systems, providers file maps of their coverage areas for each broadband technology. For fixed systems, providers file lists of Census blocks in which they can or do offer service to at least one location.[46]

This approach provides a host of challenges.

If a carrier reports providing a service to any one household within the census block, the entire block is counted as "served." For example, consider one square mile section in the rural Midwest with eight houses. If one household out of eight has broadband access, all eight are considered served by both the state and the FCC.

44 "State Broadband Initiative." Broadband USA, National Telecommunications and Information Administration, U.S. Department of Commerce, Washington, D.C., ntia.doc.gov/sbdd. Accessed February 2018.

45 "U.S. Census Bureau Geographic Entities and Concepts." Geography Division, U.S. Census Bureau, 2010, census.gov/content/dam/Census/data/developers/geoareaconcepts.pdf. Accessed February 2018.

46 "Fixed Broadband Deployment Data from FCC Form 477." Federal Communications Commission, Dec. 13, 2017, www.fcc.gov/general/broadband-deployment-data-fcc-form-477. Accessed February 2018.

This is true even if the other seven have no ability to gain access.[47]

In other cases, Census blocks may be marked as "served" when no households have access. This takes place when a broadband provider reports that a block could be served without an "extraordinary commitment of resources." This term is not officially defined, and providers have latitude to interpret it differently. Some may use the term when they have an ability to accept new customers; others use this designation when significant construction would be required to provide service, even at additional cost to the homeowner.[48]

The resulting misinformation is especially acute in rural areas, where a census block may encompass hundreds of square miles.[49] There are more than 3,200 Census blocks in the U.S. that are larger than the District of Columbia, and eight blocks that are larger than the entire state of Connecticut. Because homes and businesses are spread widely throughout these blocks, the accuracy of Form 477 data can be very weak.[50]

Even wireless coverage is reported by Census blocks under Form 477. Owing to terrain and other obstacles, many rural areas suffer from weak, inconsistent, or nonexistent wireless service. There are areas within a census block that are likely shown to be covered, but in reality have no access for miles.

Inaccuracies inherent in the Form 477 process combine to create a significant overstatement of broadband availability, especially in rural areas. This leads to faulty decision making and mismanagement of resources at both the FCC and state-based commissions. A reliance on inaccurate data makes it impossible for policy makers to efficiently deploy Universal Service Fund revenue and other resources to improve broadband access for those who remain unserved. An incomplete understanding of service gaps guarantees communities will be left behind.

This can be addressed by requiring any future data collection and mapping be generated at the street address or parcel level, as was the case under the State Broadband Initiative. This should be implemented at the state level to reflect the unique needs of each jurisdiction. Connection speed, type of technology, service area locations, and limitations should be submitted by service providers in standardized datasets for mapping. If possible, management and analysis should be conducted by the commission. Data should, in turn, be made available to policymakers and others charged with expanding broadband access. Any such policy should include safeguards to protect customers' and providers' proprietary and confidential information.

Though still an improvement, a less effective option is for state commissions to require granular data only on Census blocks over a certain size. For example, just 2 percent of Census blocks located in the 50 states and District of Columbia – a total of 253,295 out of more than 11 million blocks – exceed two square miles in land area.[51] This option may be considered by states with higher rates of broadband access in rural areas or already robust datasets. Those same states may find it appropriate to require reporting of only a proportion of households actually served.

47 "FCC Form 477: Local Telephone Competition and Broadband Reporting Instructions." Federal Communications Commission, Dec. 5, 2016, fcc.gov/form477/477inst.pdf. Accessed February 2018.

48 Ibid.

49 Rossiter, Katy. "What are census blocks?" U.S. Census Bureau, July 11, 2011, census.gov/newsroom/blogs/random-samplings/2011/07/what-are-census-blocks.html. Accessed February 2018.

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51 "Ex Parte Comments of the National Telecommunications and Information Administration In the Matter of Modernizing the FCC Form 477 Data Program," Federal Communications Commission, WC Docket No. 11-10, Washington, D.C., Sept. 14, 2017, ecfsapi.fcc.gov/file/109142903105183/CN%20477%20Comments_Final.pdf. Accessed February 2018.

Regardless of how data is gathered, it is important that it be accurate and objective. At a minimum, it is essential that only households with current access to broadband be reported as such. Households that can be eventually served, that a provider is expected to serve at an unspecified future date, or that can only be served after significant infrastructure investment on the part of the homeowner should be separately delineated. Going forward, "extraordinary commitment of resources" is a phrase that must be defined and held constant across technologies, geographies, and time frames.

Accurate and robust data is an essential tool of policymakers in all fields, and is imperative here. Complete data will enable more informed decision making, strategic resource deployment, and targeted investment. It also ensures that public and private entities are held accountable when given tax and rate revenue, such as through the Universal Service Fund, to improve access.

IV. CONCLUSION

Each community and household that remains unconnected faces unrealized opportunity. The challenge is surmountable; however, overcoming it will not be easy. Committed leadership and a coordinated effort is required on behalf of all stakeholders.

There is a role for both public and private actors. Governmental entities alone have the ability to facilitate infrastructure expansion and gather the data necessary to catalyze innovation. Private industry can respond by taking entrepreneurial risks and developing solutions to longstanding barriers. Individuals must hold elected officials accountable and demonstrate continued leadership at the local level.

During the past decades, broadband has become more than an article of privilege. It is now an essential tool of the modern economy and quality of life determinant. The time has come for rural communities to draw their own map to prosperity.

ABOUT THE CENTER FOR RURAL AFFAIRS

Established in 1973, the Center for Rural Affairs is a private, nonprofit organization with a mission to establish strong rural communities, social and economic justice, environmental stewardship, and genuine opportunity for all while engaging people in decisions that affect the quality of their lives and the future of their communities.