



# *disconnected*

*seven lessons on fixing the digital divide*



*The Federal Reserve Bank of Kansas City*

## FOREWORD

As the central bank of the United States, the Federal Reserve has a significant interest in the ability of all Americans to access the financial system and obtain credit on fair and appropriate terms. Through this mechanism, individuals and families can improve not only their own lives, but also bring important economic growth and opportunities to the communities in which they live.

Understanding how to best meet the credit needs of a community can be challenging. Understanding what makes a community thrive can be even more difficult

In 1977, Congress passed the Community Reinvestment Act (CRA). This legislation's purpose was to encourage depository institutions to help meet the credit needs of the communities in which they operate, including, importantly, low- and moderate-income (LMI) neighborhoods.

Related to this, in the early 1980s the Federal Reserve System created a community development function. The objective was to help financial institutions understand how to apply the CRA to meet the credit needs of their communities. More broadly, the Federal Reserve System's community development professionals work to foster economic opportunity for LMI populations in rural and urban communities alike.

In recent years, the Federal Reserve Bank of Kansas City's Community Development team has focused on the issues of community development investments, financial stability for the underserved, small business development, workforce development, and engagement with strategic community stakeholders. In each of these areas, society's expanding reliance on technology has become increasingly important. The ability to participate in today's economy and society requires access to current technology that may not be available within all communities. This report explores the foundational role technology access serves across a breadth of community and economic development fields.

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### **Disconnected: Seven Lessons on Fixing the Digital Divide**

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1 Memorial Drive, Kansas City, Missouri 64198

Tammy Edwards and Jackson Winsett, executive advisers

Jeremy Hegle and Jennifer Wilding, authors

Gary Barber, designer

Rick Babson, editor

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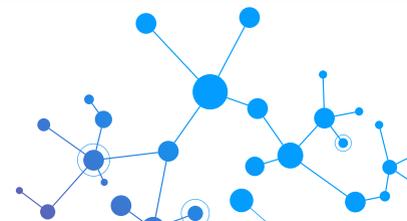
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#### **On the cover** (from top to bottom):

- Discover how educators like those at Operation Breakthrough, are closing the digital skills gap in the classroom on page 56.
- Read how rural broadband efforts, like those by Tri-County Telephone Association, are connecting rural communities to global markets and allowing farmers to deploy precision agriculture technology on page 8.
- Learn how PCs for People and other organizations give low-income individuals and nonprofits the chance to benefit from the life-changing impact of computers, mobile internet and digital literacy on page 57.

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## ACKNOWLEDGMENTS

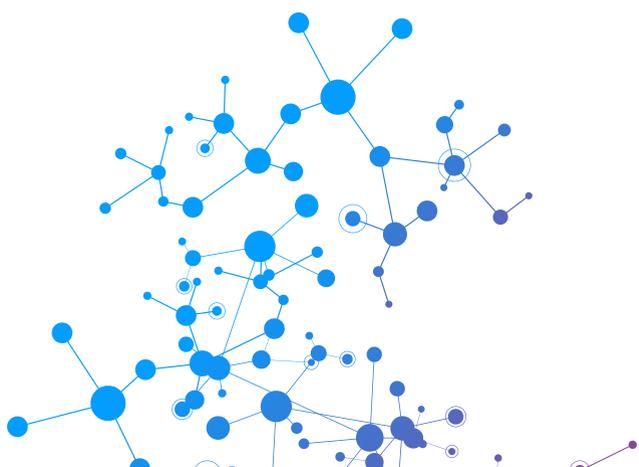
There is a saying; All of us know more than any of us. The Federal Reserve Bank of Kansas City approaches our community development work, and this project, within that spirit. Through proactive engagement we solicit a diverse range of views and insights on what's moving some communities forward and what's making it hard for others to thrive.

We would like to thank the more than 160 individuals from across the country who contributed to shaping this project. Time after time they expressed the need to give voice to the inequities caused when some people lack access to affordable, reliable broadband and the tools and skills needed to harness its power.

**We would especially like to thank the following individuals who were pivotal in this project:**

- All of the members of our Community Development Advisory Council, who were catalysts for this project by repeatedly sharing the degree to which the digital divide hinders economic growth and opportunity. The CDAC was established in 2001 and provides insights on community and economic development challenges faced by low- to moderate-income (LMI) communities. Council members include business leaders, financial institutions, universities and nonprofit leaders who serve low- to moderate-income populations.
- Carrie Coogan, Aaron Deacon, Tom Esselman, Rachel Merlo, Ina Montgomery, Stephenie Smith, Rick Usher, and the other members of the Kansas City Coalition for Digital Inclusion, whose in-depth knowledge and national contacts provided a springboard into the digital inclusion world.
- Russ Elliott, broadband manager for the State of Wyoming, and Angela Siefer, executive director, National Digital Inclusion Alliance, who, as external reviewers of the report, provided context, nuance and clarity.

The facts, observations and viewpoints expressed in this report are the sole responsibility of the authors. They do not necessarily represent positions of the Federal Reserve Bank of Kansas City or the Federal Reserve System.



## INTRODUCTION

Communities across the country are in an economic race. To compete, they need employers and qualified workers, both of which require a robust information- and knowledge-sharing infrastructure. While some communities are ahead of the pack, others are falling far behind.

Broadband is a critical component in this economic race, allowing businesses large and small to reach customers, farmers to deploy resource-saving technologies, and workers to learn critical job skills.

“ We want to attract employers and retain our young people, but employers need broadband and our students want Netflix.” Roundtable participant

For many Americans, broadband is simply too expensive. For others, particularly those in rural and tribal communities, broadband isn't available at any cost. A 2016 Federal Communications Commission (FCC) Broadband Progress Report (<https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2016-broadband-progress-report> ) shows 34 million Americans lack access to fixed broadband. This population is disproportionately low-income and rural:

- Just 53 percent of adults with incomes less than \$30,000 have broadband at home, compared with 95 percent of those with incomes above \$75,000.
- Nearly 68 percent of those without broadband at home live in rural communities.

Disparities also exist within metropolitan areas. Take Kansas City, for example. According to the U.S. Census Bureau, in 2015 nearly 88 percent of residents in suburban Overland Park, Kansas, had fixed broadband access, while in urban areas, just 63 percent of Kansas City, Kansas, and 67 percent of Kansas City, Missouri, residents were connected.

Affordable home broadband is just one necessary element to narrow the digital divide. For individuals to be fully included in the digital world, they also need the relevant technical skills and devices necessary for access. That is why efforts to narrow the digital divide—known as digital inclusion—are referred to as a three-legged stool:

1. **Affordable broadband access:** Access to sufficient bandwidth to conduct data-intensive tasks such as online learning and job research. The FCC defines this as minimum download speeds of 25 megabits per second (Mbps) and minimum upload speeds of 3 Mbps.
2. **Computer access:** Specifically, access to desktops and laptops. Mobile devices do not provide equal ease of use or functionality for conducting critical tasks, such as applying for jobs or doing homework. Data plan caps on mobile devices also limit the amount of duties that can be performed online.
3. **Digital skills:** At the most basic level, individuals need computer skills to apply for jobs, access financial services, conduct homework and safely browse the internet. More advanced digital skills, such as those needed for spreadsheets, word processing, email or even computer coding, can help a person earn a living wage.

## WHY WE WROTE THIS REPORT

A robust, stable economy requires that all members have equitable access to opportunity. The Community Development team at the Federal Reserve Bank of Kansas City, along with our peers across the Federal Reserve System, work to raise awareness of issues and advance solutions for low- to moderate-income (LMI) and underserved communities.

The Kansas City Fed relies on a Community Development Advisory Council (CDAC) and countless community partners to stay informed of emerging economic and community development issues across its seven-state region: Colorado, Kansas, western Missouri, Nebraska, northern New Mexico, Oklahoma and Wyoming. CDAC members and community partners recently expressed growing concern over the digital divide's impact on (primarily) LMI communities.

The Kansas City Fed launched a project in early 2018 to outline issues of the digital divide and identify innovative approaches that communities were taking to narrow it. Through a combination of roundtables with community leaders, one-on-one interviews and an online survey, we solicited and received feedback from more than 160 community leaders. These leaders shared perspectives on what's working and what isn't, which programs they admire, and what they wished the broader community would understand about the digital divide.

This report provides a summary of what we learned and opportunities for narrowing the divide. It is not intended to be a technical report. (For people new to the field, see Appendix A for definitions of terms.) It is instead written for non-experts, to provide them with a holistic understanding of the digital divide and its relevance to a variety of community and economic development fields.

This report also is not exhaustive. Through this study we've come across great work that people are doing across the country to narrow the divide. Much of this work is being done in isolation from others who could learn from it.

Findings are organized by seven key themes that emerged throughout the study. Each theme combines relevant research and statistics, and examples of how the issue plays out in our communities. This approach is intended to provide both data and context on the issues.

## SEVEN THEMES SHOW LESSONS LEARNED

It has been only 26 years since the day in 1993 that the European Organization for Nuclear Research (CERN) put the World Wide Web into the public domain. A few years earlier, a CERN employee had suggested a “web-like system of managing information, tied together by a series of what he called hyperlinks.”<sup>1</sup> By 1993, though, the web still was mainly an academic and military tool. That January, the National Center for Supercomputing Applications (NCSA) released Mosaic, the first major web browser. Mosaic opened the internet to the public by making it easier to use.<sup>2</sup> Soon after NCSA released Mosaic 1.0, CERN released the software to the public domain.<sup>3</sup> By making the release available with an open license, it allowed the web to flourish.<sup>4</sup>

### AND NOW HERE WE ARE

Some of us remember typing, on paper, with a bucket of correction fluid at the ready. Some of us can’t imagine life before the internet, email and social media. The rapid pace of change has not slowed in 26 years and shows no signs of stopping. Consider, for example, that the percentage of Americans with broadband access at home jumped from just 3 percent in 2000 to 70 percent a mere 13 years later.<sup>5</sup>

The people who participated in this project shared their experiences of helping to make the internet available to those left behind. The characteristics of the field—the speed of change, the newness, the populations they assist—helped shape several common themes. The themes reflect the lessons they have learned about what it takes to close the digital divide.

### THE THEMES INCLUDE:

- **Awareness:** Many lack an understanding of the digital divide.
- **Change:** The digital divide will never go away. Ever-changing technology means the digital divide is a moving target.
- **Rural broadband:** New business models and/or public funding are critical to serving unprofitable areas.
- **Broadband adoption:** Work with, not for, the community.
- **Digital skills:** Teaching digital skills is complex, labor-intensive and requires an element of trust.
- **Equipment:** Time and adequate equipment are needed to increase adoption.
- **Evaluation and collaboration:** Stakeholders are hungry to learn from others.

<sup>1</sup>“On This Day 25 Years Ago, the Web Became Public Domain,” *Popular Mechanics*, April 30, 2018, <https://www.popularmechanics.com/culture/web/a20104417/www-public-domain/>

<sup>2</sup>“NCSA Web Browser ‘Mosaic’ was Catalyst for Internet Growth,” Illinois News Bureau, April 17, 2003, <https://news.illinois.edu/view/6367/212344>

<sup>3</sup>Douglas E. Phillips, *The Software License Unveiled: How Legislation by License Controls Software*, (New York: Oxford University Press), page 179.

<sup>4</sup>“On This Day 25 Years Ago, the Web Became Public Domain,” *Popular Mechanics*.

<sup>5</sup>“How Pew Research Calculates Broadband Adoption,” Pew Research FactTank, Aug. 29, 2013, <https://www.pewresearch.org/fact-tank/2013/08/29/how-pew-research-calculates-broadband-adoption/> (accessed June 4, 2019).

## AWARENESS Lesson: Many do not understand the digital divide.

# 1

People generally understand that communities will struggle without an educated workforce, or a diversified economy, or capital for investing. But the digital divide? To many, the concept is new and unfamiliar.

Bridging the digital divide is a multifaceted undertaking. Affordable, reliable broadband, the most seemingly straightforward element of digital inclusion, can feel elusive. As Christopher Mitchell, director of the Community Broadband Network's Initiative for the Institute for Local Self-Reliance, explained, "It's a complex issue consisting of technology, economics and politics, which together make many people intimidated."

Providing a foundational understanding of the size, scope and challenges of the digital divide was a theme throughout this study, as some survey respondents noted:

- "Few in our city understand or can comprehend what a 'digital divide' is, what 'digital inclusion' means, and what 'digital equity' looks like."
- "Few in the financial and economic inclusion fields yet recognize the crucial importance of removing the digital divide as a barrier to equitable economic opportunity."
- "It takes sustained effort to educate organizational leaders who are also not involved in the online environment."

Respondents said awareness of the specific effects of the digital divide on communities and individuals could lead to action and investment.

### IF YOU HAVE MONEY, YOU PROBABLY HAVE BROADBAND

Increasingly, digital inclusion means economic inclusion. A higher income makes it more likely that a person will have access to broadband, and having broadband can increase the chances of having a higher income.

In 2013, a household that made more than \$100,000 had a 92 percent likelihood of having broadband at home, according to the Census Bureau 2013 American Community Survey. For those who made \$25,000 or less, the chance of having home broadband fell to 47 percent.<sup>6</sup> Job seekers find they are more likely to earn a living wage if they have digital skills. And, in rural communities, you see the impact of broadband on the economic health of farms and small towns.

<sup>6</sup>"Closing the Digital Divide: A Framework for Meeting CRA Obligations," Federal Reserve Bank of Dallas, December 2016, page 2, <https://www.dallasfed.org/~media/documents/cd/pubs/digitaldivide.pdf>

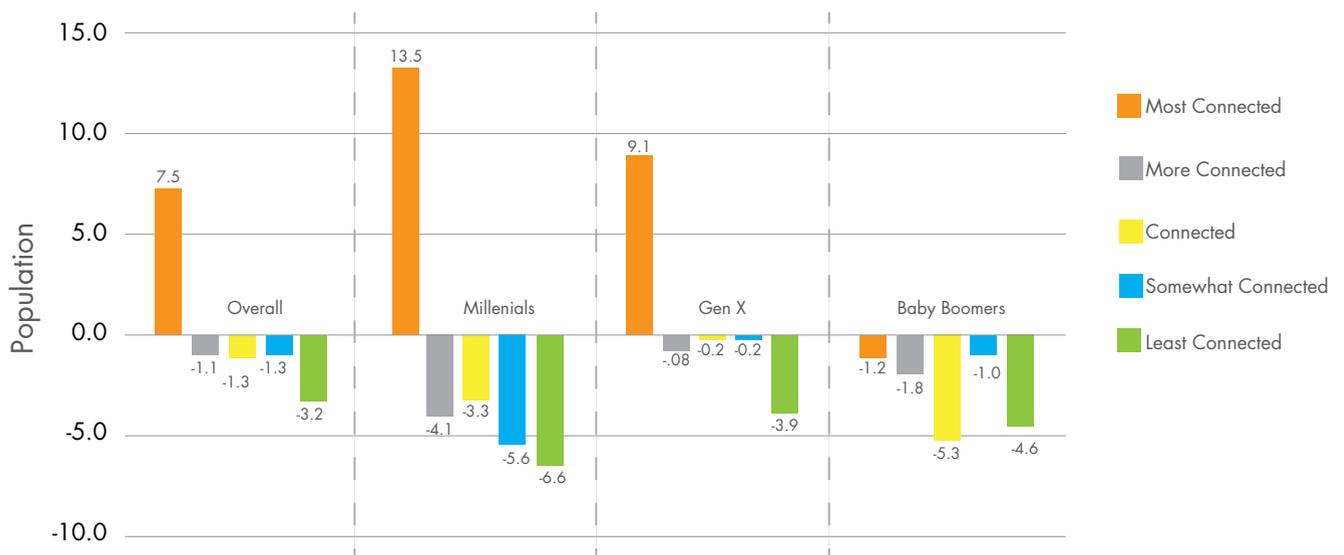
## IMPACT ON RURAL COMMUNITIES: POPULATION GROWTH, SMALL BUSINESS, HEALTH CARE

When the internet hit the scene, some reasoned that when everybody had it, anyone could live and work almost anywhere. So far, it's difficult to say the digital age has led to a fully decentralized economy.

*The Daily Yonder*, published by the Center for Rural Strategies, decided to find out. In 2015, it applied the Purdue Center for Regional Development Digital Divide Index (DDI) to counties considered metropolitan, small city and rural. Although it did not find a decentralizing effect overall, it did find an impact on population.

*The Daily Yonder* identified the 420 most-rural counties in the country. As shown in the chart below, it found that the most connected of those counties experienced a 13.5 percent increase in millennials between 2010 and 2016.<sup>7</sup> The authors say any community attempting to retain or attract millennials would need to address the digital divide, both in broadband access and use.

### POPULATION CHANGE IN RURAL COUNTIES BY DEGREE OF CONNECTIVITY



**Notes:** This chart shows population change by generation and “DDI” quintile in the nation’s most rural counties (rural counties that are farthest from metropolitan areas). In rural counties with the best digital access (a low digital divide index), the number of Millennials and Generation X members increased.

**Sources:** USDA; Pew Research; U.S. Census Bureau; Purdue Center for Regional Development. Used with permission of *The Daily Yonder*.

<sup>7</sup>“When it Comes to Broadband, Millennials Vote With Their Feet,” *The Daily Yonder*, April 11, 2018, <https://www.dailyyonder.com/comes-broadband-millennials-vote-feet/2018/04/11/24960/>

For farms and other businesses in rural communities, access to broadband can be an economic game changer. Nationwide, the internet generated 6 percent of the U.S. economy in 2014, according to a study published by the Internet Association. The value contributed by internet businesses to the economy grew 110 percent between 2007 and 2012.<sup>8</sup>

Tony Neal-Graves, executive director of the Colorado Broadband Office, told *The Denver Post* that robust internet is vital to making Colorado's smaller towns and cities economically vibrant and bringing back those in decline. "I 100 percent believe that having access to broadband service can be an economic catalyst for these communities," he said. "It's the 21st century version of providing everyone with electricity or phone service."<sup>9</sup>

Broadband allows most types of businesses to sell to people anywhere in the world. It also allows the most place-based businesses you can imagine—farms—to conserve resources and increase profitability. Precision agriculture uses information technology and tools like sensors, robotics, drones, GPS-based soil sampling and software to "make farming more accurate and controlled when it comes to the growing of crops and raising livestock."<sup>10</sup> To obtain and analyze the data, it takes broadband connections. Twenty-nine percent of U.S. farms, however, had no access to the internet in 2017, according to the U. S. Department of Agriculture.<sup>11</sup>



*Tri-County Telephone Association brings broadband service to businesses like Gayla Deines' of Hope, Kansas, making their operations much more efficient and immediate. Photo by Preston Keres, USDA.*

<sup>8</sup>"Study: The U.S. Internet Is Worth \$966 Billion," *U.S. News and World Report*, Dec. 11, 2015. The Internet Association is a trade group representing companies like Google, Airbnb, Facebook and Amazon. <https://www.usnews.com/news/blogs/data-mine/2015/12/11/the-internet-is-6-percent-of-the-us-economy-study-says>

<sup>9</sup>"Colorado Divide: Broadband Gaps Threaten to Leave Rural Areas in the Dust of Digital Age," *The Denver Post*, Sept. 8, 2017, <https://www.denverpost.com/2017/09/08/rural-colorado-broadband-gaps/>

<sup>10</sup>"What Is Precision Agriculture?" *AgFunder News*, April 24, 2017, <https://agfundernews.com/what-is-precision-agriculture.html/>

<sup>11</sup>"Rural Broadband," American Farm Bureau Federation, <https://www.fb.org/issues/technology/broadband/> (accessed April 15, 2019).

Broadband also gives rural areas and small towns access to life-saving health care. This is critical in areas with a low rate of providers to patients, and few specialists. “Broadband access is an essential means for these communities to create alternative opportunities for accessing health care through proven technologies such as telemedicine ... With broadband access at sufficient speeds, specialists can see patients, share health information and confer with primary care doctors who are hundreds of miles away.”<sup>12</sup>

## GENERAL IMPACT ON ECONOMIC DEVELOPMENT

Scholarly research on the impact of broadband on economic development produced mixed results, according to a Purdue University review. Some studies of local economies and broadband found a positive relationship with both economic growth and higher housing prices. Others found no significant impact of faster broadband on household incomes, employment rates or changes in unemployment rates.<sup>13</sup>

E-commerce is having an impact, the reviewers found. They cite a 2017 report from Progressive Policy Institute that showed e-commerce was responsible for adding about 261,000 net jobs between 2007 and 2017.<sup>14</sup>

As we look into the (not-so-distant) future, broadband will reshape cities and industries in ways that are hard to imagine. The Internet of Things (IoT) is the extension of internet connectivity into physical devices and everyday objects, enabling them to send and receive data. IoT will allow big data and artificial intelligence to monitor and enhance the physical world. IoT, along with artificial intelligence, is driving a fourth wave of industry. Where the steam engine, electrification and automation comprise the first three waves of technological advancement, Industry 4.0 will include “augmented reality, autonomous robots, simulation, additive manufacturing (also called 3D printing)” and more. Industry 4.0 will have an impact on manufacturing and, “provides opportunities to urban and rural areas alike, and consists of decentralized creativity, ‘democratizing’ manufacturing using online tools and 3-D printing as a source of experiential learning and skills-building.”<sup>15</sup>

## IMPACT ON JOBS: ACCESS TO MIDDLE-SKILL JOBS THAT PAY A LIVING WAGE

Middle-skill jobs are those that require less than a bachelor’s degree while paying at least \$15 an hour – what academics and others often consider a living wage. About 46 percent of overall labor demand is for middle-skill jobs, and some 82 percent of all middle-skill jobs are now “digitally intensive,” according to Burning Glass Technologies.<sup>16</sup> It analyzed its database of about 27 million online job postings from 2016 to determine whether digital skills had an impact on pay and jobs available. Burning Glass found “the number of jobs with digital skill requirements is growing faster, and the jobs pay more and offer greater opportunity for career advancement than jobs without those requirements.” Jobs that require less in the way of digital skills are concentrated in a few industries, among them construction and transportation. Baseline digital skills pay 17 percent more than non-digital roles.<sup>17</sup>

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<sup>12</sup>“Closing the Digital Divide,” Federal Reserve Bank of Dallas, page 9.

<sup>13</sup>“Broadband’s Impact: A Brief Literature Review,” Roberto Gallardo, Brian Whitacre and Alison Grant, Purdue University Center for Regional Development, January 2018, page 3.

<sup>14</sup>Ibid, page 4.

<sup>15</sup>Ibid, page 9.

<sup>16</sup>“Digital Edge: Middle-Skill Workers and Careers,” Burning Glass Technologies, 2017, page 1, [https://www.burning-glass.com/wp-content/uploads/Digital\\_Edge\\_report\\_2017\\_final.pdf](https://www.burning-glass.com/wp-content/uploads/Digital_Edge_report_2017_final.pdf)

<sup>17</sup>Ibid.

Broadband also makes it possible for people to telecommute, which has been found to increase job satisfaction and productivity, decrease work-family conflict and have a positive impact on median household income at the census tract level.<sup>18</sup>

## IMPACT ON EDUCATION

A 2008 analysis by the Board of Governors of the Federal Reserve System found that “after controlling for other characteristics, students with access to a computer and the internet at home are 6 to 8 percent more likely to graduate from high school.” The study found that internet access makes doing homework easier and also might reduce “non-productive activities” such as truancy and crime.<sup>19</sup>

The Pew Research Center found that about a third of households with school-age children lacked home broadband in 2013. Another study showed that about half of students surveyed “were unable to complete homework due to lack of broadband and 42 percent said they received a lower grade due to lack of broadband as well.”<sup>20</sup>

Students get creative to bridge the broadband gap. For example, in the Rocky Ford School District in southeast Colorado, some students with minimal internet access at home go to a Walmart parking lot or outside a closed library where wifi is free.<sup>21</sup> Students also may go to football grandstands and public parks where wifi is available, but “weather, business hours, distance and loitering or curfew laws” come into play. “In the same way that 20th century children depended on electrification to complete homework, 21st century students depend on internet access as if it were light.”<sup>22</sup>



*The Kansas State Library conducted a pilot hotspot lending program in rural libraries, including the Coffeyville Public Library. The library loaned out devices (“Mi-Fi”) that connect to 3G or 4G cellular networks.<sup>23</sup> The pilot program proved successful. Since the end of the pilot program, the library has invested in continuing to make the mobile hotspots available to patrons. “Our Mi-Fis are constantly being checked out and there is still a lengthy hold list on them,” Lee Ann Eggers, library director, said. Along with Mi-Fi, the library has its own wifi that residents can access inside the library, or outside 24 hours a day. Eggers said she sees people of all backgrounds parking or walking up to use the wifi each day.<sup>24</sup>*

<sup>18</sup>“Broadband’s Impact,” Purdue University, page 7.

<sup>19</sup>Daniel O. Beltran, Kuntal K. Das and Robert W. Fairlie, “Home Computers and Educational Outcomes: Evidence from the NLSY97 and CPS,” International Finance Discussion Papers (Board of Governors of the Federal Reserve System, November 2008), <https://www.federalreserve.gov/pubs/ifdp/2008/958/ifdp958.pdf>

<sup>20</sup>“Broadband’s Impact,” Purdue University, page 6.

<sup>21</sup>“Colorado Divide,” *The Denver Post*.

<sup>22</sup>Sharon Strover, Brian Whitacre and Colin Rhinesmith, “At the Edges of the National Digital Platform,” *D-Lib Magazine*, May/June 2017, vol. 23, no. 5/6, <http://www.dlib.org/dlib/may17/strover/05strover.html>

<sup>23</sup>Sharon Strover, Brian Whitacre and Colin Rhinesmith, “At the Edges of the National Digital Platform: Assessing and Creating Mobile Hotspot Lending Programs in the Rural Library,” Institute for Museum and Library Services, <http://sites.utexas.edu/imlsedgesgrant/>

<sup>24</sup>Email, Lee Ann M. Eggers, director, Coffeyville Public Library, to Jennifer Wilding, May 22, 2019.

In Kansas, according to one study, some rural school districts have replaced paper materials with e-books starting in first grade. Students complete all work online, and parents go online to download grades and progress reports, pay fees and check the school calendar. While schools may loan laptops or tablets, families are expected to provide an internet connection.<sup>25</sup> Homes without internet access are at a disadvantage.

## IMPACT ON ACCESS TO FINANCIAL SERVICES

To build wealth, it pays to have a relationship with a bank. Increasingly, that relationship happens online, as people conduct their banking on their electronic devices. “Fintech” is what they call the apps and innovations in the financial technology industry, often aimed at millennials or younger.

The Pew Research Center found 61 percent of total internet users bank online.<sup>26</sup> In response, banks are reducing their physical presence. Since 2010, the Federal Deposit Insurance Corp. (FDIC) says total office closures have exceeded openings.<sup>27</sup>

A 2018 Kansas City Fed study found low-income households without internet access are much more likely to be unbanked:

“In particular, we find that a low-income household without internet access has a significantly higher probability of being unbanked than a low-income household with internet access. Our results suggest that policies that target low-income households without internet access may be able to bring households into the banking system.”<sup>28</sup>

Characteristics beyond income associated with being unbanked Ranked from strongest to weakest correlation	
Education: Less than high school	<p>Among low-income households, research by the Federal Reserve Bank of Kansas City shows that lacking internet access has a higher correlation to being unbanked than a variety of other characteristics, including employment status and race.</p>
Age of household head: 34 or younger	
<b>Internet access: None</b>	
Race: Black	
Employment status: Unemployed	
Homeownership: Nonhomeowner	
Citizenship: Noncitizen	

<sup>25</sup>“At the Edges of the National Digital Platform,” *D-Lib Magazine*.

<sup>26</sup>“Closing the Digital Divide,” Federal Reserve Bank of Dallas, page 6.

<sup>27</sup>Ibid.

<sup>28</sup>Fumiko Hayashi and Sabrina Minhas, “Who Are the Unbanked? Characteristics Beyond Income,” *Economic Review*, Federal Reserve Bank of Kansas City, second quarter 2018, <https://www.kansascityfed.org/~//media/files/publicat/econrev/econrevarchive/2018/2q18hayashiminhas.pdf?la=en>

## CHANGE Lesson: Ever-changing technology means the divide will never go away.

# 2

What is cutting edge one day is obsolete the next. Several survey respondents said a simple but important lesson they learned was that the digital divide was not going away. For example:

- “This is a solvable problem today, but the technology is always changing, so the divide will evolve into another kind of digital disadvantage in the years to come.”
- “Twenty years ago I coordinated a community internet training program. We thought the program would only be needed for a couple of years. The need is still there. The need for training will never go away.”
- “As technology evolves, there are more chances to be left behind by it. Tech training really is an equalizer in a lot of ways. With knowledge comes the opportunity to fully participate and succeed in today’s world.”

We can learn from what works to narrow today’s digital divide, and keep innovating to find even better solutions to wherever the technology goes next.



*What was once the newest and best is now ready for repurposing, recycling or scrap at a community organization.*

## THE COMMUNITY REINVESTMENT ACT CAN HELP

Every year, the Community Reinvestment Act (CRA) helps bring more than \$100 billion in capital to LMI communities. In the 40 years since Congress passed the CRA, rules about what types of projects can be funded have changed to respond to changes in communities. One big change has been the internet, and the need for broadband access, training and hardware to ensure that people can engage in educational and economic activities online. As technology changes in coming decades, it is likely the CRA will continue to have a role in bringing it to LMI communities.

*“Banks can receive CRA credit by investments in ‘essential infrastructure,’ including broadband construction, as well as for computer access and digital literacy/job skill training initiatives for LMI individuals and/or in geographies that revitalize or stabilize LMI areas, or rural middle-income census tracts.”*

## WHAT IS THE CRA?

Congress passed the CRA in 1977, a time of urban decay and disinvestment. The CRA requires that all banking institutions that receive FDIC insurance provide “equitable access” to banking and credit services for residents of LMI communities in their service region, using safe and sound underwriting. Banks of different sizes have different CRA requirements.

Banks also get CRA credit through support of community organizations that serve LMI populations. Such bank support can include loans, financial services, grants, and/or bank employees volunteering their professional experience to the community organization. (Volunteering to paint houses and mow lawns might be helpful, but unless the bank employee does this type of work professionally, the bank wouldn’t get CRA credit for it.)

A bank’s CRA activity is reviewed by its bank regulator—either the FDIC, the Federal Reserve, or the Treasury Department’s Office of the Comptroller of the Currency (OCC). Banks are assigned a CRA rating, with Outstanding being the highest and Substantial Noncompliance the lowest. The bank’s CRA rating is taken into account in considering an institution’s application for deposit facilities, including mergers and acquisitions. A bank’s entire public CRA file must be available at its main office.

## CRA AND DIGITAL INCLUSION: WHAT’S ELIGIBLE?

Banks can receive CRA credit through investments in “essential infrastructure,” including broadband construction, as well as for computer access and digital literacy/job skill training initiatives for LMI individuals and/or in geographies that revitalize or stabilize LMI areas, or rural middle-income census tracts.

In 2016, the Federal Reserve, the OCC and the FDIC published updates to the Interagency Questions and Answers Regarding Community Reinvestment, the document that guides decisions about what is and is not eligible for CRA funding. The new version clarified that broadband communication services are an example of a community development purpose, and, therefore, CRA-eligible.

The Q&A document is not exhaustive, so the Federal Reserve Bank of Dallas developed guidelines for investing in broadband access and digital inclusion, available in “Closing the Digital Divide: A Framework for Meeting CRA Obligations.”

The Dallas Fed’s publication encourages banks to pay attention to the three legs of the stool and to blend or layer the types of investments they make in broadband to include all three. “To take their work even further, bank employees can offer online financial education/online banking training as part of their efforts to provide relevant skills ...”<sup>29</sup>

Like the Dallas Fed, the National Collaborative for Digital Equity (NCDE) emphasizes the need for all three legs of the stool. It cites research, such as a study of how to use technology to support at-risk student learning.<sup>30</sup> The research shows that “simplistic investments for technology ... that don’t address training, technical support, use of engaging instructional strategies, and assistance with literacy and cybersafety skills, are likely to yield limited impact.”<sup>31</sup>

NCDE also agrees with taking a blended approach. Currently, NCDE sponsors the “One Percent for Digital Equity” campaign. It advocates that banks and their community partners strive to reach a target of 1 percent of CRA funding—\$1 billion annually—to close the digital divide.

NCDE encourages banks and other investors to make digital equity investments that are “systemic,” which it defines as “supporting an integrated, evidence-based approach to equipping low-income learners with the tools they need to prepare and qualify for living-wage careers in STEM and other fields.”<sup>32</sup>

**The One Percent for Digital Equity Campaign recommends initial CRA proposals that:**

- are evidence-based and multifaceted;
- are incremental, so they start small;
- are aligned with other local efforts that support issues like workforce development, business retention, etc.;
- employ a collective impact approach that ensures LMI learners have a voice in planning and action; and
- are supportive of the funder’s investment strategy and community needs.<sup>33</sup>

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<sup>29</sup>“Closing the Digital Divide,” Federal Reserve Bank of Dallas, page 10.

<sup>30</sup>Linda Darling-Hammond, Molly Bullock Zieleszinski and Shelley Goldman, “Using Technology to Support At-Risk Students’ Learning,” Stanford Center for Opportunity Policy in Education and Alliance for Excellent Education, September 2014, [https://www.researchgate.net/publication/299951721\\_Using\\_Technology\\_to\\_Support\\_At-Risk\\_Students'\\_Learning](https://www.researchgate.net/publication/299951721_Using_Technology_to_Support_At-Risk_Students'_Learning)

<sup>31</sup>“Guide to CRA Grantmaking for Digital Equity and Economic Inclusion,” National Collaborative for Digital Equity, Fifth Edition, August 2018, <http://digitalequity.us/resources.html>

<sup>32</sup>Ibid.

<sup>33</sup>Ibid.

NCDE shares some examples of digital equity support likely to qualify for CRA credit, provided they serve a documented population of at least 51 percent LMI residents. Here are a few:

- Mobile hotspot devices for lending to LMI families;
- Donation by banks both of their own recent used computers, along with funds to refurbish and provide them for free to LMI learners;
- Training for young people in how to provide tech support in LMI communities; and
- Training children, young people and adults in coding.<sup>34</sup>

NCDE offers its free “Guide to CRA Grantmaking for Digital Equity and Economic Inclusion” here: <http://digitalequity.us/resources.html>

## RURAL BROADBAND

Lesson: New business models and/or public funding are critical to serving unprofitable areas.

# 3

Sometimes, providing broadband is profitable and sometimes the costs outstrip the return. That is why survey respondents said serving unprofitable areas would need to take a different approach:

- “Large incumbent carriers and ISPs (internet service providers) are not going to invest in improving broadband infrastructure without having a certain level of return on their capital investment. Rural, impoverished, underserved segments will never give the return they need. That’s why an alternative model, allowing municipalities and public co-ops to own and operate, will work if they have support, but large incumbent lobbyists are such a force that this is difficult to overcome.”
- “Public resources are essential, as the private market is not addressing unprofitable areas and constituents.”
- “Playing a passive role, providing access to the internet and technology, is critical. But to eliminate the digital divide, it’s going to take a more proactive approach that libraries outside of metro areas don’t currently have the capacity to provide. If we want libraries to continue to provide equitable access to technology, it’s going to require a major public investment in libraries.”

What makes it profitable or unprofitable to provide broadband services to an area? The answer offers a stark contrast between urban and rural America. In urban areas, the broadband infrastructure usually is in place, but people in a low-income neighborhood may not be able to afford a monthly subscription or the computers needed to use it. Take one giant step backward, and you see the challenge in rural areas, where there often is no broadband infrastructure at all. To bring broadband to a particular farm, it may take laying fiber to that farm or building a series of towers to link a wireless network. And that farm may be one of just a handful in the area. This is not cheap.

<sup>34</sup>Ibid.

Because the rural and urban versions of the digital divide are so different, the players often are different, as well. State governments take a stronger role in providing broadband to rural areas, while municipal government and nonprofits often take the lead in serving urban areas. The federal government has programs aimed at both.

## **SERVING RURAL AMERICA: BUILDING THE BROADBAND INFRASTRUCTURE**

The Tenth District includes states that are mainly rural, although “rural” looks different in Missouri than it does in Wyoming. The problem, however, is the same—how to get broadband to farms and towns spread across great distances—and the solutions fit each state’s specific circumstances.

First, a little context.

### **The need in rural areas**

Rural communities without broadband miss out on a range of services, from homework help and health-care access to business data and commerce. A recent study by the National Rural Electric Cooperative Association, for example, found that “rural electric cooperative members are missing out on nearly \$70 billion annually” because they lack high-speed internet.<sup>35</sup>

The U.S. Census Bureau defines rural areas as open countryside with population densities less than 500 people per square mile and places with fewer than 2,500 people. In some rural counties, there are fewer than five households per square mile. Depending on terrain, it costs \$10,000 to \$30,000 per mile to lay glass fiber.<sup>36</sup>

According to 2016 FCC data, more than a third of all rural residents lack access to broadband. In urban areas, only 4 percent of the population lacks broadband access.<sup>37</sup>

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<sup>35</sup>“Missouri receives \$254 million for boosting broadband,” *Missouri Ruralist*, Sept. 20, 2018, <https://www.farmprogress.com/print/197605>

<sup>36</sup>“Border-to-Border Dreams,” *fedgazette*, Federal Reserve Bank of Minneapolis, <https://www.minneapolisfed.org/publications/fedgazette/border-to-border-dreams#top>

<sup>37</sup>“At the Edges of the National Digital Platform,” *D-Lib Magazine*.

## What rural broadband looks like in the Tenth District

The following chart provides a snapshot of rural broadband across states in the Tenth Federal Reserve District. These data are from the FCC, the Census Bureau and private sources such as broadband providers and resellers.<sup>38</sup> Most datasets used are from 2013-17. The results are calculated by BroadbandNow.com, a service that attempts to simplify the broadband shopping experience while also showing where there is and isn't competition for broadband services.<sup>39</sup> With the exception of Colorado, all states in the Tenth District ranked in the bottom quarter for the level of connection.

State	Percent of broadband coverage	Percent of population underserved*	Mbps average statewide speed	Ranking of connection level among 50 states†
Colorado	91	13	48.4	22
Kansas	87	21	44.4	38
Missouri	84	22	40.9	41
Nebraska	87	15	30.5	37
New Mexico	82	24	31.4	43
Oklahoma	77	30	45.5	47
Wyoming	76	27	35.4	49

\*“Underserved” is the percent of the population with access to fewer than two wired providers.

†Rank based on percent of the population with access to 25+ Mbps wired broadband.

## BROADBAND TODAY EQUALS ELECTRICITY AND TELEPHONE SERVICE IN THE 1930S

For rural areas today, broadband is a utility as vital as electricity and telephone service. In the 1930s, without government subsidies, American small towns and farms would not have received electricity or telephone service as soon as they did, if at all.

The Communications Act of 1934 “established universal service as a cornerstone of federal policy, ensuring that all Americans could use the telephone at a reasonable cost. In the following decades a system of subsidies was developed to provide additional support for rural telecommunications.” One way the cost of phone service in rural areas was reduced was through mandates that telephone companies charge the same price statewide, even though it cost much more to deliver service in the countryside.<sup>40</sup>

<sup>38</sup>“Exploring the Data Behind BroadbandNow: Where Our Data Comes From, How We Process It, and Why It’s the Best on the Web,” BroadbandNow website, <https://broadbandnow.com/data> (accessed May 2, 2019).

<sup>39</sup>BroadbandNow database of broadband providers, <https://broadbandnow.com/>, figures as of May 2, 2019.

<sup>40</sup>“A Little Help for Rural Broadband,” *fedgazette*, Federal Reserve Bank of Minneapolis, Aug. 15, 2017, <https://www.minneapolisfed.org/publications/fedgazette/a-little-help-for-rural-broadband>

Electric cooperatives sprang up across the United States in the 1930s as part of President Franklin D. Roosevelt's New Deal. "These not-for-profit organizations received federal subsidies to build out electricity infrastructure to power up rural America. Co-op members pay to join, and pay for their electric usage, but any extra money is reinvested into the co-op or paid back to members."<sup>41</sup> Decades after the first electric cooperatives, people created telephone cooperatives using the same structure.<sup>42</sup>

Today, some 260 telephone cooperatives and 900 electric cooperatives provide service to rural America. Electric cooperatives provide power to more than half the U.S. land area, and more than 30 states have at least one telephone cooperative, according to a policy brief by the Institute for Local Self-Reliance.<sup>43</sup>

Some cooperatives are using their networks to provide internet service. They are one of several types of internet service providers available to American consumers.

## THERE ARE SEVERAL DIFFERENT TYPES OF BROADBAND PROVIDERS

Various entities provide broadband, and most compete for federal funds to expand their networks into rural areas. Who is allowed to provide broadband differs by state. In some states, the same coops that provide electricity and telephone service provide broadband, as the same low profit margins apply to broadband as to phone and electric. Also in the mix are small, independent for-profit companies, along with large national corporations that dominate the industry. And, in some states, municipalities are building their own networks where none existed.

In addition to the different types of broadband providers, there are also multiple technologies used to gain access to the internet. From radio waves and phone lines to cable and fiber, the options expand with each new technological breakthrough. Fiber is generally considered the best internet option if it is available, but currently it covers only about 25 percent of the United States. ConsumerAffairs.com, a web-based consumer news and resource center, asked consumers how they judge their ISPs. While rural residents may be grateful for any service at all, most consumers judge providers by these features:<sup>44</sup>

1. Internet speed
2. Service offerings (business, residential, etc.)
3. Customer support
4. Reliability
5. Availability

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<sup>41</sup>"Rural America Is Building High-Speed Internet the Same Way It Built Electricity in the 1930s," *Motherboard*, Dec. 1, 2017, [https://www.vice.com/en\\_us/article/ywnz37/electric-coops-internet-america-cooperatives-broadband](https://www.vice.com/en_us/article/ywnz37/electric-coops-internet-america-cooperatives-broadband)

<sup>42</sup>"Cooperatives Fiberize Rural America: A Trusted Model for the Internet Era," Community Networks policy brief, Institute for Local Self-Reliance, November 2017, page 1, <https://muninetworks.org/reports/edit-report-cooperatives-fiberize-rural-america-trusted-model-internet-era>

<sup>43</sup>Ibid, page 3.

<sup>44</sup>"Top- and Lowest-Rated Internet Providers – What Customers Have to Say," Allconnect Resource Center, February 21, 2019, <https://www.allconnect.com/blog/top-lowest-rated-internet-providers/>

If they are dissatisfied with their provider, though, most consumers have no alternative. More than half of all Americans have just one option for high-speed broadband.<sup>45</sup> Large carriers generally target the more-populated, more-profitable urban and suburban areas. Other providers may go where the large carriers choose not to go, or they may challenge the large carriers on their home turf. Depending on who you ask, lack of competition is due to lobbying and lawsuits by the large carriers, or local governments that charge excessive fees for rights-of-way, or the high cost to deploy the technology, among other factors.<sup>46</sup>

### Large carriers

The large carriers are the names that most people think of when they think of internet service. It's AT&T, Comcast, Verizon and the other large corporations that provide most of the United States with internet. Despite their size, the large carriers may find themselves challenged by consumer demands and changing tastes.

The American Customer Satisfaction Index provides customer satisfaction rankings across 46 industries—financial service providers, restaurants, retail and, yes, internet service providers. According to its 2018 survey, internet service providers, along with subscription TV, have the poorest customer satisfaction ratings among industries the survey tracks. Consumers gave ISPs a score of 62 out of 100 in 2018, down 3.1 percent from 2017.<sup>47</sup>

### Small, independent for-profit providers

There is a David-and-Goliath feel when small independent ISPs meet their gigantic competitors on the battlefield. Whether the little guys win, or even make the attempt, often comes down to local regulations that determine the cost to deploy high-speed internet service. (FCC regulations also have a massive impact, but are beyond the scope of this report.)

Let's take Sonic, for example. It's an independent ISP in Santa Rosa, California. It has 100,000 customers. The 25-year-old company is planning its largest expansion so far into another 19 neighborhoods in the Bay Area. It expects to add about 50,000 new customers to its existing base in the next two years. The company has more than 500 employees, and considers itself a "midsize regional telecommunications carrier," according to Dan Jasper, its chief executive officer. Its competitors include AT&T, Comcast and Wave. Sonic offers gigabit fiber internet bundled with home phone service for \$40 a month for the first year, \$50 a month after that.<sup>48</sup> *Consumer Reports* ranks Sonic the second-best broadband provider in the country.<sup>49</sup>

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<sup>45</sup>"ACSI Telecommunications Report 2018," American Customer Satisfaction Index, May 22, 2018, [www.theacsi.org](http://www.theacsi.org), page 8.

<sup>46</sup>"Don't Blame Big Cable. It's Local Governments that Choke Broadband Competition," *Wired*, July 2013, <https://www.wired.com/2013/07/we-need-to-stop-focusing-on-just-cable-companies-and-blame-local-government-for-dismal-broadband-competition/>

<sup>47</sup>"ACSI Telecommunications Report 2018," American Customer Satisfaction Index, page 8.

<sup>48</sup>"Internet Provider Sonic Adding Faster Gigabit Fiber Service for 19 Bay Area Neighborhoods," *San Francisco Chronicle*, March 7, 2019, <https://www.sfchronicle.com/business/article/Internet-provider-Sonic-adding-faster-gigabit-13668653.php>

<sup>49</sup>"How a Small ISP Delivers Ultra-Fast Broadband When the Giants Won't," *CIO*, May 7, 2017, <https://www.cio.com/article/3193735/how-a-small-isp-delivers-ultra-fast-broadband-when-the-giants-won-t.html>

The large incumbent carriers already have infrastructure in place—think AT&T’s telephone poles—that can be used to carry internet service the last mile to customers’ homes. If an independent ISP like Sonic wants to run fiber to a home, it has two choices. It can string the fiber from telephone poles, or it can bury them in trenches in the street. But the telephone company may make it difficult for a competitor to use the poles, and digging a trench is up to 10 times more expensive than the phone pole option.<sup>50</sup>

Another option is to forego fiber altogether. Small Wireless Internet Service Providers (WISPs) provide a fixed wireless internet service that is much less expensive to build. A WISP “relies upon a direct, line-of-sight connection from the access point (normally on top of a tower or tall landmass) to the roof of your home.” WISPs are limited to relatively flat terrain, and in those conditions they can usually match the speeds of cable providers, and far exceed the speeds of satellite, DSL or dial-up, according to a report by BroadbandNow. And while it might cost some \$1.5 million to install fiber in 500 homes, the same homes would cost about \$100,000 to reach via WISP. In recent years, WISPs are increasingly serving rural areas unserved by other carriers.<sup>51</sup>



*Nex-Tech is a communications company serving central and western Kansas. The company says, “Enjoying the small-town environment we live in ourselves, our passion is to make life better for our friends and neighbors, our customers, by giving them access to high-speed, high-tech services that some city-dwellers only dream about.” Here, physicians at Clara Barton Hospital in Hoisington, Kansas, use technology and fiber-powered internet connectivity to create a patient care plan.*

<sup>50</sup>Ibid.

<sup>51</sup>“WISPs Are the Real Heroes in Bridging the Digital Divide,” BroadbandNow, Jan. 26, 2018, <https://broadbandnow.com/report/wisps-real-heroes-bridging-digital-divide/>

## **Rural co-ops**

After nearly a century of delivering electricity and phone service to rural Americans, cooperatives are taking on the newest infrastructure need—high-speed internet. The Institute for Local Self-Reliance finds that rural electric cooperatives provide broadband to 334 communities, and calls cooperatives “an under-appreciated tool for expanding access rapidly in a fiscally responsible manner across rural America.”<sup>52</sup>

People often cite the Co-Mo Electric Cooperative as a positive example of what co-ops can do. (Learn more about Co-Mo on page 33 of this report.) As Co-Mo’s former information technology manager, Randy Klindt led the process of bringing broadband to what had been one of the most underserved areas in Missouri. In 2015, Klindt formed Conexon LLC, to help rural electric cooperatives with fiber-to-the-home projects.

According to Klindt, electric co-ops make sense as broadband providers for several reasons. They already have the equipment, such as bucket trucks. They have access to rights of way. They already serve the people who are typically unserved by broadband. Their financial expectations are all very long term, 30 years rather than the seven years that is typical of for-profits. And they are willing to accept a lower return and have a lower cost of capital.<sup>53</sup>

## **Municipalities**

More than 500 communities receive service from municipal networks, according to the Institute for Local Self-Reliance. The networks range from publicly owned fiber-to-the-home citywide networks, publicly owned cable, to publicly owned fiber or dark fiber, the unused extra fiber-optic cable companies often lay to curb the costs of repeatedly having to lay fiber. More than 150 communities in 29 states have a publicly owned network that provides at least 1 gigabit services.<sup>54</sup>

Any community can find it daunting to launch investment in broadband infrastructure. Next Century Cities, a nonprofit membership organization founded to support communities and elected officials in providing broadband, offers a toolkit that can help, available at <https://nextcenturycities.org/wp-content/uploads/Becoming-Broadband-Ready-Toolkit-web.pdf>

“Becoming Broadband Ready: A Toolkit for Communities,” covers topics such as: building a community movement; establishing policies and procedures such as “dig once” and “simplified permitting;” creating a digital inclusion plan; identifying legislative and regulatory barriers; exploring connectivity options such as co-ops or open access networks; exploring financing options; and more. The toolkit includes real-life examples and a helpful glossary and checklist.<sup>55</sup>

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<sup>52</sup>“Cooperatives Fiberize Rural America: A Trusted Model for the Internet Era,” Community Networks policy brief, Institute for Local Self-Reliance, November 2017, page 1, <https://muninetworks.org/reports/edit-report-cooperatives-fiberize-rural-america-trusted-model-internet-era>

<sup>53</sup>Randy Klindt, partner, biography. <https://www.conexon.us/executive-team/>

<sup>54</sup><https://muninetworks.org/communitymap>

<sup>55</sup>Next Century Cities. “Becoming Broadband Ready: A Toolkit for Communities.” Washington, D.C.: Next Century Cities: January 2019.

The way each community tackles the challenge of broadband varies. We offer a couple of examples below.

### ***Ammon, Idaho***

Ammon, Idaho, offers the internet infrastructure as a utility. It uses a model called Open Access Virtual Infrastructure (OAVI), which separates the underlying physical infrastructure from the network services. This means that multiple ISPs can offer service over the same fiber infrastructure and any user can use any ISP they want. Consumers can switch among ISPs quickly and easily. It is somewhat like the city owning the roads, and leasing access to any trucking company that wants to use them, with residents deciding which to hire.

Ammon's public utility built the network with no debt and got 70 percent of its potential customers to sign up for the service. Because it offers its own Point of Presence (PoP) and other equipment that ISPs need, at low cost, it was able to recruit multiple ISPs to deliver services. Each of these ISPs then have a level playing field to compete for customers based upon service and price.

“It is somewhat like the city owning the roads, and leasing access to any trucking company that wants to use them, with residents deciding which to hire.”

According to a white paper on the City of Ammon website, Ammon's OAVI model addresses three issues related to broadband:<sup>56</sup>

- Broadband today is largely a natural monopoly.
- Broadband regulation via antitrust and consumer-protection laws has proven deficient.
- Broadband is arguably already a public utility.

With OAVI, though, a municipal utility creates a self-regulating infrastructure. “This will allow the fixed costs of building, operating and maintaining the infrastructure to be equitably apportioned amongst the users,” according to the white paper. “In return the infrastructure is guaranteed and is equally available to all utility members. Network services, including bandwidth, will become a commodity; open and abundantly available to all.”<sup>57</sup>

Ammon was named the Community Broadband Project of the Year in 2016 by the National Association of Telecommunications Officers and Advisors.<sup>58</sup>

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<sup>56</sup>“The Ammon Model: Open Access Virtual Infrastructure,” [http://www.cityofammon.us/pdf/departments/fiberoptic/Ammon\\_Model\\_D4.pdf](http://www.cityofammon.us/pdf/departments/fiberoptic/Ammon_Model_D4.pdf), page 3.

<sup>57</sup>Ibid.

<sup>58</sup>“Unique Model Makes Citizens a Funding Partner in Broadband Network,” *The Daily Yonder*, Oct. 5, 2017, <https://www.dailyyonder.com/unique-funding-model-makes-citizens-funding-partner-network/2017/10/05/21706/>

### ***Longmont, Colorado***

NextLight™ is Longmont’s community-owned fiber-optic internet service, rated the fastest ISP in the nation by *PC Magazine* (2018). The service is provided by Longmont Power & Communications, the city’s nonprofit electric and broadband services utility that operates under the direction of the Longmont City Council. NextLight signed up its first subscribers in 2014 and now has a 55 percent subscription rate, ahead of the 37 percent that was originally projected for 2019.



Longmont is Colorado’s first “gigabit city” and NextLight was named the 2017 Community Broadband Project of the Year by the National Association of Telecommunications Officers and Advisors<sup>59</sup>

*Longmont residents can help low-income children secure internet services with “Sharing the NextLight.” The new program provides a free NextLight connection and combined modem/wireless router to qualifying low-income families with children in local schools. Longmont residents can donate to the fund through the Longmont Community Foundation, or NextLight subscribers can donate through their monthly bill.*

## **WHAT ARE YOUR OPTIONS FOR INTERNET SERVICE?**

Each city, town and even neighborhood has a distinct set of possible internet service providers. When it is time to get connected, it can be nice to know that much of the research has already been done.

BroadbandNow has identified 2,670 internet service providers in the United States, their coverage and download speeds. Enter your ZIP code at <https://broadbandnow.com/All-Providers>, and the website tells you which DSL, copper, cable, fiber-optic, fixed wireless and mobile broadband providers serve where you live. Scroll down for an “internet provider competition map” for your region, showing how many providers serve which census tracts.

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<sup>59</sup>“NextLight Wins National Honors from NATOA,” Longmont Power & Communications press release, July 18, 2017, [www.longmontcolorado.gov/NextLight](http://www.longmontcolorado.gov/NextLight)

## BROADBAND MAPS MAY NOT TELL THE COMPLETE STORY

State governments also are jumping in to make sure broadband is available statewide. When a state decides to expand broadband access, the first step usually is to draw a map to determine where it is most needed. This often is a complicated and contentious process.

State maps showing broadband availability need to be accurate, in part because they determine if areas qualify for federal funding. Community leaders engaged throughout this initiative expressed concern about issues with mapping. Incomplete maps, they said, complicated efforts to narrow the digital divide.

### Collectively, people in the field have identified four mapping issues:

#### 1. The maps track availability only to the census block level.

If even one location in a census block has service, the whole block is considered served. In rural areas, census blocks can be immense. In Wyoming, for example, the largest census block is 575 square miles.

A quick lesson on the difference between census blocks and tracts: The progression from smallest to largest is block, block group and tract. Census blocks vary in population from zero to several hundred, while census tracts generally have between 1,500 and 8,000 people.<sup>60</sup>

To see the impact, consider the process for distributing grants from the Connect America Fund. That fund provides subsidies to companies willing to build internet in parts of rural America that don't have service. The FCC asks telecom companies to complete a form—Form 477—twice a year. The information helps the FCC determine whether an area is eligible to receive grant-funded service.<sup>61</sup>

*Motherboard* magazine explains how it works: "On these forms, the companies indicate any census block where at least one home could theoretically be served with 10 Mbps internet within 'a reasonable amount of time.' If so, that region is considered 'served' and is no longer eligible for funding under the Connect America Fund." In reality, none of the homes in the census block may have internet, yet the block still would be considered "served."<sup>62</sup>

<sup>60</sup>"Research 101: Census Tracts vs. Census Block Groups," Current360, <https://current360.com/research-101-census-tracts-vs-census-block-groups/>

<sup>61</sup>"The FCC Disqualified a Bunch of Rural Communities from Receiving Internet Funding After Big Telecom Said They Already Have Internet," *Motherboard*, Jan. 4, 2018, [https://www.vice.com/en\\_us/article/yw5bpv/fcc-caf-auction-final-census-blocks](https://www.vice.com/en_us/article/yw5bpv/fcc-caf-auction-final-census-blocks)

<sup>62</sup>"The FCC Disqualified a Bunch of Rural Communities from Receiving Internet Funding," *Motherboard*.

**2. The map does not distinguish between residential and other uses.**

It takes much less broadband capacity to do homework, for example, than to run a business or government office. But the map “does not distinguish between residential broadband and connectivity that is adequate for institutions, government, and businesses,” according to research by the New Mexico Broadband Program. Broadband may be shown on the map as available to the residential market but may not be available to the small business market, and vice versa.<sup>63</sup>

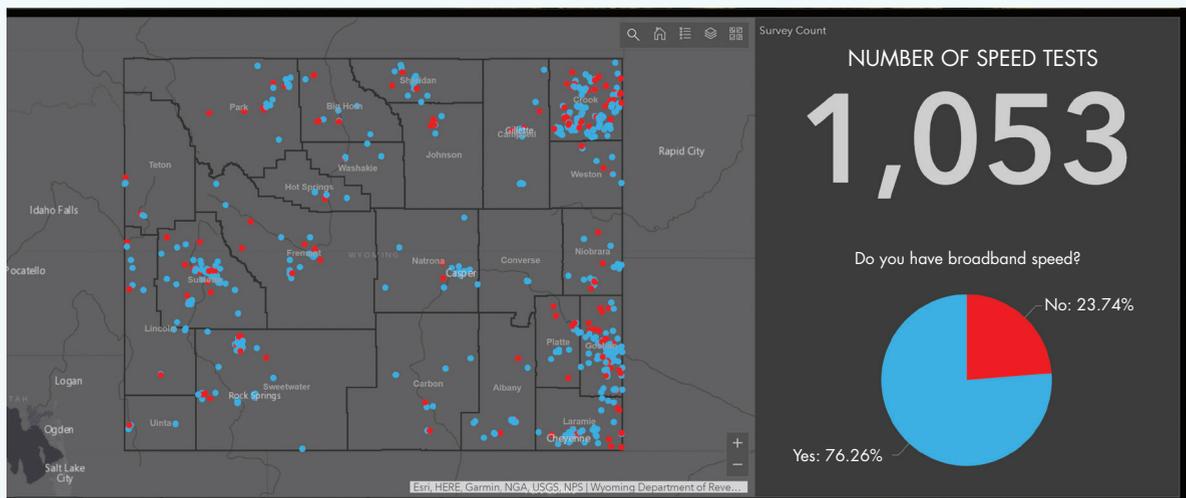
**3. The map relies on self-reporting by commercial carriers.**

Each commercial carrier uses a different method to quantify its service levels, and the FCC does not audit any of the data supplied to it by the carriers. A study by Earth Data Analytics Center found that broadband availability and coverage was overestimated in New Mexico. The Center developed procedures for reviewing ISP data and for finding areas where availability is less than what is shown on the map.<sup>64</sup>

**4. The map does not reflect affordability.**

Where broadband is available, it often is expensive. Smaller communities tend to have fewer providers and slower speeds, but pay more. Roundtable participants in Omaha reported paying \$90 a month for 10 Mbps, for example, whereas in Kansas City, \$40 a month can buy speeds of 100 Mbps.<sup>65</sup>

## WYOMING DASHBOARD SHOWS SPEED TESTS CONDUCTED TO VERIFY BROADBAND AVAILABILITY



When Russ Elliott became Wyoming’s first broadband manager in 2018, he knew he needed an accurate map of internet availability to deploy expansion efforts effectively. Each dot on the state’s broadband dashboard reflects a speed test, provider information and parcel data. Blue shows where actual broadband is available and red shows where speeds are below broadband level. Not surprisingly, the majority of unserved areas fall outside of cities and towns.

<sup>63</sup>The New Mexico Broadband Program, Statewide Final Strategic Plan, Version 2, December 2014,” ctc technology & energy, www.doit.state.nm.us, page 20.

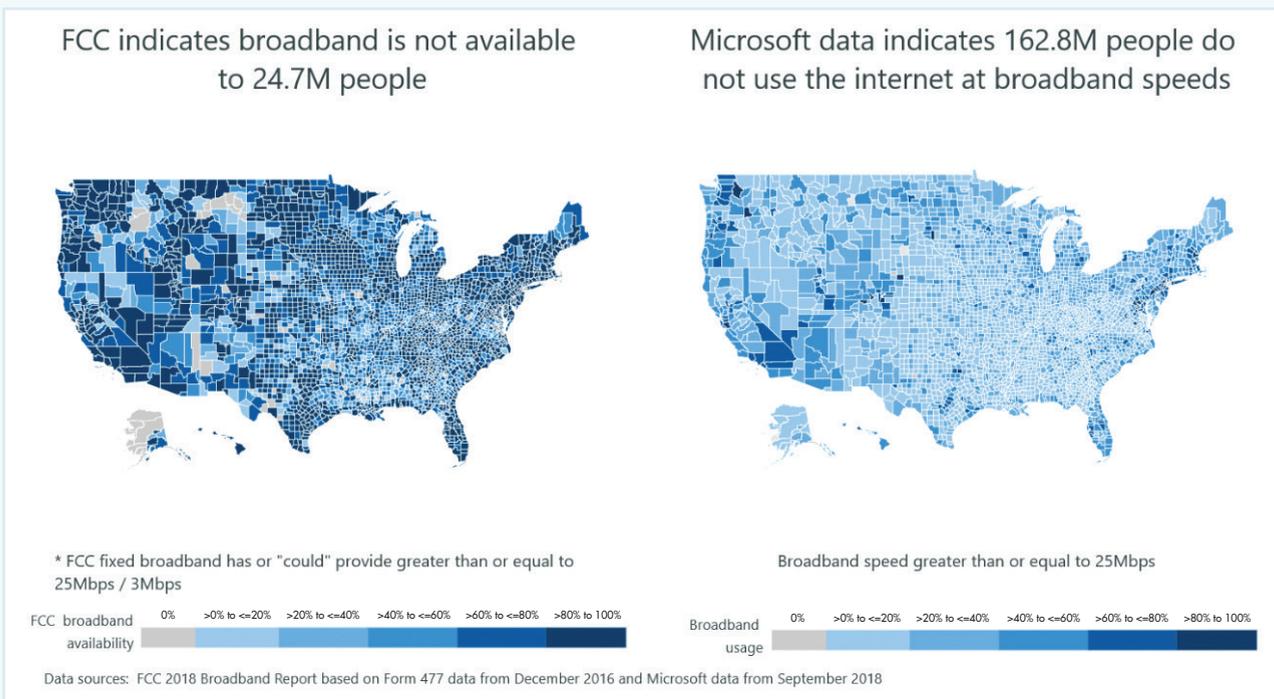
<sup>64</sup>“New Mexico State Broadband Initiative: Availability Assessment Methodology,” Dec. 31, 2013, [http://www.doit.state.nm.us/broadband/reports/NMBB\\_Availability\\_Assessment\\_Report\\_Oct2013.pdf](http://www.doit.state.nm.us/broadband/reports/NMBB_Availability_Assessment_Report_Oct2013.pdf)

<sup>65</sup>Jeremy Hegle, “2018 Community Leader Roundtable Summary: Digital Inclusion,” (Federal Reserve Bank of Kansas City, unpublished), page 3.

### Microsoft verifies problems with FCC maps

Microsoft conducted its own study of the digital divide, which it released in December 2018. Microsoft researchers created detailed data by looking at the internet speeds at which people were using their software and services. The FCC's data measure **availability** of broadband while the Microsoft data measure broadband **usage**. The company shared its analysis with the FCC, which is looking at how it might improve its broadband measurements.<sup>66</sup>

While the FCC says 24.7 million Americans lack access to broadband, Microsoft found the actual number was 162.8 million. According to *The New York Times*, "The discrepancy is particularly stark in rural areas. In Ferry County (Washington), for example, Microsoft estimates that only 2 percent of people use broadband service, versus the 100 percent the federal government says have access to the service."<sup>67</sup>



Microsoft researchers found that fewer people use the internet at broadband speeds than suggested by FCC maps.<sup>68</sup> Used with permission of Microsoft.

<sup>66</sup>"Digital Divide Is Wider Than We Think, Study Says," *The New York Times*, Dec. 4, 2018, <https://www.nytimes.com/2018/12/04/technology/digital-divide-us-fcc-microsoft.html>

<sup>67</sup>Ibid.

<sup>68</sup>"It's time for a new approach for mapping broadband data to better serve Americans," John Kahan, chief data analytics officer, Microsoft on the Issues (the official Microsoft blog), April 8, 2019.

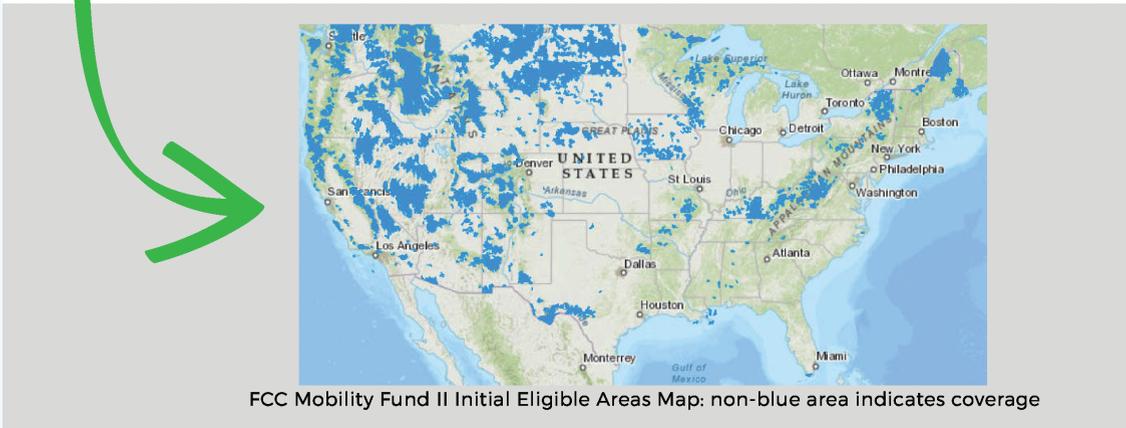
### Kansas Farm Bureau verifies problems with 4G LTE data

The same problems that bedevil broadband maps also affect maps of 4G LTE wireless services. In preparation for making about \$4.5 billion available, the FCC required maps. The funds were intended to support areas—primarily rural—that lacked unsubsidized 4G LTE services, through a program called Mobility Fund Phase II (MF-II). The FCC required that mobile providers submit current data on coverage on qualified 4G LTE service, and the FCC would use the data to decide what areas were eligible for MF-II funding. The agency allowed interested parties “to challenge an initial determination that an area is ineligible for MF-II support.”<sup>69</sup>

When phone carriers submitted data showing that all of Kansas had reliable, fast cell phone coverage, the Kansas Farm Bureau mobilized its members to verify actual coverage. It formed #ConnectingKansas. It asked Kansas residents to download the FCC speed test app, run the test at various times and different locations, and send the results to the Kansas Farm Bureau at [speedtest@kfb.org](mailto:speedtest@kfb.org).<sup>70</sup>

Kansas Farm Bureau members conducted more than 6,000 tests, of which more than 2,600 met the FCC guidelines. Nearly 1,600 reported download speeds of less than 5 Mbps, and six locations met the FCC criteria for substandard service.<sup>71</sup>

## #CONNECTINGKANSAS



*The FCC granted the Kansas Farm Bureau the chance to challenge the wireless phone coverage maps showing all of Kansas was covered.*

<sup>69</sup>“Mobility Fund Phase II (MF-II),” Federal Communications Commission, Wednesday, Aug. 1, 2018.

<sup>70</sup>“#ConnectingKansas,” Kansas Farm Bureau, [www.kfb.org/Get-Involved/connecting-kansas](http://www.kfb.org/Get-Involved/connecting-kansas) (accessed Dec. 19, 2018).

<sup>71</sup>Ibid.

## IN SOME STATES, LAWS CAN MAKE BROADBAND VERY DIFFICULT

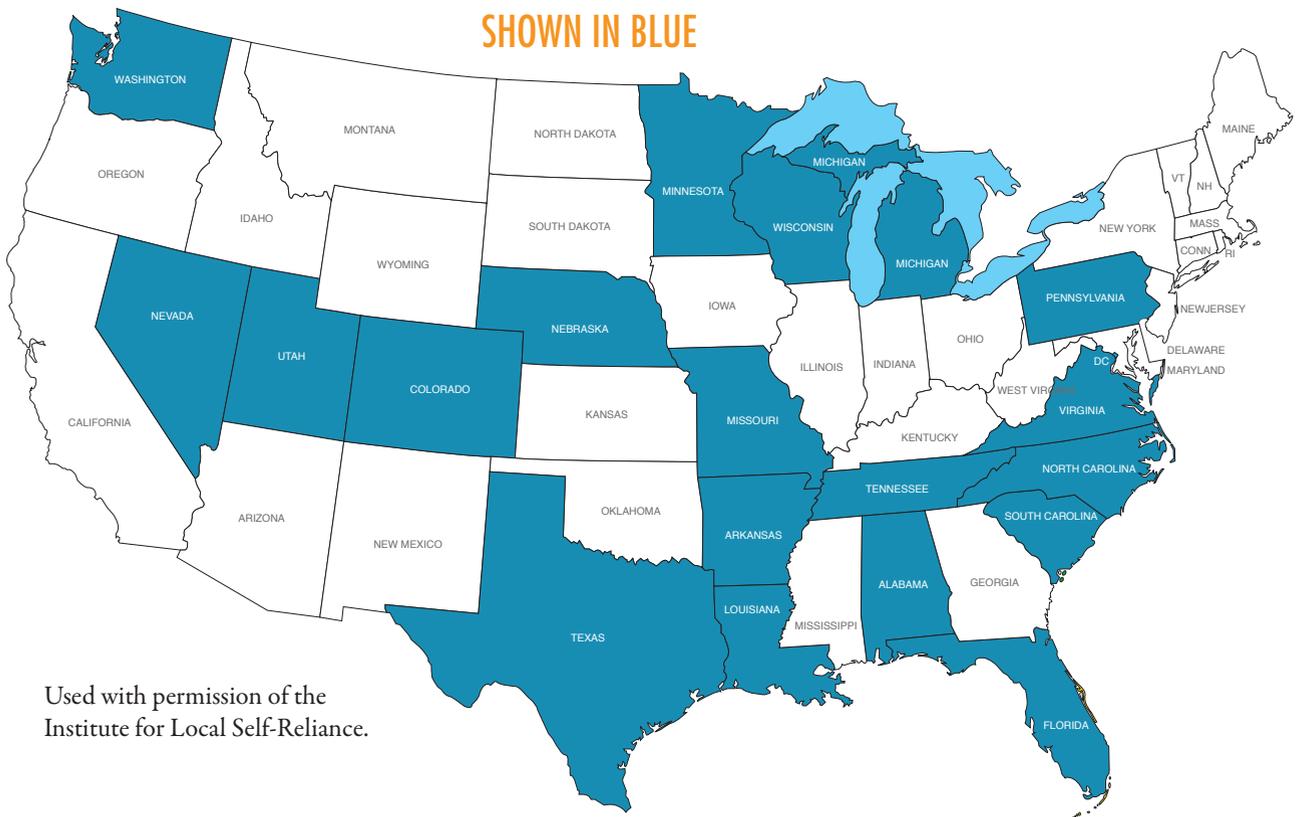
At the national level, the FCC regulates broadband. But whether a state has access to high-speed broadband also depends on laws passed by state or local governments. Some states have laws that prohibit municipalities from providing broadband. At a different level, laws can make it more or less difficult to deploy the technology.

### Some state laws keep municipalities from providing broadband

The Institute for Local Self-Reliance finds that 19 states have barriers in place “that discourage or prevent local communities from deciding locally if ... an investment [in broadband] is a wise decision.”<sup>72</sup> The institute mentions three states in the Tenth District:

- **Colorado:** Unless incumbent service providers refuse to provide the requested service, municipalities must have a referendum to offer service. The referendum allows them to opt out of the state law that prohibits municipalities from offering broadband.
- **Missouri:** State law bars cities and counties from selling telecommunications services to the public, though “internet-type” services are exempted.
- **Nebraska:** The state prohibits communities and public power companies from providing telecommunications services.

## 19 STATES WITH BARRIERS SHOWN IN BLUE



<sup>72</sup>“Community Network Map,” Community Networks, a project of the Institute for Local Self-Reliance, <https://muninetworks.org/communitymap> (accessed June 4, 2019).

## Chattanooga is a gigabit pioneer

According to Harvard University researchers, municipal or co-op networks provide significant benefits. They write that these “community fiber networks offer better entry-level broadband values and clearer, teaser-free pricing.”<sup>73</sup> Survey respondents mentioned the municipal network in Chattanooga, Tennessee.

In 2008, Chattanooga wanted a “smart” power grid for the city, one that could reroute electricity and avoid outages. The municipal power company, EPB, “realized it could lay every customer’s home for fiber-optic cable at the same time” it updated the power grid. It did not have to raise taxes or pull funds out of its budget.

In 2010, Chattanooga became the first U.S. city to be wired by a municipality for 1 gigabit-per-second (Gps) fiber-optic internet service. In 2015, the city started offering 10 Gps service.

As of 2016, EPB offered gigabit connections at \$70 a month and provided discounts for low-income residents, according to reporting in *The Nation*. EPB offered service to more than half the area’s internet market. In comparison, Comcast offered service that was about 85 percent slower at twice the price.<sup>74</sup>

When Chattanooga first started planning its municipal network, Comcast sued to keep EPB from offering the service.<sup>75</sup> Comcast said the municipal service was unfair competition. It lost the suit, “but Comcast and other companies have spent millions of dollars on ad campaigns and donations to local politicians in the hope that municipal providers don’t expand more than they already have.”<sup>76</sup>

Municipal broadband in Chattanooga appears to be helping economic development and low-income communities. The \$220 million EPB spent to develop the system has led to \$865 million in economic growth, according to an economic analysis prepared by the University of Tennessee-Chattanooga. Because the network makes the electrical grid more efficient, EPB can afford to offer the internet to low-income families for a reduced price of about \$27.

More municipalities are following Chattanooga’s lead. In 2016, more than 50 communities offered publicly owned 1-Gps internet services, and more than 450 offered some form of publicly owned internet service.<sup>77</sup>

The FCC has said it would push for the repeal of state and local laws, supported by the cable industry, that make it harder for cities to create their own networks. In 2016, 18 states had laws preventing cities and towns from offering internet services outside of their municipal boundaries.

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<sup>73</sup>Talbot, David, Kira Hessekiel, and Danielle Kehl. “Community-Owned Fiber Networks: Value Leaders in America,” Berkman Klein Center for Internet & Society, research publication, 2017, <https://dash.harvard.edu/handle/1/34623859>

<sup>74</sup>“Chattanooga Was a Typical Postindustrial City, Then It Began Offering Municipal Broadband,” *The Nation*, June 3, 2016, <https://www.thenation.com/article/chattanooga-was-a-typical-post-industrial-city-then-it-began-offering-municipal-broadband/>

<sup>75</sup>“Chattanooga’s Super-Fast Publicly Owned Internet,” CNN Business, May 20, 2014, <https://money.cnn.com/2014/05/20/technology/innovation/chattanooga-internet/index.html>

<sup>76</sup>“Chattanooga Was a Typical Postindustrial City,” *The Nation*.

<sup>77</sup> Ibid.

Chattanooga Mayor Andy Berke said, “People understand that high-speed internet access is quickly becoming a national infrastructure issue just like the highways were in the 1950s. If the private sector is unable to provide that kind of bandwidth because of the steep infrastructure investment, then just like highways in the 1950s, the government has to consider providing that support.”<sup>78</sup>



*Students at The Howard School in Chattanooga use a powerful microscope located at another school. Chattanooga’s fiber optic network makes it possible for students at The Howard School, and other schools in the district, to share remote access to the research tool. Photo provided by The Enterprise Center in Chattanooga, Tennessee.*

## RED TAPE CAN MAKE IT MORE DIFFICULT TO DEPLOY BROADBAND TECHNOLOGY

“From right-of-way access and zoning to construction permits and franchising, state and local barriers to infrastructure deployment can have a major impact on Americans’ access to broadband,” according to the 2018 Broadband Scorecard Report from the R Street Institute. The institute is a nonprofit, nonpartisan public policy research group that promotes free markets and limited, effective government.

The scorecard examines laws that govern broadband infrastructure deployment in all 50 states. It gives each state a score, based on 44 criteria, that is specific to the category of broadband deployment. The categories included things like access to public rights of way, franchise agreements, and construction permits.

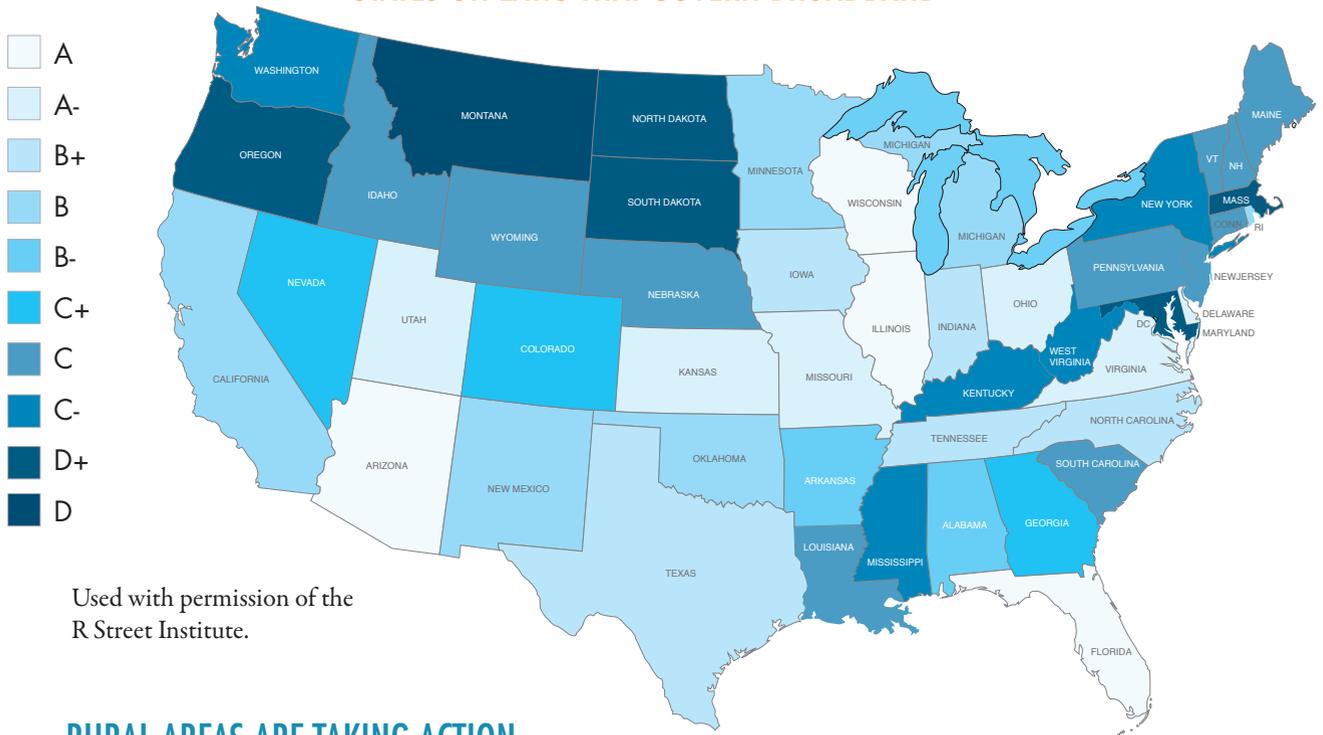
The scores are based on how easy states make it for internet service providers to cut through the red tape:<sup>79</sup>

- Colorado: C+
- Kansas: A-
- Missouri: A-
- Nebraska: C
- New Mexico: B
- Oklahoma: B
- Wyoming: C

<sup>78</sup>“Chattanooga’s Super-Fast Publicly Owned Internet,” CNN Business.

<sup>79</sup>“2018 Broadband Scorecard Report,” R Street Institute, Nov. 29, 2018, <https://www.rstreet.org/2018/11/29/2018-broadband-scorecard-report/#>

## R STREET INSTITUTE'S BROADBAND SCORECARD REPORT GRADES STATES ON LAWS THAT GOVERN BROADBAND



Used with permission of the R Street Institute.

### RURAL AREAS ARE TAKING ACTION

Small communities also are taking action to secure broadband, sometimes working alone and sometimes as part of a larger statewide effort. *Motherboard* magazine investigated the digital divide, including rural areas that were building their own networks “because no one else will.”<sup>80</sup> One example, from Kentucky, illustrates a method for solving the rural broadband problem.

Letcher County, Kentucky, sees the internet as the next economic revolution, replacing a coal industry that has played out. Letcher County has 25,000 residents on 300 square miles near the Virginia border. It has formed a broadband board to deliver the internet like a self-sustaining municipal broadband utility. The utility plans to use a mix of broadband signals and fiber, and possibly microtrenching, where fiber optic cable is embedded into the road and blacktopped over.<sup>81</sup>



Residents of Linefork, in Letcher County, Kentucky, worry that a lack of broadband access is holding back local youth, and making them leave the area to find work. About 19 percent of the state’s population had no access to wired broadband in 2017. State officials have developed KentuckyWired, which is building a middle-mile fiber-optic network across the state.<sup>82</sup> Photo by Malcolm Wilson; used with permission of Ohio Valley ReSource.

<sup>80</sup>“Rural America Is Building Its Own Internet Because No One Else Will,” *Motherboard*, Aug. 29, 2017.

<sup>81</sup>Ibid.

<sup>82</sup>“Without A Net: Rural Residents Band Together for Internet Service,” Ohio Valley ReSource, June 5, 2017, <https://ohiovalleyresource.org/2017/06/02/without-net-rural-residents-band-together-internet-service/>

Several Tenth District states are striving to provide the infrastructure needed for broadband in rural counties. A few stories illustrate what seems unique and especially interesting about each state's work to connect rural areas.

### **Colorado voters opt out of restrictive state law**

By pushing for a restrictive state law, large internet providers said they would serve the whole state, but then did not provide internet services everywhere. The outcome has spilled over to the ballot box.

Large incumbent internet providers advanced SB 152, which prevents local government from providing telecommunication service to the public itself or partnering with the private sector.<sup>83</sup> The state legislature passed SB 152 in 2005. As a result, large parts of the state, such as the Eastern Plains and mountain towns, had no or insufficient service.<sup>84</sup>

The bill, though, allowed a community to hold a referendum to opt out of SB 152, which would leave it free to pursue other options. Rio Blanco County voted to opt out of SB 152 in 2014, with 82 percent approval. The Colorado Department of Local Affairs chose Rio Blanco County as one of the first two to receive money set aside for broadband networks.<sup>85</sup> Initially, the county worked with Colorado Fiber Community (CFC), which built the infrastructure and then contracted with the county to perform maintenance and operations on the network. Local ISPs used the infrastructure to deliver services to the public and work with subscribers.

Demand for service, though, was much higher than expected. The county has about 6,500 residents on 3,200 square miles in the western part of the state. Officials thought about 40 percent of residents would sign up, but instead about 75-80 percent of residents are on track to enroll. Funds, however, were available to meet only about 10 percent of the demand. That led county commissioners to end the agreement with CFC and take more responsibility for operations. This will allow Rio Blanco government to build a self-sustaining system by keeping all funds in house.<sup>86</sup>

Usually, the goal for building rural broadband is economic development or return on investment. The county, though, set the goal "of obtaining the fastest internet access it could for as many people as it could and offering it at Google-type pricing" of about \$70 for 1 gigabit service. They viewed it as necessary to "maintain relevancy as a community."<sup>87</sup>

In Colorado's November 2016 elections, the SB 152 ballot measures passed with an average approval rating of 76 percent.<sup>88</sup> As of January 2019, 40 of the state's 64 counties and 102 municipalities had passed ballot measures to opt out of SB 152.<sup>89</sup>

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<sup>83</sup>Colorado Senate Bill 152: Restrictions on Municipal or Community-Led Broadband Initiatives," NEO Connect, April 2016, <http://neoconnect.us/wp-content/uploads/2016/07/SB152.pdf> and "Should Colorado Broadband Law Be Revoked? Yes," *The Denver Post*, April 26, 2016, an op/ed written by Timothy E. Wirth, who served Colorado in the U.S. Senate and House of Representatives, and Ken Fellman, former Arvada mayor and current Littleton city attorney. <https://www.denverpost.com/2014/09/05/should-colorado-broadband-law-be-revoked-yes/>

<sup>84</sup>Colorado Voters Choose Local Control in 26 Communities," Community Networks, a project of the Institute for Local Self-reliance, Nov. 9, 2016, <https://muninetworks.org/content/colorado-voters-choose-local-control-26-communities>

<sup>85</sup>Rio Blanco County Stays Relevant with Broadband," *Broadband Communities*, November/December 2016, <http://www.bbpmag.com/Features/1116-Rio-Blanco.php>

<sup>86</sup>Rio Blanco County to Eliminate Third Layer," Community Networks, a project of the Institute for Local Self-reliance, Nov. 9, 2017, <https://muninetworks.org/content/rio-blanco-county-eliminates-third-layer>

<sup>87</sup>Rio Blanco County Stays Relevant With Broadband," *Broadband Communities*.

<sup>88</sup>Colorado Voters Choose Local Control In 26 Communities," Community Networks.

<sup>89</sup>Colorado Map: Local Authority Expanding Across the State," Community Networks, a project of the Institute for Local Self-Reliance, Jan. 9, 2019, <https://muninetworks.org/tags/tags/sb-152>

## **Missouri electric co-op takes the lead in bridging the digital divide**

The Co-Mo Electric Cooperative was founded in 1939 to bring power to rural areas in central Missouri.<sup>90</sup> By the 2000s, local residents were hungry for the next must-have utility: the internet.

When Randy Klindt joined Co-Mo in 2008, only 15 percent of its territory—2,300 square miles in central Missouri—had broadband access. In 2010, Co-Mo applied for American Recovery & Reinvestment Act funding to build middle-mile and last-mile fiber, building broadband connections to anchor institutions and customer homes and businesses. Despite an outpouring of letters of support from members, Co-Mo did not get the grant.

Klindt wrote a financial plan for Co-Mo to self-finance a gigabit fiber-to-the-home network.<sup>91</sup> His board needed to be convinced because until then, no electric cooperative had been able to build without a government subsidy. The Co-Mo board gave Klindt permission to market a pilot project, and said if 25 percent of possible subscribers signed on, they would move forward.

To be included, a subscriber needed to pay a \$100 deposit. The enthusiasm for broadband was such that people went door to door to get sign ups, and some people paid the deposits of neighbors and friends. Two banks, Central Bank of Jefferson City and Bank of Concordia, volunteered to pay the deposits for each of their bank depositors.

Based on the community's enthusiasm in exceeding the 25 percent threshold, Co-Mo's board of directors voted to launch Co-Mo Connect, the new telecommunications subsidiary. They hired Klindt as general manager. Over four years, Co-Mo Connect built 4,000 miles of fiber and made broadband available to all co-op members, as well as three nearby towns that weren't served by the cooperative.

In 2015, Co-Mo Connect had its first break-even year.<sup>92</sup> In mid-2017, it completed fiber optics to all its members. It was the first to deliver broadband in Missouri without federal funds.<sup>93</sup> Co-Mo often is cited as an inspiration to other communities seeking to own their own internet utility.



*Randy Klindt convinced his board to self-finance a fiber-to-the-home network in 2010. In 2015, it broke even for the first time.*

<sup>90</sup>“How Internet Co-ops Can Protect Us From Net Neutrality Rollbacks,” *Yes!* magazine, Nov. 22, 2017, <https://www.yesmagazine.org/people-power/how-internet-co-ops-can-protect-us-from-net-neutrality-rollbacks-20171122>

<sup>91</sup>“Cooperatives Fiberize Rural America: A Trusted Model for the Internet Era,” Community Networks policy brief, Institute for Local Self-Reliance, November 2017, page 7.

<sup>92</sup>Interview, Randy Klindt, May 1, 2019. Conducted by Jeremy Hegle.

<sup>93</sup>“Mo. Co-ops Seek More Broadband,” America's Electric Cooperatives website, Aug. 22, 2017, <https://www.electric.coop/missouri-electric-cooperative-broadband-blunt-mccaskill>

## **Nebraska engages thousands in broadband planning, with a focus on business**

The Nebraska Broadband Planning Initiative was a five-year project (2010-15) and was part of a national effort to integrate broadband into state and local economies. The project involved partners that included state agencies, a university and a nonprofit. It focused on project areas that included mapping, planning, capacity building, technical assistance and regional planning.

The effort engaged a significant number of state residents. More than 8,000 Nebraskans, including 600 young people, provided their time and ideas. They served on planning teams, focus groups and forums, and helped to create the state plan and eight regional plans.

Regional planning teams encouraged a focus on businesses, as surveys and other feedback “consistently showed that many businesses in the State of Nebraska do not understand how technology and broadband can enhance their bottom line.”<sup>94</sup>

The project asked Nebraska businesses for feedback on how they used broadband technologies. They said:<sup>95</sup>

- When businesses use broadband, their revenue typically increases 24 to 45 percent. Broadband use resulted in a net increase of 654 jobs by 364 businesses.
- Eighty-three percent of businesses said the availability of broadband affected their decision to remain in their current location.

The initiative took on activities that its leaders hoped would encourage the skillful use of broadband. Among them:<sup>96</sup>

- The project conducted eight regional technology fairs designed to educate businesses on ways to leverage various technologies to improve their operations. The fairs drew more than 270 businesses. Experts talked about cloud computing, remote sensing and more topics. Businesses said they made changes based on what they learned.
- They trained 24 business coaches to help individual businesses understand how to use broadband to increase their economic vitality. The coaches met with more than 40 businesses, and more than half said they took action.
- They conducted four statewide broadband conferences with more than 200 participants at each.

The University of Nebraska has worked recently with the cities of Ashland, Ravenna and Nebraska City to better utilize social media and gain trust. Here are examples of the results of that project.<sup>97</sup>

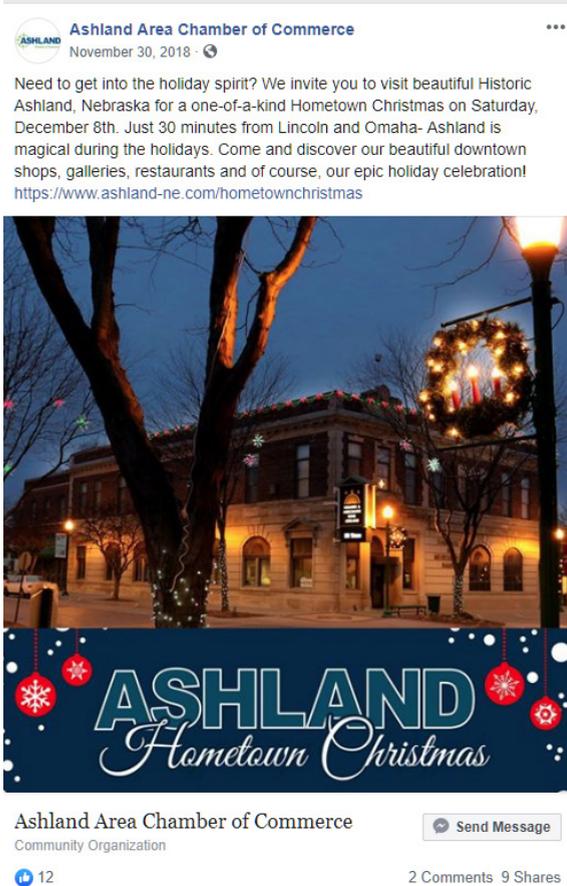
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<sup>94</sup>“Nebraska Broadband Planning Initiative, Final Report – April 2015,” page 5, <https://unlcms.unl.edu/ianr/extension/nebraska-broadband/custom/Final-NE-Report-Supplemental.pdf>

<sup>95</sup>Ibid., page 1.

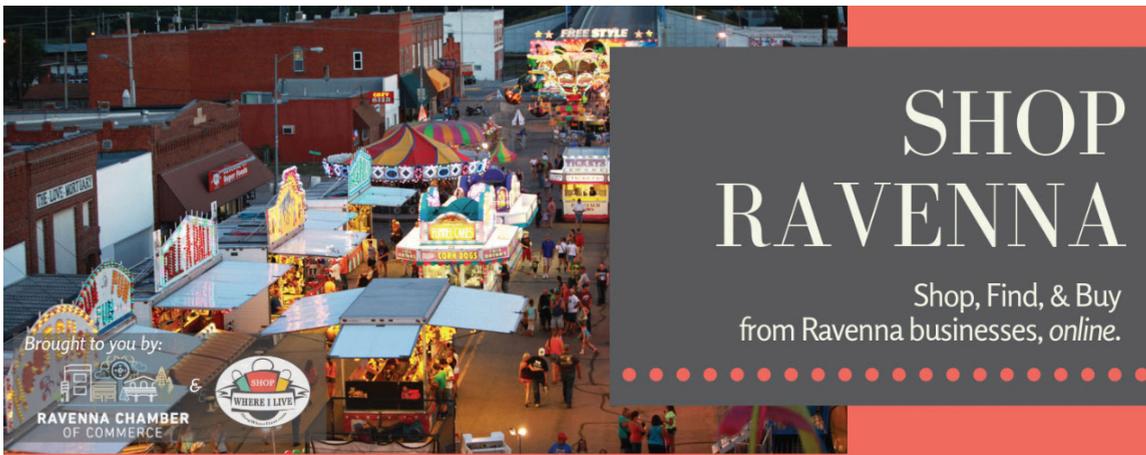
<sup>96</sup>Ibid., page 2.

<sup>97</sup>Email, Anne Byers, Nebraska Information Technology Commission, May 9, 2019, to Jennifer Wilding. Various emails from Charlotte Narjes, extension educator, UNL Ag Economics – Nebraska Cooperative Development Center, May 2019, to Jennifer Wilding.



### ***Ashland, Nebraska, uses social media to boost participation***

The City of Ashland involved stakeholders in developing and launching a social media strategy that used minimal funds to achieve dramatic results. For example, the only change in marketing for the Ashland Home Town Christmas event was the use of sponsored posts on Facebook. Organizers spent \$185 on five sponsored ads, which reached 13,162 individuals. While social media is not the only reason for an increase in attendance—organizers also added new attractions—they say it deserves much credit for attendance leaping from 200-300 in the first year to about 4,000 in the third.



### ***Ravenna, Nebraska, uses social media to spotlight local businesses***

Ravenna, with a population of about 1,400, is in Buffalo County. They used the grant to post an online e-commerce market, <https://ravenna.shopwhereilive.com/>, which allows people to shop and buy from local businesses online. They also launched an online talk show hosted by the Ravenna Economic Development Corp. and Chamber of Commerce that reaches almost the entire population.

### Nebraska City has first Twitter Town Hall

Nebraska City conducted a rural civic engagement survey, encouraged residents to sign up for emergency notifications and conducted a town hall meeting on Twitter. The Twitter Town Hall, @Nebraska\_City #NECityListens, was billed as “a new way to communicate with City Hall” when it previewed Sept. 13, 2018.

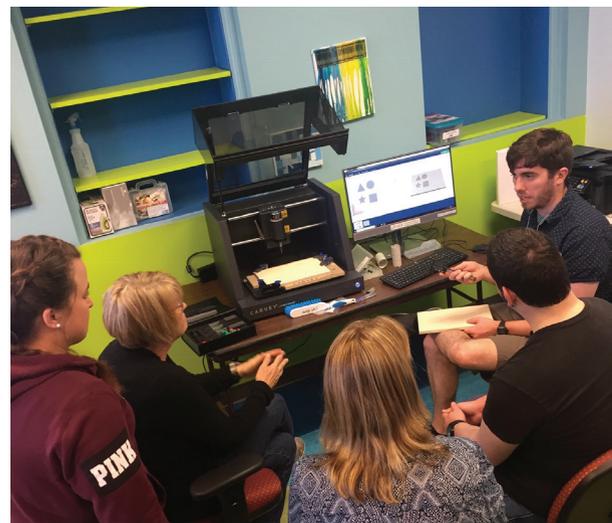


### Nebraska Innovation Studio—traveling makerspaces

The Library Innovation Studios project introduces libraries and their communities in rural Nebraska to new and different types of technology. Libraries host the makerspaces (collaborative work spaces) for about 20 weeks each, with the long-term goal of creating support for a permanent makerspace. The project also provides training to library staff and community members, instructional materials, equipment certification, and more. The grant is a partnership of the Nebraska Library Commission, Nebraska Innovation Studio, Nebraska 4H Extension, Nebraska’s Regional Library Systems, supported in part by a grant from the Institute of Museum and Library Services.



Scott Scholz, director of the Talking Book and Braille Services, conducts a library staff training using the makerspace audio kit.



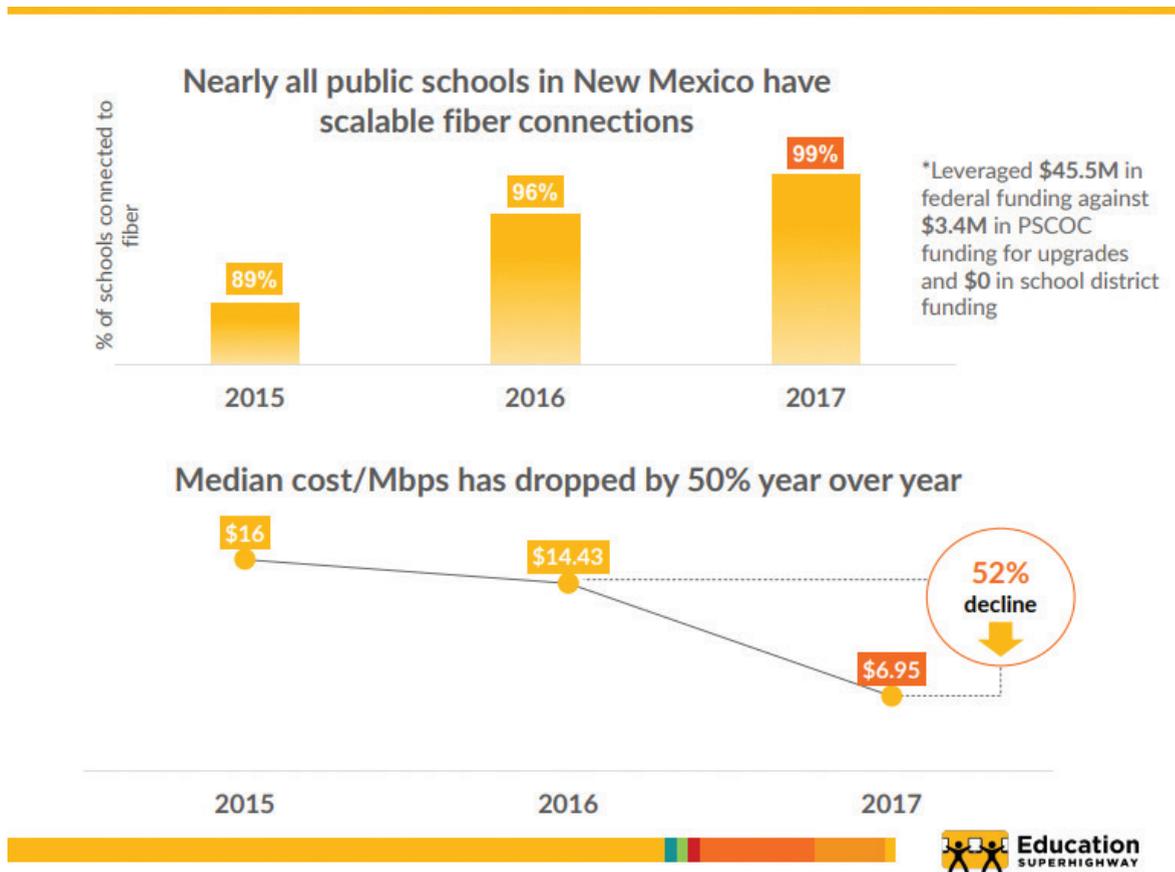
Instructional designer Max Wheeler trains at the Bridgeport Public Library.

## New Mexico helps schools reduce broadband costs

In 2015, New Mexico state government launched an initiative to connect every classroom by the 2018 school year. What was standing in the way? The state considered affordability its largest barrier between schools and high-speed internet access, so that is where it focused. Various state departments, school districts and a national nonprofit, EducationSuperHighway, developed a plan.

The state focused on lowering costs through statewide pricing agreements. Its state website links to a tool that makes school broadband and pricing data transparent, enabling schools to get more bandwidth for their budget.<sup>98</sup> State government also provides other assistance, such as leveraging federal, state and local funding for fiber infrastructure and upgrades, to help drive competitive pricing within regional clusters of school districts.

From 2015-17, the median cost per Mbps dropped from \$16 to \$6.95.<sup>99</sup>

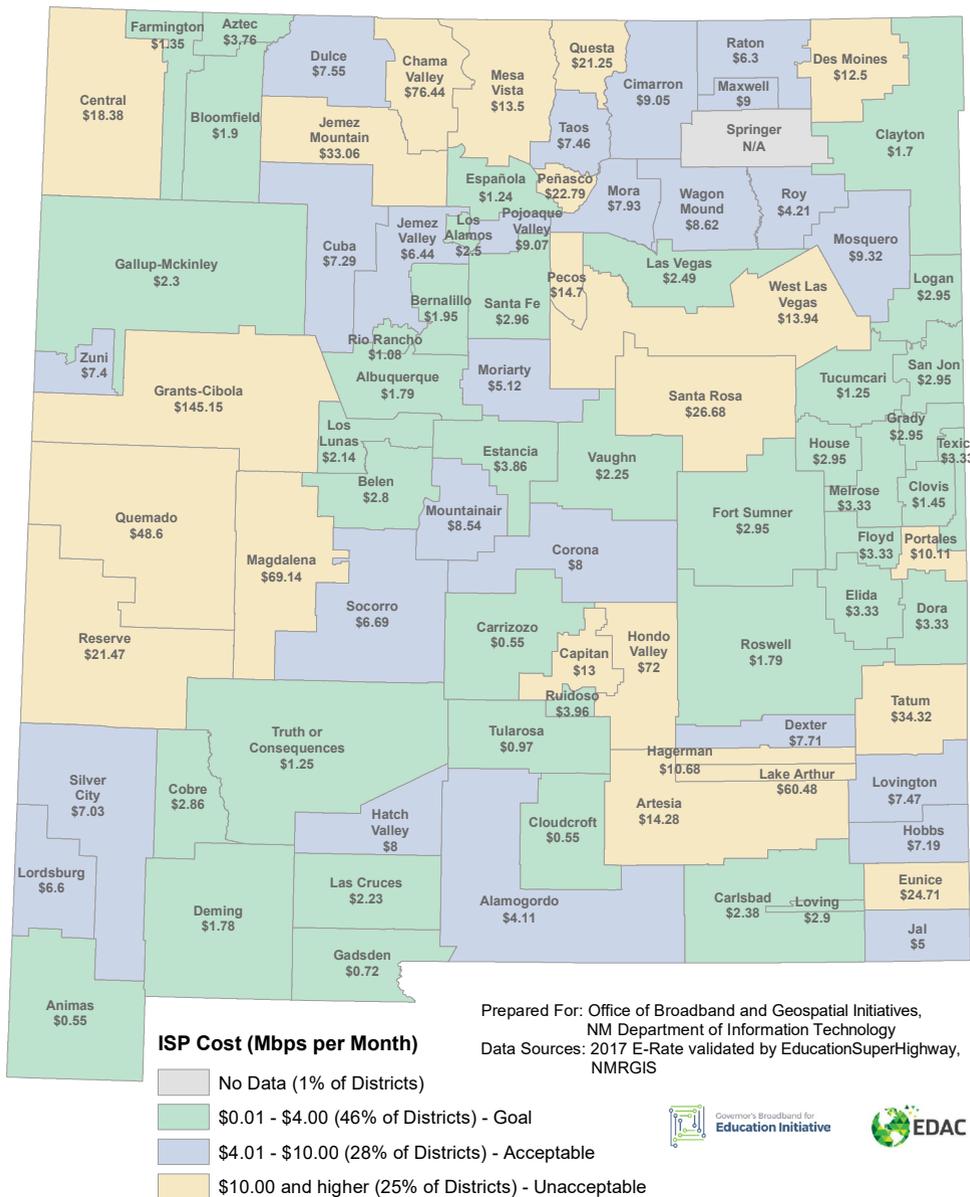


Source: Governor's Broadband for Education Initiative

<sup>98</sup>“Overview of the Initiative,” [www.broadband4education.nm.gov](http://www.broadband4education.nm.gov) (accessed April 4, 2019).

<sup>99</sup>“Internet Access Progress for New Mexico’s Public Schools,” EducationSuperHighway, Sept. 13, 2017, [http://www.broadband4education.nm.gov/uploads/PressRelease/685d5fd30b5144c3b4e58870f413c917/PSCOC\\_9\\_13\\_2017\\_ESH.pdf](http://www.broadband4education.nm.gov/uploads/PressRelease/685d5fd30b5144c3b4e58870f413c917/PSCOC_9_13_2017_ESH.pdf)

## ISP Cost per Mbps per Month 2017 E-rate Data



In September 2018, the Governor's Broadband for Education Initiative released the most recent figures showing a cost comparison for school districts and libraries throughout New Mexico. The data were from the 2017 E-rate, validated by EducationSuperHighway. The E-rate program helps ensure that schools and libraries can obtain high-speed Internet access at affordable rates. In New Mexico, the E-rate provides eligible public schools with an estimated 82 percent discount on approved costs. E-rate discounts are based on the number of students eligible for the federal National School Lunch Program. Cost ranges from \$145 per Mbps per month in Grants-Cibola County to 55 cents in Carrizozo, Cloudcroft and Animus counties.<sup>100</sup>

Source: Governor's Broadband for Education Initiative

### Some examples of how New Mexico reduced its costs for internet:

- Entities in eastern New Mexico reduced their cost/Mbps nearly 50 percent from their existing service providers after aggregating demand and using price transparency;
- The Jemez Tribal Consortium had a fiber construction project approved by E-rate, an FCC program that helps ensure that schools and libraries can get high-speed internet at affordable rates. The project will connect three tribal schools and two tribal libraries to fiber and to the Albuquerque GigaPoP for internet access. A gigabit point of presence (GigaPoP) is an individual access point to Internet2, a high-speed network maintained by universities and other parties.<sup>101</sup>

<sup>100</sup>ISP Cost per Mbps per Month 2017 E-Rate Data, [http://www.broadband4education.nm.gov/uploads/PressRelease/685d5fd30b5144c3b4c58870f413e917/ISP\\_Cost\\_Mbps\\_Month\\_Vs2.pdf](http://www.broadband4education.nm.gov/uploads/PressRelease/685d5fd30b5144c3b4c58870f413e917/ISP_Cost_Mbps_Month_Vs2.pdf)

<sup>101</sup>Gigabit Point of Presence (GigaPOP), Techopedia, <https://www.techopedia.com/definition/15448/gigabit-point-of-presence-gigapop>

## Wyoming explores emerging technologies

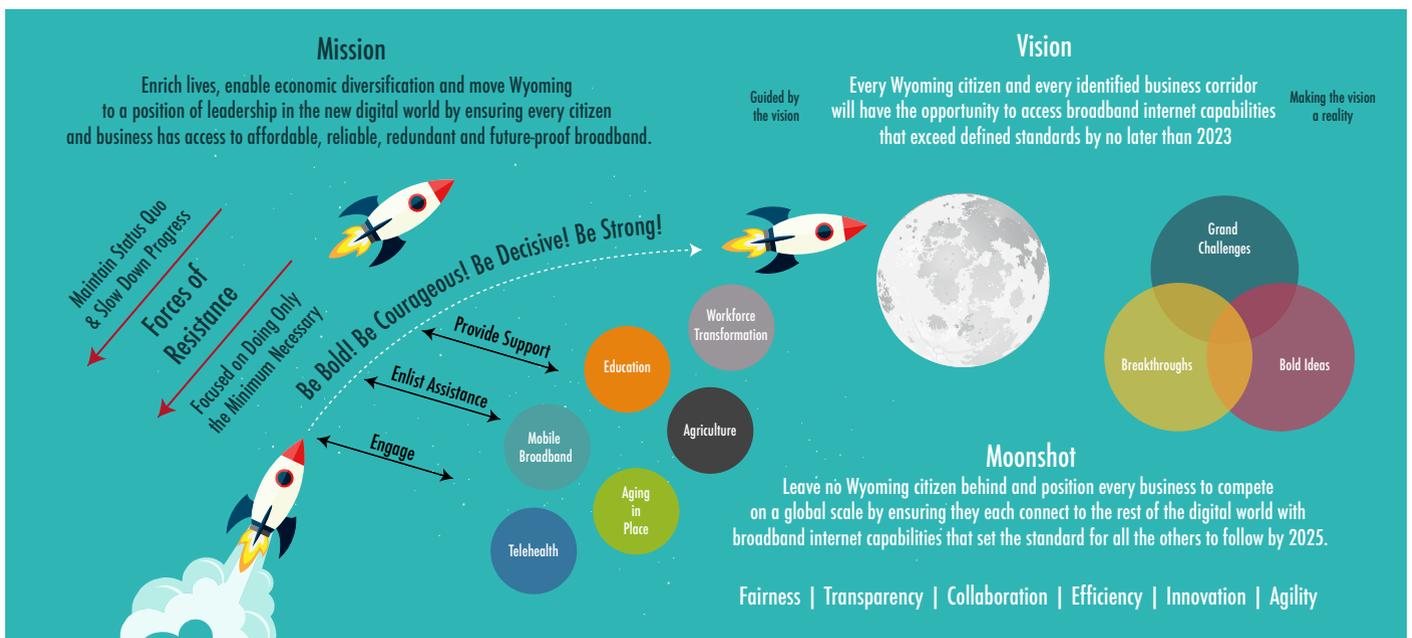
Wyoming's plans for broadband encourage innovation. That may be necessary for the state with the lowest population density of the 48 contiguous states.<sup>102</sup>

The Wyoming Broadband Advisory Council developed a broadband plan for the state. It offers goals for broadband targeted to residential and business. It also offers a “moonshot” goal: to enlist partners to push the limits of what is possible to ensure that Wyoming becomes a leader in broadband deployment and utilization.<sup>103</sup>

The plan includes recommendations for leveraging public-private partnerships. They include policies dealing with pole attachment and road classification, a dig-once policy for interstate rights-of-way, and improving rural funding models, among others.

The plan also recommends integrating emerging technologies. Some technologies that Wyoming will continue to evaluate includes:

- Wired (fiber, cable and DSL);
- Wireless (fixed and cellular technologies, Citizens Broadband Radio Space and TV white space); and
- Atmospheric (balloons, unmanned aerial vehicles, high altitude pseudo satellites and satellite technologies).



This Wyoming Broadband Advisory Council graphic highlights the council's mission, vision and moonshot. "It shows that change takes work and can put you in uncomfortable conversations, but if you ensure the voices for the mission, vision and moonshot are the loudest in the room, the people win," said Russ Elliott, state broadband manager.<sup>104</sup>

<sup>102</sup>“Wyoming Broadband Enhancement Plan: Riding Broadband to New Heights,” Wyoming Business Council, September 2018, <http://www.wyomingbusiness.org/Uploads/Wyoming%20Broadband%20Plan%20Small%20File%20082818.pdf>

<sup>103</sup>“Broadband Development,” Wyoming Business Council, 2018, page 6.

<sup>104</sup>Email from Russ Elliott, Wyoming state broadband manager, May 20, 2019.

Getting the broadband infrastructure in place is a huge accomplishment. There is still more to be done, however. The next steps involve a whole different set of players.

## ADOPTION Lesson: Work with, not for, the community.

# 4

If you build it, they might come. Or they might not. Just because broadband is available, does not mean everybody can afford the service or sees its relevance. Getting seniors and others to adopt the internet requires engaging the community.

That work is distinct from the first step of building broadband infrastructure. State and national agencies take the lead, and their work focuses on the physical world and the technical aspects of building broadband. People who benefit from their work can be anywhere from poor to wealthy. A ranch owner in rural Wyoming lacks broadband every bit as much as one of her ranch hands; it is about location rather than income.

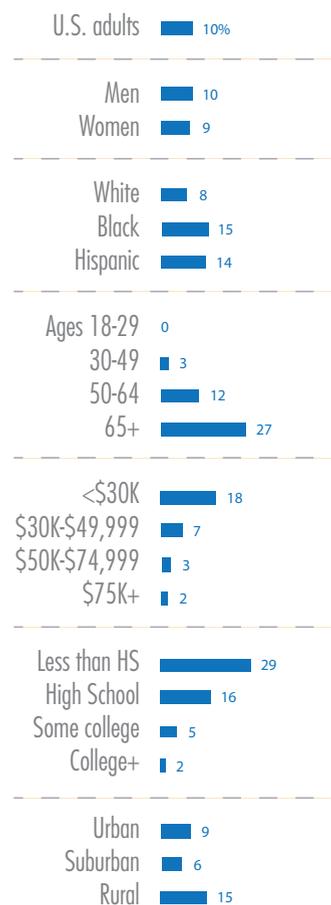
Once that infrastructure is in place, the next task of closing the digital divide focuses on adoption of broadband. This is often, but not always, a matter of cost.

A 2017 Brookings Institution study showed 93 percent of the nation’s population had access to high-speed wireline service, but not nearly all of them subscribed. Of the 73 million people living in low-subscription neighborhoods, most tended to be older, have lower incomes and lower levels of education. The subscription rate was lowest in rural America, “where adoption challenges ... are compounded by the high costs of addressing gaps across far-flung, low-density communities.”<sup>105</sup>

A 2019 report from Pew Research noted that the percent of Americans who say they do not use the internet had dropped from 48 percent in 2000 to 10 percent in 2019. Like the Brookings Institution, Pew Research found nonadoption is linked to a number of demographic variables.<sup>106</sup>

### Who’s not on online in 2019?

% of U.S. adults who say they do not use the internet



Note: Whites and blacks include only non-Hispanics. Hispanics are the race.  
Source: Survey conducted Jan. 8-Feb. 7, 2019  
PEW RESEARCH CENTER

Used with permission of the Pew Research Center.

105 “Signs of Digital Distress,” Brookings Institution Metropolitan Policy Program, page 35.

106 “10% of Americans Don’t Use the Internet. Who Are They?” Pew Research Center, April 22, 2019, <https://www.pewresearch.org/fact-tank/2019/04/22/some-americans-dont-use-the-internet-who-are-they/>

The federal government has, in the past, focused overwhelmingly on making broadband available and largely overlooked adoption.<sup>107</sup> The Brookings study notes that efforts so far to move adoption issues to the forefront of national policy have been a patchwork. “Simply put, formal policy must move beyond volunteerism.”<sup>108</sup>

Encouraging adoption and making the internet, computers and training affordable for LMI residents involves a different set of players. Leaders often come from municipal government, nonprofits, schools and libraries.

Their work is not primarily physical or technical. It involves physical items, such as computer equipment, but it really is more about the interaction between human beings and those items. To be successful, survey respondents told us, it is important to view community members as resources rather than recipients, and to work *with* them rather than *for* them.

- “Without the voices of those who are facing the challenges, we cannot make any change.”
- “Take it slow. Earn trust first. It is a continuum that to address requires constant fine-tuning.”
- “Meet your audience where they are by holding listening sessions within economically distressed neighborhoods and hearing the stories of residents who are not or may be unable to access the internet.”

## **CITY AND COUNTY GOVERNMENTS HAVE A LEAD ROLE IN BRIDGING THE DIVIDE**

Governors often lead the charge for making broadband available statewide. When it comes to municipalities, mayors and other local government officials have a leadership role to play. Our survey respondents offer a sense of the array of options.

Nine city or county government agencies responded to the Kansas City Fed survey on digital inclusion. They were at different stages in the process of closing the digital divide. Some had just completed a broadband plan while others were deep into implementation. Of the nine, three provided internet services through free hotspots and wifi in public housing common areas and free or low-cost computers, while the rest focused on policy and collaboration, or were in the planning stages. Because governments have access and because the need is great, public housing projects were popular sites for intensive tech programs.

Survey respondents also identified innovative digital inclusion programs, including government action at the municipal level. Many examples they mentioned are included in the National Digital Inclusion Alliance (NDIA) list of Digital Inclusion Trailblazers.

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<sup>107</sup>“Signs of Digital Distress,” Brookings Institution Metropolitan Policy Program, page 36.

<sup>108</sup>*Ibid.*, page 37.

## **NDIA Digital Inclusion Trailblazers**

The NDIA brings together more than 300 nonprofits, policymakers and academics to advocate for national access to broadband and end the digital divide. The nonprofit provides a unified voice for digital inclusion policies and programs. Its Digital Inclusion Trailblazers list is the first public inventory of local government initiatives to promote digital literacy and broadband access for underserved residents.

It uses eight indicators (<https://www.digitalinclusion.org/digital-inclusion-trailblazers-indicators/>) to select initiatives it considers trailblazers. A government is considered a trailblazer if it meets at least one of the eight key indicators of municipal digital inclusion leadership; most can check off at least two or three. Here is a sampling:<sup>109</sup>

- Does your municipal government convene, and/or materially support, an ongoing digital inclusion planning process for your community?
- Does your municipal government regularly conduct and publish research on internet access and use by your residents?
- Does your municipal government provide material support to a public or community wireless network deployed in one or more residential neighborhoods, and offering internet access to residents where they live?

As of 2018, the trailblazing communities include:<sup>110</sup>

- Austin, Texas
- Boston, Massachusetts
- Charlotte, North Carolina
- Kansas City, Missouri
- Long Beach, California
- Louisville, Kentucky
- Madison, Wisconsin
- Philadelphia, Pennsylvania
- Portland, Oregon
- Raleigh, North Carolina
- San Antonio, Texas
- San Francisco, California
- San Jose, California
- Seattle, Washington
- Washington, D.C.
- Wilson, North Carolina

We asked survey respondents what they consider the most innovative digital inclusion programs.

Responses regarding municipal government included:

- Municipal mesh networks, public/private partnerships that use unlicensed wireless service to provide free internet to residents.
- Cities that own their own broadband network. They mentioned Chattanooga, Tennessee, and Ammon, Idaho.
- Cities with digital inclusion goals that engage stakeholders and track progress, specifically the governments of Kansas City, Missouri/Kansas; San Antonio, Texas; and Seattle, Washington.

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<sup>109</sup>“Digital Inclusion Trailblazers: Indicators,” National Digital Inclusion Alliance, <https://www.digitalinclusion.org/digital-inclusion-trailblazers-indicators/>, (accessed May 25, 2019).

<sup>110</sup>“This Trailblazing Local Government ...” National Digital Inclusion Alliance, [www.digitalinclusion.org/digital-inclusion-trailblazers/](http://www.digitalinclusion.org/digital-inclusion-trailblazers/), as of June 5, 2019.



*Chattanooga Mayor Andy Berke (left) and Kansas City Mayor Sly James appeared on a panel at the Federal Reserve Bank of Kansas City moderated by Tammy Edwards, vice president of Community Development and Strategic Engagements. Both Chattanooga and Kansas City have been leaders in digital inclusion strategies.*

“It’s important that when we talk about digital inclusion, we’re focusing on equity. We’re working to ensure every resident has the opportunity to access reliable and efficient internet, which is just as much a part of our infrastructure as streets, roads and bridges,” Sly James said. James served as Kansas City, Missouri mayor, from 2011-2019. The City has worked with the private sector on a systems-thinking approach. For example, they used transportation projects, such as the streetcar and bus lines, as opportunities to install fiber cable, smart kiosks, and wifi access points that extend free internet access to residents living and working near the transit lines.

A community’s plan to close the digital divide usually has a few common elements, whether the plan is being implemented by a municipality or by a mix of community groups. The common elements include making broadband available and providing computers and digital training to individuals who otherwise could not afford it, that three-legged stool mentioned earlier. Some plans also include elements such as technical support and advanced training in digital skills.

### **When broadband is available, but not affordable**

In some areas, broadband is available to people who can afford it, but that rarely includes everyone. When the physical infrastructure is in place, but the economics are a barrier, various programs can help. Sometimes the programs make broadband, or faster broadband, available at lower cost for institutions like schools and libraries that serve the public. Sometimes the programs focus on making free or low-cost internet available in underserved locations, such as a low-income neighborhood or housing project. Sometimes, the focus is on making broadband less expensive for individual low-income households.

Our survey respondents mentioned the following examples as among the most innovative at providing access to free or low-cost internet service.

## Making discounted broadband available to institutions that serve the public

E-rate is the FCC program for schools and libraries. It uses money from the Universal Service Fund to provide discounts for telecommunications, internet access and internal connections to eligible schools and libraries. Discounts range from 20 to 90 percent, with higher discounts for rural schools and libraries and those serving areas with higher poverty.<sup>111</sup>

Survey respondents also mentioned Massachusetts Broadband Institute (MBI) (<https://broadband.mass-tech.org/middle-mile-program>), which constructed an open-access, middle-mile fiber optic network to hundreds of public facilities around the state. “Middle mile” is the network infrastructure that connects local networks to other network service providers, telecommunications carriers and the internet.

## Making free or discounted broadband available where service is limited

Schools and libraries loan wifi hotspots to individuals, and some even put wifi hotspots on school buses, which they park overnight in rural areas for anyone to use. According to data from the Institute of Museum and Library Services, 43 percent of the nation’s libraries are small and rural. Of those rural libraries, about 70 percent are the only source of free internet for their communities.<sup>112</sup>

- Oklahoma State University’s Division of Agricultural Sciences and Natural Resources (DASNR) partners with libraries to loan mobile hotspot devices to rural residents. The director of one rural library said, “Just about every night there are cars parked around the library with drivers and passengers tapping into our wifi network.” The DASNR program allows individuals to check out one of four mobile hotspot devices assigned to the library, typically for up to a week.<sup>113</sup>



Perkins, Oklahoma, resident Jenny Hernandez is a single mother who works in the medical field. For Hernandez and her son, the wifi hotspots from the Perkins Public Library are their only source of home internet. According to Hernandez, “I primarily borrow the wifi hotspot for my 10-year-old son. Like most children, he enjoys playing online games and streaming videos. I also like that he can access digital library materials, and educational games. He has really improved his reading level and I believe much of that is due to having internet access.” Hernandez also notes that when her son has internet access via the hotspot, it allows her a little extra time for her own reading. The Perkins Library currently lends six wifi hotspots that can be checked out for one week. There is always a waiting list of 10-15 people for the devices.

<sup>111</sup>“E-rate: Universal Service Program for Schools and Libraries,” Federal Communications Commission, <https://www.fcc.gov/consumers/guides/universal-service-program-schools-and-libraries-e-rate> (accessed June 5, 2019).

<sup>112</sup>“At the Edges of the National Digital Platform,” *D-Lib Magazine*.

<sup>113</sup>“OSU, Public Libraries Working Together to Bridge ‘Digital Divide’ in Rural Oklahoma,” Oklahoma State University News and Information, June 6, 2018, [https://news.okstate.edu/articles/agricultural-sciences-natural-resources/2018/stotts\\_extension\\_library\\_mobile\\_hotspots.html](https://news.okstate.edu/articles/agricultural-sciences-natural-resources/2018/stotts_extension_library_mobile_hotspots.html)

- The Nebraska Library Commission promotes internet sharing between schools and libraries to help rural students get their homework done. It is using a \$25,000 Sparks Grant from the Institute for Museum and Library Services to launch sharing in five rural communities in 2018-19. According to the Nebraska Library Commission, about 15 percent of Nebraska's public K-12 students have no or slow internet at home. Public libraries are the one source for wifi in many rural areas, but 82 percent have speeds below the 25 Mbps threshold for broadband, and 68 percent are at or below 12 Mbps. "Within two miles of almost every rural public library sits a school building that is connected by fiber to Network Nebraska and capable of internet speeds from several hundred Mbps to over 1,000 Mbps," according to the commission. In the five Sparks Grant communities, the public library will use fixed wireless technology to offer the school district's students and staff the ability to access the school district's network within the public library.<sup>114</sup>

### **Making discounted broadband available to low-income households**

If you want to know what the digital divide looks like in the real world, the 2012 map of Google Fiber sign-ups in Kansas City, Missouri, was as stark as it gets. When Google Fiber came to Kansas City, Google only built in neighborhoods ("fiberhoods") where a certain percentage of households pre-registered for the 1 gigabit broadband hookups. Pre-registration helped keep construction costs down by only taking the service where there was demand.

Google posted a map online that showed which neighborhoods had reached the goal, at which time they would turn from yellow to green. Day after day, more neighborhoods on the western side of town turned green, while those on the eastern side of town did not. The line between west and east was Troost Avenue, the city's historic dividing line between more affluent white residents and lower-income black residents.

Google Fiber did not create the digital divide—or racial and economic segregation, for that matter. What Google Fiber did was make the digital divide visible. Google and local nonprofits like Connecting for Good went door to door to encourage residents east of Troost to sign up. A Google spokesperson said the average conversation lasted about 25 minutes. Affordability was an issue, she said, but also relevance, as many people didn't think they needed internet access at home.

At the time, the lowest tier of service Google Fiber offered guaranteed a free broadband connection for at least seven years for a \$300 start-up fee to cover construction costs, payable in monthly installments.<sup>115</sup> If enough people in the neighborhood signed up for service, even the free service, Google also would wire nearby public institutions like schools for free.

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<sup>114</sup>"RFP #LG-99-2018 Information Page," Nebraska Library Commission, <http://nlc.nebraska.gov/grants/sparks/index.aspx>, and "Partnership Launched to Help Close the Homework Gap for Rural Students," Nebraska Library Commission NCompass Blog, May 7, 2018, <http://nlcblogs.nebraska.gov/nlcblog/2018/05/07/partnership-launched-help-close-homework-gap-rural-students/>

<sup>115</sup>"Google Fiber Splits along Kansas City's Digital Divide," *Wired*, Sept. 7, 2012, <https://www.wired.com/2012/09/google-fiber-digital-divide/>



*During the sign-up period for Google Fiber, Google and the nonprofit Connecting for Good conducted outreach east of Troost Avenue, the historic racial dividing line in Kansas City, Missouri.*

Most towns have people with too little income to afford heat and lights, much less the internet. As with gas and electric utilities, ISPs work with nonprofits and others to help the most disadvantaged individuals get or stay online. Millions of eligible Americans, however, are not taking advantage of the programs.

The Discount Internet Guidebook, from NDIA and Public Knowledge, traces the history of home internet pricing, shares the major affordable broadband plans for disadvantaged households, and links to a searchable database ([https://www.discounts.digitalinclusion.org/10\\_resources.html](https://www.discounts.digitalinclusion.org/10_resources.html)) that shows which providers offer services at reduced cost in a particular area.<sup>116</sup>

The programs offer cable modem, DSL and fixed wireless services. Monthly rates run from \$5 to \$15, and download speeds range from 768 Kbps to 30 Mbps. Eligibility requirements vary across the programs. Typically, though, a person or family would need to meet one or more of the following criteria:

- At least one child enrolled in the federal free or reduced-cost lunch program;
- Living in public housing;
- Enrolled in Federal Supplemental Nutrition Assistance;
- Living on Supplemental Security Income (seniors); and
- Low income (veterans).

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<sup>116</sup>Angela Siefer, Bill Callahan, Alisa Valentin, Daiquiri Ryan and Benjamin Austin, “The Discount Internet Guidebook.” National Digital Inclusion Alliance and Public Knowledge, 2018. Retrieved from [www.discounts.digitalinclusion.org](http://www.discounts.digitalinclusion.org)

The FCC established ISP discount programs as a result of two initiatives:

1. **Merger deals.** The FCC required low-income discount rate programs be included in major cable and telecom mergers between 2011 and 2016; and
2. **Connect2Compete.** The FCC and the cable industry organized the program to replicate the first big merger program, Comcast Internet Essentials. The voluntary program is administered by EveryoneOn, a nonprofit.

Millions of households are eligible for discounted broadband that are not receiving it, according to the guidebook, although exact figures are not available. While providers are required to report the number of participants in discount programs, all but one provider—Comcast Internet Essentials—refused to share annual enrollment numbers with the public. They successfully petitioned the FCC to have the figures redacted in public reports.

The guidebook offers an example: The four biggest cable providers—Comcast, Charter, Cox and Altice—provide discount broadband to families in their service areas whose children receive free or reduced-cost school lunches. Their service territories include about 120 million of the 126 million homes in the U.S., and between 10 million and 12 million households that receive the lunch program. Comcast Internet Essentials, the largest of the four, reports the number of discounted subscriptions it provides: 1 million to 1.2 million. That leaves “at least 8 to 9 million eligible low-income families ... who could be receiving discount cable modem service but are not.”<sup>117</sup>

## DIGITAL SKILLS Lesson: Teaching digital skills is complex and labor intensive.

# 5

How do you take someone who has never turned on a computer and help that person join the digital age? Rarely is it easy.

Of our online survey’s 63 respondents, 27 were from nonprofit organizations. Many provide training and education. Most often, the focus is on basic digital literacy. Some offer advanced training and a few even help people earn certificates that can move them into jobs in the digital economy.

<sup>117</sup>Ibid, page 5.

We asked survey respondents what would be their highest priorities if they had additional funding, and didn't limit them to just one. Of the 77 priorities mentioned, 36 (47 percent) were for more training. Some wanted funds, including stipends, for volunteer instructors, while others wanted to provide more advanced training than they could currently offer. A few mentioned the need for incentives to help keep lower income people engaged in training when their other responsibilities threatened to derail them.

Among the comments:

- “Relationships are key. Once you lean in and engage with a person, they are more open and excited about the possibilities you may present to them. Building cohorts of like learners also help. Change is hard and going through it with others makes success more possible.”
- “Every user is starting at a different place in terms of their own digital literacy. One-on-one learning opportunities seem to net the best long-term impact, but this requires more volunteers and a greater time commitment.”
- “Relying on volunteers to train others is not sustainable. We need stipends to support our (volunteer) members, which would greatly increase capacity.”

Do people want the training? It depends. A Pew Research Center study found that black and Hispanic individuals were very interested in getting training that would help improve their digital skills. “Some 46 percent of blacks and 48 percent of Hispanics say training to help them be more confident in using computers, smartphones, and the internet would help ‘a lot’ in terms of making important decisions.” Only 20 percent of whites said training would help “a lot.”<sup>118</sup>

In Kansas City, a survey of local residents helped draw a line between lack of digital skills and economic viability.

### **KC Digital Drive emphasizes the need for digital skills**

The two Kansas Cities—Missouri and Kansas—provide an interesting case study. In 2011, the mayors of both Kansas Cities appointed the Mayors Bistate Innovation Team. Its job was to develop a playbook of creative ways the community could use Google Fiber to “spark economic development, advance opportunities and improve daily life in Kansas City.”<sup>119</sup>

After hearing from many community representatives, the group decided that digital inclusion, defined as making technology accessible to everyone, should be the first plank in the community's digital platform.<sup>120</sup>

What was the starting point? To find out, in 2012 Google Fiber and Global Prairie, a marketing firm, conducted a survey. They found that 17 percent—about 80,000—of Kansas Citians did not have access to the internet. Of the 80,000, 41 percent thought the internet was irrelevant and 28 percent did not have access. Sixty-four percent had a high school education or less, 44 percent were seniors and 42 percent made less than \$25,000 a year.<sup>121</sup>

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<sup>118</sup>“Smartphones Help Blacks, Hispanics Bridge Some – But Not All – Digital Gaps with Whites,” Pew Research Center, Aug. 31, 2017, <https://www.pewresearch.org/fact-tank/2017/08/31/smartphones-help-blacks-hispanics-bridge-some-but-not-all-digital-gaps-with-whites/>

<sup>119</sup>“Preface: Drafting the Playbook,” KC Digital Drive, <https://www.kcdigitaldrive.org/playbook/preface>

<sup>120</sup>Ibid.

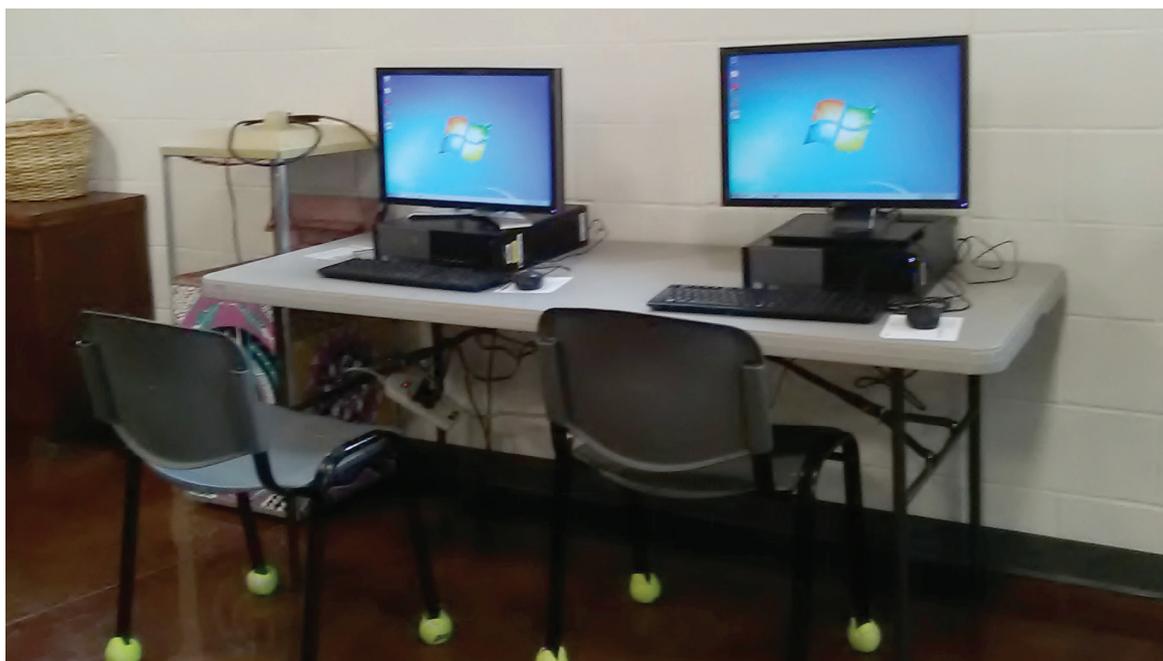
<sup>121</sup>Ibid

## **Libraries play an important role in rural and urban settings**

The digital divide won't be closed without the help of libraries, the Kansas City Fed heard when it convened roundtable discussions in five cities in the Tenth District.

The historical role of libraries was providing access to information. Today, participants widely viewed libraries as being on the front lines of digital inclusion efforts. In some rural communities, libraries offer the only publicly available broadband access or digital skills training. At the Oklahoma City roundtable, a librarian said, "I didn't think the work I did was considered digital inclusion. However, yesterday I spent two hours helping a patron apply for a minimum wage job online. The job only took applications online and he didn't know how to use a computer."

A renewed focus on digital skills is part of what some call the "second wave of the digital divide." According to Richard Reyes-Gavilan, executive director of the Washington, D.C., Public Library, digital skills are becoming increasingly important because, like that minimum-wage employer, people are finding it easier to provide or request information in an online format only. "The world has lost its patience with those who cannot navigate the online world," he said. "And because those folks who cannot navigate the online world are typically uneducated, poor, or otherwise vulnerable, to many this group is really easy to overlook."<sup>122</sup>



*Two used desktops and a folding table does not look like much, until you learn what happened after a university donated them to the town of Boley, Oklahoma. The donation was the catalyst for the town to bring back both a public library and free/public internet access, both of which had been missing for more than a decade.*

<sup>122</sup>"Responding to the Second Wave of the Digital Divide," *American Libraries Magazine*, May 7, 2014, <https://americanlibrariesmagazine.org/blogs/the-scoop/responding-to-the-second-wave-of-the-digital-divide/>

## TRAINING IN BASIC DIGITAL SKILLS UNLOCKS A WORLD OF OPPORTUNITY

Imagine you never have used a computer, don't even know how to turn it on, much less use a mouse to make that "little pointy thing" move. You're afraid of pushing the wrong button and making the machine explode. But there is something you must do. It may be staying in touch with the grandchildren or applying for a job or conducting research on a health issue. Whatever "it" is, it is important and it's behind a virtual wall because you don't know how to use a computer or the internet.

Those are the people that nonprofits, libraries and others seek to help with basic digital skills training. The types of skills included in most basic digital training deals with:<sup>123</sup>

- Email
- Search engines
- Shopping and banking online
- Social networks
- Online classes
- Online government services
- Online job applications
- Online safety

People who need basic digital skills training may fall into one or more of several groups. They may be low income, seniors, parents, veterans, people who have been unemployed for some time, public housing residents, residents of rural areas or small towns, immigrants and more. They often face a variety of challenges—child care, transportation, unstable work schedules—that can make it difficult for them to attend long-term training programs consistently.



*Tuesdays are special in Omaha. Do Space is a community technology library, digital workshop, and "an innovation playground" for local residents. On Tech Help Tuesday, community members can bring their tech questions to Do Space. There, volunteers can explain how to operate a mobile device, computer, or other pieces of technology or software. It is free for anyone in the community. "We have a number of great volunteers that make Tech Help Tuesday possible," said Ty Nared, Do Space community engagement specialist. "Their willingness to serve the community through Do Space is what makes this program a success."*

<sup>123</sup>"Preface: Drafting the Playbook," KC Digital Drive, <https://www.kcdigitaldrive.org/playbook/preface>

Connecting for Good (CFG) conducts basic and advanced digital skills training in both Kansas Cities. It trains about 7,500 people a year, more than 80 percent of whom have annual incomes below the federal poverty line. Most are working-age adults over 21. Many have risk factors such as being a single head of household, having a poor academic record, negative behaviors or health issues and language barriers. “The most common difficulty CFG faces is the constant interruption of these risk factors in the lives of its clients. This is why CFG’s staffing criteria include empathy, patience, and positive persistence,” according to its website. All but two of its staff members began as clients or volunteers.<sup>124</sup>

Groups that provide basic skills training often use volunteers to provide the one-on-one attention learners need. On one hand, using volunteers makes that kind of labor-intensive training affordable to cash-strapped nonprofits. On the other, it may limit reach, and some say relying mainly on volunteers is not sustainable.

Literacy KC is an example of positively engaging volunteers. The nonprofit used more than 450 volunteers in 2018 in working to advance literacy within the Kansas City metro area. Volunteers donated 7,694 hours, equaling the value of 5.5 full-time staff members. The volunteers fulfilled a variety of roles, including “teaching students the reading, writing, math and digital literacy skills they need to be successful,” according to Gillian Helm, executive director.<sup>125</sup>

Mary Kay Morrow, digital program coordinator, offers some reasons for their success, among them:

- The sense of purpose around the importance of the mission;
- A culture of community and honest communication among all constituents;
- Group classroom teaching environment;
- Measurement of student outcomes;
- Ongoing, compelling volunteer training and education;
- Clear understanding of specific volunteer needs, and the ability for volunteers to be involved as much—or as little—as they would like; and
- Celebration and recognition of volunteers.

When we asked survey respondents for the most innovative types of digital inclusion programs, here is what they said related to basic skills:

- Using outreach programs to help digital newcomers, such as seniors, learn to operate in the digital age; and
- Making it a credit option for university students to volunteer to work with people in the digital divide.

Respondents also highlighted specific examples of innovative basic or advanced training programs.

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<sup>124</sup>“About Us—Connecting for Good,” Connecting for Good website, <http://www.connectingforgood.org/about-us/>

<sup>125</sup>Emails from Gillian Helm and Mary Kay Morrow to Jeremy Hegle, May 21, 2019.

## Community Tech Network (CTN) focuses on digital literacy

CTN started in 2008 in the San Francisco Bay area, and in 2018 began to expand its reach, first to central Texas. It intends to form digital inclusion hubs wherever it finds partnerships serving communities in need. It offers several types of digital skills training, usually delivered by volunteers, such as:

- SF Connected, which focuses on older adults and people with disabilities, with training delivered in sites around the city;
- NeighborNest—Get Connected offers nonprofit clients classes in English and Spanish to help them find housing and jobs;
- Digital Parents Program delivers digital literacy classes on family-related topics in English and Spanish;
- Support in Housing, which takes job-search support and other help to low-income housing communities; and
- Tech Teach-in Events, two-hour events where volunteers help learners gain basic digital skills and confidence.

CTN sponsors Digital Literacy Corps, composed of tech-savvy volunteers, as well as a team of 20 young people who help with digital literacy at the library, and Digital Ambassadors, which pays people who lived in affordable housing communities to help their fellow residents.

## ADVANCED TRAINING CAN UNLOCK MIDDLE-SKILL JOBS

Learning digital skills can have a major impact on a person's income, according to research by Burning Glass Technologies and Capital One. They analyzed 27 million online job postings and, among the findings, showed that higher wages come with greater digital skills, even for the two-thirds of Americans who do not have a college degree.

### DIGITAL JOBS PAY MORE

**Baseline Digital Skills** like productivity software pay **17% higher wages** than nondigital middle-skill jobs.

**Advanced Digital Skills** such as experience with Information Technology (IT) and Customer Relationship Management (CRM) software, place individuals in the top quarter of all earners.



**Nondigital Middle-Skill**  
**\$15/hour**



**Baseline Digital Skills**  
**\$20/hour**



**Advanced Digital Skills**  
**>\$28/hour**

Source: Burning Glass Technologies

Once people get beyond the basics, digital skills such as Microsoft Office, coding, 3D printing, digital graphic design, along with certificate programs, can launch learners into administrative or technical fields. Again, Kansas City Fed survey respondents said these programs were among the nation's most innovative.

### **Byte Back**

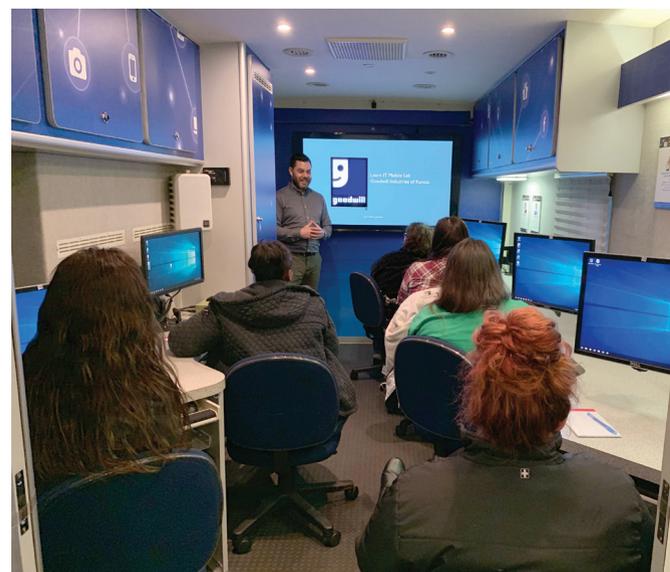
Byte Back, in Washington, D.C., provides a pathway of inclusive tech training that leads to living-wage careers. The program offers classes for beginners, but that is just a start. Its intermediate class, Office Track, teaches the Microsoft Office suite. The Byte Back professional tracks include classes and certifications that prepare people for jobs as administrative professionals or as IT professionals.

Along with the classes, Byte Back offers online resume and interview support, and coaches who work in the administrative or IT fields. It also offers internships for students both within Byte Back and at outside organizations.

### **Connecting for Good**

In Kansas City, Connecting for Good offers a range of services, including advanced training. Students can earn certifications or college credit through a partnership with Metropolitan Community College and Northstar Digital Literacy Assessment. Its new Connecting to Careers course is a 16-week Cisco Networking program designed to learn entry-level tech skills and gain CompTIAA+ certification.

Other services range from digital literacy training to public access computer centers, hot-spots in high-traffic areas, STEM classes for young people, job-search classes and refurbished computers.



*Distance and lack of public transportation makes it challenging for those in rural areas to access digital skills training. Funding from Google allowed Goodwill Industries of Kansas Inc. to take the show on the road. With a full-time program coordinator and 10 computer stations, the mobile computer lab has provided training in 35 rural communities throughout Kansas.*

## **Equitable Internet Initiative in Detroit**

The Equitable Internet Initiative (EII) seeks to increase access through the distribution of shared gigabit connections in three Detroit neighborhoods. Part of the Detroit Community Technology Project, EII is a collaborative effort of existing community technology programs in each neighborhood, including a community makerspace, youth-run tech collective, community radio station and a church with a computer-building program.<sup>126</sup>

Along with connecting about 150 households to low-cost, high-speed internet, the project trains residents—called digital stewards—with the skills necessary to bring homes online. Digital stewards are community organizers as much as people with technical skills. It also provides more advanced digital training for young people, which helps them get jobs in Detroit’s Innovation District.<sup>127,128</sup>

## **Muskogee Public Library in Oklahoma**

The Muskogee Public Library was one of 28 nationally to receive a 2017 grant from Libraries Ready to Code, an initiative of the American Library Association sponsored by Google. The grant program promotes computer science and computational thinking among young people. The grant helped the library conduct a summer coding camp and a coding club for young people between fifth and 12th grades.

In 2018, the library’s Learn-Create-Share program sought to demystify technology and encourage young people to keep from “automatically envisioning an academic laboring away in a cubicle somewhere,” according to a library blog. Instead, they introduce technology in a “recreational way, demonstrating that technology can be utilized by anyone to meet their needs.”<sup>129</sup>

## **Peer 2 Peer University (P2PU)**

P2PU grew from the 2007 Cape Town Open Education Declaration. It was built on the belief that, with adequate social support, anyone can learn almost anything online for free. It reached tens of thousands of learners in more than 50 countries.

In 2014, though, P2PU changed course. Hoping to reach new audiences, it partnered with the Chicago Public Library to run in-person study groups for library patrons who wanted to learn together. These learning circles, over 18 months, “managed to dramatically increase completion rates and reach new audiences who were new to both online learning and postsecondary education. Learning circles also formed strong social bonds for citizens from diverse backgrounds who shared common goals, and helped to highlight the library as a hub for community learning experiences.”<sup>130</sup>

What started as an online-only form of free, open education, moved to face-to-face learning circles when the original approach wasn’t reaching its goals. Today, libraries worldwide offer learning circles on topics, among them digital skills.

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<sup>126</sup>“Detroit’s Equitable Internet Initiative Bridges the Digital Divide,” prgrss, Nov. 26, 2017, <https://www.progrss.com/connectivity/20171126/detroit-equitable-internet-initiative/>

<sup>127</sup>“Detroit Community Technology Project (/dctp), The Equitable Internet Initiative,” <https://alliedmedia.org/dctp/eii>, (accessed April 4, 2019).

<sup>128</sup>“Meet the Digital Stewards of the Equitable Internet Initiative,” Hour Detroit, March 1, 2018, <http://www.hourdetroit.com/Hour-Detroit/March-2018/Meet-the-Digital-Stewards-of-the-Equitable-Internet-Initiative/>

<sup>129</sup>“Muskogee Public Library – Learn, Create, Share 2018,” City of Muskogee Foundation, Oct. 10, 2018, <https://cityofmuskogeefoundation.org/muskogee-public-library-learn-create-share-2018/>

<sup>130</sup>“About P2PU,” <https://www.p2pu.org/en/about>, (accessed January 15, 2019).

P2PU and its partner libraries and community centers offer learning circles from Barcelona, Spain, to Wichita, Kansas, where classes include basic 3D modeling and basic 3D animation. Learning circles occur in other U.S. cities, as well, such as Boston, Chicago and Detroit. In Kansas City, learning circles at the Kansas City (Missouri) Public Library include topics such as building a website, digital graphic design, email marketing and various social media platforms.<sup>131</sup>

## AFFORDABLE EQUIPMENT

Lesson: It takes time and adequate equipment to overcome resistance to technology.

# 6

Once you have affordable broadband and access to digital skills training, the third leg of the stool is computer equipment. Residents may use a computer at the library or at a neighborhood or school computer lab, or they may buy or earn a device from a nonprofit refurbisher. That reliable computer, laptop or tablet is transportation on the information superhighway, and nobody likes a clunker.

When we asked people about lessons learned, some had to do with the equipment:

- “A hodgepodge of equipment and consumer equipment costs the program trust, while going in with large numbers of like equipment from corporations earns trust. It also knocks down costs and makes support easier.”
- “It can take a lot of time to get comfortable with technology for those who have been left behind. Without regular access, easy tech support, and training, folks will not stick with it.”
- “Many parents are skeptical of getting a device at no charge and/or they don’t want to be responsible for it.”

### **How does the process typically work?**

Let’s say a company is upgrading its laptops and wants to donate 40 old machines. Its community has a nonprofit that recycles computers, so the company representative checks to be sure the nonprofit uses sound data security and environmental practices. It does, so the company donates its laptops to that group. We will call it A Million Drives (AMD). AMD technicians strip the laptops of any data on the hard drives, refurbish and clean the hardware and load new software. Then AMD distributes the laptops. Some go to other nonprofits or schools. A few laptops, AMD sells for a reduced price at its shop. The rest it gives to people who can show they meet income guidelines or who successfully complete a training class.

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<sup>131</sup>Ibid.

## KANSAS CITY FED DONATES LAPTOPS

In 2018, the Federal Reserve Bank of Kansas City donated 25 laptop computers to Connecting for Good, which refurbished the machines at its Kansas City, Kansas, technology center. The laptops no longer met the Bank's technology standards, but Connecting for Good was able to install fresh operating systems and Microsoft Office software.

Connecting for Good passed the laptops along to Operation Breakthrough, which provides a wide range of education, child care and family support services for low-income families in Kansas City, Missouri.

Jeremy Hegle leads the Bank's digital inclusion project. He visited the Operation Breakthrough campus in March 2019 to learn how the donated computers were being used.

Many of the donated laptops went to the SMART Lab, a STEM program. Among other benefits, the laptops allowed the SMART Lab robotics team to operate their projects in off-site competitions. Other laptops are being used by parents of Operation Breakthrough students, who need a functional computer to continue coursework or continue their own education. And Operation Breakthrough teachers and support staff members are using donated laptops to continue their advancement toward classroom certifications and credentials.



*Several months after receiving laptops from the Federal Reserve Bank of Kansas City, Operation Breakthrough teachers shared first-hand how the computers were making a difference; increased professional certification of teachers in the classrooms, parents being able to complete their high school and college education, and students finally being able to have the tools needed to learn and compete in off-campus robotics competitions.*

## WHAT ARE THE SIGNS OF A QUALIFIED REFURBISHER?

Electronics should come with a warning label. Disposed of improperly, their toxic materials can harm people or the environment. And the data they store, well, anyone who has experienced identity theft or a security breach can tell you how time-consuming, unsettling and potentially dangerous they can be. That's why, when donating computers, it is important to know that the refurbisher will wipe the hard drive and repair, reuse or recycle in a way that is environmentally sound.

According to the U.S. Environmental Protection Agency (EPA), there are two certification standards for electronics recyclers—the eStewards® Standard for Responsible Recycling and Reuse of Electronic Equipment© and the R2-Certified Recycling Standard for Electronics Recyclers. To be certified, a recycler must show an independent, third-party auditor that it meets whichever of the two standards is being used.<sup>132</sup>

Both certification programs provide these benefits, according to the EPA:

- Advance best management practices;
- Offer a way to assess the environmental, worker health and security practices of entities managing used electronics; and
- Are based on strong environmental standards that “maximize reuse and recycling, minimize exposure to human health or the environment, ensure safe management of materials by downstream handlers, and require destruction of all data on used electronics.”<sup>133</sup>



*Through electronic reuse, PCs for People gives low-income individuals and nonprofits the chance to benefit from the life-changing impact of computers, mobile internet and digital literacy. The self-sustainable nonprofit is based in Minnesota but has a national reach. PCs for People has worked since 1998 to drive digital inclusion efforts across the United States. It has so far provided 250,000 persons with computers, given 128,000 the chance to access mobile internet, and has responsibly recycled millions of pounds of electronics.*

<sup>132</sup>“Certified Electronics Recyclers,” U.S. Environmental Protection Agency, <https://www.epa.gov/smm-electronics/certified-electronics-recyclers>, (accessed April 28, 2019).

<sup>133</sup>“Certified Electronics Recyclers,” U.S. Environmental Protection Agency.

### **e-Stewards Certified Refurbisher/Recycler**

The e-Stewards Standard promotes globally responsible electronics recycling and reuse. It prohibits the export of hazardous electronic waste from developed to developing countries, while allowing viable technology to be reused. The e-Stewards Certification is an accredited, third-party audited certification program for electronics recyclers, refurbishers and asset managers, which identifies globally responsible recyclers. There are several certified e-Stewards recyclers in the Tenth District. To find them, visit: <http://e-stewards.org/data/list-recyclers/>.<sup>134</sup>

### **e-Stewards Digital Equity (eDE) program**

eDE makes it easier for large companies to donate computer equipment for community good. The program starts with large corporations or institutions, which donate large numbers of computer equipment to an e-Steward Certified Refurbisher/Recycler. The eSteward refurbishes the equipment and then deploys it in partnership with city government, through an existing digital equity program.

### **R2-Certified Recycling**

The R2 Standard is a common set of processes, safety measures and documentation requirements for businesses that repair and recycle used electronics. More than 800 facilities in 31 countries have gone through the independent auditing process to become R2 certified. To see whether one is nearby, visit: <https://sustainableelectronics.org/recyclers>. Sustainable Electronics Recycling International (SERI) houses the R2 Standard and works with a coalition of partners to raise awareness of electronics repair and recycling issues.

One other certification program deals only with information, not with recycling. The program is administered by the National Association for Information Destruction (NAID), the international body for companies that provide secure information destruction services.

### **NAID AAA-Certified Data Destruction**

This is a voluntary program for NAID member companies that provide information destruction services. If they volunteer, the companies are subjected to a comprehensive program of both scheduled and unannounced audits for mobile and/or plant-based operations in paper or printed media, micromedia, computer hard drive destruction and/or computer hard drive sanitization. To find a vendor with the NAID certification, visit: <http://directory.naidonline.org/>

Microsoft authorizes or registers companies that refurbish computers with its software. Microsoft states that its refurbishers follow strict requirements it established to ensure high-quality devices with genuine Microsoft software. The requirements deal both with data security and the production and disposal of electronics. The program agreement states that Microsoft or a designated third party may periodically audit the refurbisher's facilities, employees, records and books to assure compliance.

### **Microsoft Authorized Refurbishers Program**

This program is for large refurbishers worldwide that meet the minimum average threshold of 1,000 PCs shipped per month.<sup>135</sup>

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<sup>134</sup>"Frequently Asked Questions," e-Stewards website, [www.e-stewards.org/faq/](http://www.e-stewards.org/faq/) (accessed April 3, 2019).

<sup>135</sup>"Why Purchase from a Microsoft Authorized Refurbisher?" Microsoft website, <https://www.microsoft.com/en-us/refurbishedpcs/buygenuine>, (accessed March 10, 2019).

## Microsoft Registered Refurbisher

The Microsoft Registered Refurbisher program is for small and midsize refurbishers worldwide who want to supply refurbished PCs preinstalled with genuine Microsoft software to local consumers and businesses, as well as qualified charitable organizations, academic users and specially approved recipients. The program makes available Windows and Office for refurbished devices.<sup>136</sup>

There are, for example, 38 Microsoft Registered Refurbishers in Missouri, 16 in Nebraska and 13 in Kansas. To find the nearest, visit: <https://www.msregrefurb.com/rpsite/onlinedirectory.aspx>

Now all three legs of the stool are in place—affordable broadband, equipment and digital skills training. How do you determine what is and isn't working? Evaluating outcomes can show the impact, but people in the field say it is difficult and hard to fund. It is one of several reasons to form collaboratives and learn from one another, they said.

## EVALUATION AND COLLABORATION

Lesson: People are hungry to learn from others.

# 7

Increasingly, people understand that digital inclusion can mean the difference between places in decline and those that thrive. States, cities and towns are taking on new roles in encouraging access to broadband and to affordable equipment and training. How do we make sure that the work is having the desired effect? How do we share what we learn? Evaluation and collaboration, together, make the difference.

- “We are left with the 20 percent of the population that is hard to serve and expensive to reach, and this (digital) doesn't come natural to them. We need to keep communication open about what's working well. The worst thing we can do is have lots of great pilot projects growing up in isolation.”
- “We need to help scrappy nonprofits know how to track and share program impacts with funders and stakeholders. Measuring impact is not happening regularly in a meaningful way.”

## EVALUATION MEASURES THE RESULTS OF ACTIVITIES TO BRIDGE THE DIGITAL DIVIDE

Influential national funders have, in recent decades, encouraged nonprofits to measure outcomes rather than activities, to show the results of their work rather than count the number of participants or programs. Measuring outcomes helps a nonprofit answer the question, “What good did we do?” Outcomes can be quantitative or qualitative, and are often expressed as changes that individuals perceive in themselves.<sup>137</sup>

<sup>136</sup>“Microsoft Registered Refurbisher program,” Device Partner Center, <https://devicepartner.microsoft.com/en-US/communications/comm-microsoft-registered-refurbisher-program>, (accessed June 5, 2019).

<sup>137</sup>“Introduction to Project Outcome,” Public Library Association, <http://www.ala.org/pla/initiatives/performance measurement> (accessed June 5, 2019).

Moving to outcomes evaluation has been a challenge. Outcomes are abstract, difficult to control and take time to manifest, and, while they can be expensive to measure, few funders pay for outcomes evaluation.<sup>138</sup>

### What are outcomes and how do they work?

Outcomes are one piece of what is called a logic model, which shows the progression from ingredients (inputs) through results (outcomes). Here are the definitions and a very basic example: Baking a batch of muffins.<sup>139</sup>



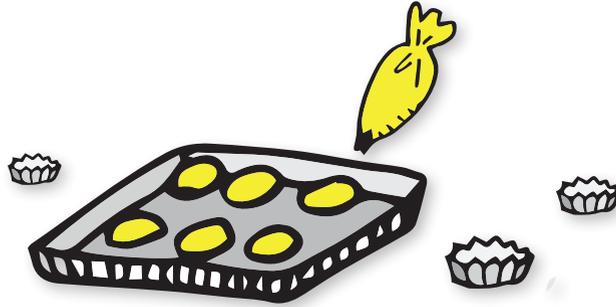
ELEMENT	DEFINITION	MUFFINS
Inputs	What is used to produce the program or product. The physical, financial and human resources allocated to or consumed by a program.	Flour, butter, sugar, eggs, oven, electricity, muffin tin, recipe, one hour
Activities	What the program or strategy does with the inputs, such as the tasks, steps, methods, techniques, etc.	Measure, beat, fold, pour, bake
Outputs	The tangible products or services produced with the inputs and activities.	A dozen muffins
Outcomes	The benefits or changes for participants from the outputs. Outcomes can be seen in knowledge, skills, attitudes, values, behavior, condition or status. They are what the participants know, think or can do.	Knowledge of how to use a recipe, improved nutrition, increased energy, commitment to avoid processed foods

<sup>138</sup>“Stop Measuring Activities and Start Measuring Outcomes,” *The Chronicle of Philanthropy*, May 28, 2014. <https://www.philanthropy.com/article/Stop-Measuring-Activities-and/195903>

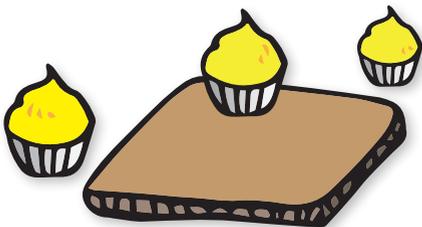
<sup>139</sup>“A Logic Model of Performance Inputs, Outputs and Outcomes,” *Made2Measure*, Oct. 19, 2005, <http://made2measure.blogspot.com/2005/10/logic-model-of-performance-inputs.html>

What can make outcomes so difficult and expensive to measure is the element of time. You don't just measure what people learned during a class, but you need to go back to them later to find out whether and how their behavior changed as a result.<sup>140</sup>

ACTIVITIES



INITIAL OUTCOMES	INTERMEDIATE OUTCOMES	LONGER-TERM OUTCOMES
Changes in knowledge, skills, attitudes, values.	Changes in behavior or action that result from the knowledge.	Meaningful changes, often in their condition or status in life.
These rarely are major changes, but are necessary steps toward the desired ends.		These are the most removed benefits that the program can reasonably expect to influence.
	<b>Back to the muffins ...</b>	
Baker learns how to use a recipe. Baker recognizes increased energy from home-baked items. Baker recognizes superior taste of home-baked item.	Baker quits buying food from convenience and dollar stores. Baker tries new recipes. Baker has more energy and begins exercising regularly.	Baker loses 20 pounds. Baker reduces fasting blood-glucose level. Baker is no longer at risk of Type 2 diabetes.



OUTPUTS



OUTCOMES

<sup>140</sup>“A Guide to Developing an Outcome Logic Model and Measurement Plan,” United Way of Greater Richmond & Petersburg, June 8, 2015, <http://www.yourunitedway.org/wp-content/uploads/2015/12/UWGRP-Guide-to-Outcomes-and-Logic-Models-6-8-15.pdf>

We asked our survey respondents to tell us how they measure success for their work to narrow the digital divide.

## HOW DO SURVEY RESPONDENTS MEASURE SUCCESS?

Here are examples of outputs and outcomes for digital inclusion projects, suggested by survey respondents. Given different definitions for aspects of digital inclusion and different understandings of “outputs” and “outcomes,” we recognize that readers will differ on what is included in the chart and where it appears.

The outputs and outcomes are listed in no particular order. No one output is intended to be viewed as causing a specific outcome.

TYPE OF PROGRAM	OUTPUTS	OUTCOMES FOR THE PARTICIPANT OR COMMUNITY
Access to broadband using fiber, wifi, satellites, etc.	<ul style="list-style-type: none"> <li>• Number or percentage of homes where service is available</li> <li>• Adoption rate—the percentage of homes that purchase broadband</li> <li>• Number of provider options</li> <li>• Monthly cost</li> <li>• Speed of service</li> </ul>	<ul style="list-style-type: none"> <li>• Community recognizes the need for broadband</li> <li>• Increase in economic development</li> <li>• More people move to the area</li> <li>• Millennials stay instead of move away</li> <li>• Small businesses increase revenue, market share, volume and scalability</li> <li>• Residents secure jobs working online from home</li> </ul>
<p><b>The three-legged stool:</b></p> <ul style="list-style-type: none"> <li>• Affordable broadband;</li> <li>• Affordable equipment; and</li> <li>• Basic or advanced digital skills training</li> </ul>	<ul style="list-style-type: none"> <li>• Percentage of residents with access to broadband</li> <li>• Monthly cost per Mbps</li> <li>• Quality of computers donated</li> <li>• Number of computers fixed</li> <li>• Number of computers deployed to individuals</li> <li>• Tons of e-waste kept out of landfill</li> <li>• Number of participants who enroll</li> <li>• Number of instructional hours</li> <li>• Numbers of volunteers</li> <li>• Completion rate</li> <li>• Quality of training content</li> <li>• Waiting lists for wifi hotspots and computer labs, etc.</li> <li>• Number of public-use computers available in a computer lab</li> </ul>	<ul style="list-style-type: none"> <li>• More adopt broadband at home</li> <li>• Students do homework online</li> <li>• People apply for jobs online</li> <li>• More people go online to find a job than five years ago</li> <li>• People pay bills and perform other everyday life functions online</li> <li>• Learners reach goals they set, such as a new job, passing the GED, etc.</li> <li>• Learners can do specific tasks, such as build a website or write code or fix a laptop</li> <li>• Increase in test scores and graduation rates</li> <li>• People express confidence at their online ability</li> <li>• People show capacity for ongoing learning</li> <li>• Increased score on the Northstar Digital Literacy Assessment</li> <li>• Rates of students receiving reduced and free lunch</li> <li>• Rates of students pursuing higher education or trade training</li> <li>• People move out of public housing</li> <li>• Documented decreases in unemployment for target neighborhoods</li> <li>• More people earn a living wage in target neighborhoods</li> <li>• Increased life expectancy in ZIP codes of economic distress</li> <li>• Community is prepared to transition to, adapt and prosper in the digital age</li> </ul>

One respondent lauded the power of human stories. “Numbers will always fail, particularly in terms of digital inclusion. My greatest success comes from the stories I can share. When I can talk about someone who came in jobless and homeless, and we were able to help them secure a job, it’s a huge success ... Stories capture what data never can.”

## DEVELOPING SHARED OUTCOMES FOR THE DIGITAL INCLUSION FIELD

We asked people to tell us both their current digital inclusion metrics and the metrics they thought were the best, whether they were using them or not. Typically, respondents said they currently measured outputs but felt that the “best” metrics were outcomes. As one person said, “Outcomes-based evaluation tools and implementation (are best). But capturing good and correct metrics takes people, staff, support, time and resources!”



*The NDIA and the Benton Foundation conducted a series of workshops with people involved in digital inclusion and interested in outcomes-based evaluation. They held the workshops in 2016 in Boston, Kansas City and St. Paul.*

Workshops conducted by the NDIA and the Benton Foundation identified the core needs of digital inclusion groups and stakeholders related to outcomes evaluation:

- **A shared vocabulary.** Definitions can be a challenge, as digital inclusion activities are not always defined as “digital inclusion.” And digital inclusion programs often only measure outputs, such as the number of computers distributed or number of people who received training. Proving that the outputs caused a particular outcome is a significant challenge.
- **Outcomes-based evaluation tools and implementation support.** Workshop participants said they had no trouble tracking what happened during programs, but it was difficult and expensive to track what happens after people leave the program. People wanted a set of tools, based on a standard set of frameworks, which many organizations could use to measure the outcomes of digital inclusion projects.

- **Common indicators.** “Multiple agencies and organizations that are providing digital inclusion programming may also not be working together or even know of each other’s efforts let alone what indicators they are using to measure the success of their programs,” the report said. “These stakeholders may well have different ideas of what success looks like.”<sup>141</sup>
- **Time and resources.** Workshop participants realized the need for outcomes-based evaluation, “but most told us they lacked the organizational capacity to develop and conduct outcomes-based evaluation on their own.”<sup>142</sup> A particular challenge was being able to collect contact information for follow-up evaluation, while still maintaining the privacy of those who received services.

### **The authors recommended that the field:**

1. Develop shared definitions, indicators and data elements.
2. Engage other stakeholders in digital inclusion in developing shared outcomes-based evaluation tools and resources.
3. Create a robust online tool and resource.

Let’s consider one example of how researchers measure outcomes of certain interventions.

Brian Whitacre is professor and extension economist with the Department of Agricultural Economics at Oklahoma State University. His main area of interest is rural economic development, with a focus on the role of technology. He wanted to test the impact of providing technology to students at an alternative high school. Instead of traditional classes, students at the alternative high school earned credits when they mastered topics. The pace of their progress varied by student.

In spring 2018, Whitacre divided the students into three groups. One, the control group, received no intervention. Another group was loaned hotspots that they could use to gain access to the internet at home. The third group received hotspots plus loaned laptops. They were able to keep the loaned items throughout the spring 2018 semester.

The researchers measured the outcome by comparing the number of credits students earned in fall 2017 with the number of credits earned in spring 2018. “This chart shows that the number of credits earned by students only increased significantly for the ‘hotspots + laptops’ group,” Whitacre said. “The other two groups were either unchanged or lower.”<sup>143</sup>

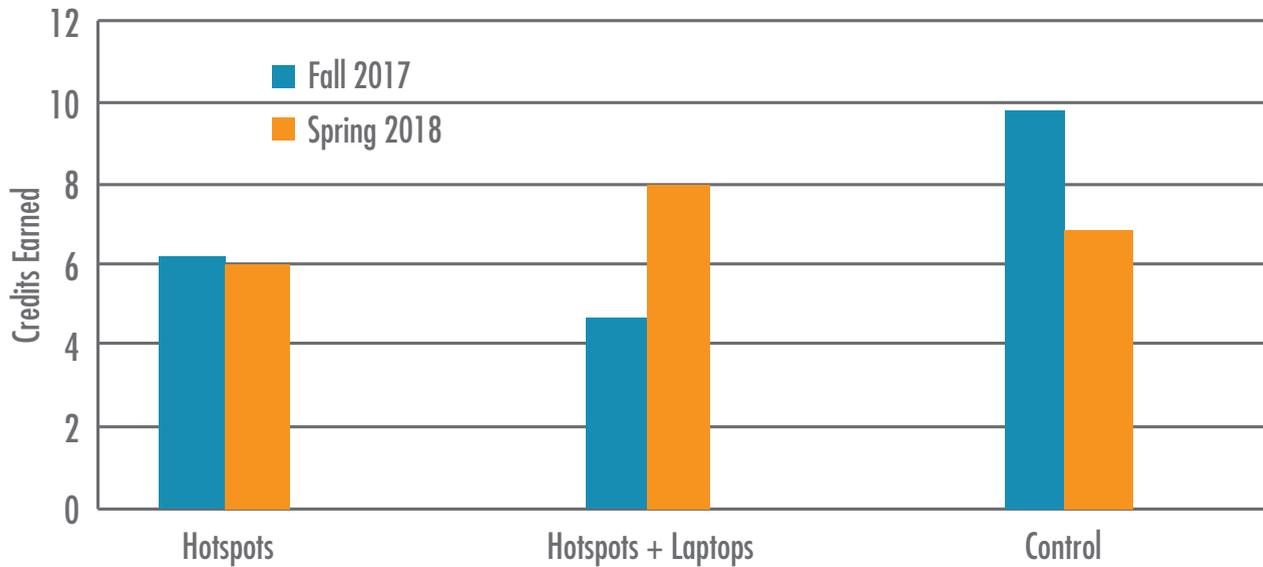
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<sup>141</sup>Colin Rhinesmith and Angela Siefer, “Digital Inclusion Outcomes-Based Evaluation,” Evanston, Ill.; Benton Foundation, May 2017, [Benton.org/outcomes-based-evaluation-report](https://benton.org/outcomes-based-evaluation-report), page 7.

<sup>142</sup>Ibid, page 8.

<sup>143</sup>Email, Brian Whitacre to Jeremy Hegle, May 7, 2019.

## IMPACT ON STUDENT CREDITS OF HOTSPOTS, LAPTOPS



Source: Brian Whiteacre, Department of Agricultural Economics, Oklahoma State University.

### COALITIONS HELP WITH ADVOCACY, ALIGNMENT, AND THE NETWORK

At each of the Kansas City Fed roundtables, people said they wanted a clearer understanding of what was happening in their communities and what was working well in other places.

Nascent coalitions can learn from more experienced groups. NDIA developed The Digital Inclusion Coalition Guidebook (<https://www.coalitions.digitalinclusion.org>) to capture and share lessons learned from six existing coalitions.

So what does one of these coalitions look like? NDIA says it's communitywide and draws people from a variety of groups throughout the area. It focuses on getting underserved residents access to affordable broadband, devices, training and tech support. And, as a coalition, it is an organization of organizations that operates for the public good with a formalized structure.<sup>144</sup>

<sup>144</sup>The Digital Inclusion Coalition Guidebook," National Digital Inclusion Alliance, [www.digitalinclusion.org/coalitions](http://www.digitalinclusion.org/coalitions)

NDIA talked with six digital inclusion coalitions nationwide. The six coalitions are based in Austin; Charlotte; Kansas City; Philadelphia; Portland, Oregon; and San Antonio. It found three main reasons that the coalitions mattered:<sup>145</sup>

1. **The advocacy effect.** They focus attention on digital inclusion as an area for public policy and community action.
2. **The alignment effect.** They create a framework to align the efforts of community players who may have little in common other than a concern about digital inclusion.
3. **The network effect.** Just by bringing people together in one room, coalitions can be the catalyst for new working relationships and shared insights.

The guidebook offers advice for starting and building a coalition.



*Stephenie Smith facilitates a discussion at the May 2019 Kansas City Coalition for Digital Inclusion meeting. Coalition meetings are held at the Kansas City Public Library monthly and are attended by coalition members, which includes community organizations, corporations, government agencies, internet service providers, schools and universities. Photo by Gary Barber.*

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<sup>145</sup>The Digital Inclusion Coalition Guidebook,” National Digital Inclusion Alliance, [www.digitalinclusion.org/coalitions](http://www.digitalinclusion.org/coalitions), pp 7-8

## CONCLUSION

### THREE OPPORTUNITIES FOR ACTION

The digital divide is wide and complex. No one group can bridge the divide alone—not government, banks, businesses or community organizations. Each of these groups, however, must play a role if the divide is to be narrowed.

This report identified three specific opportunities for action, which align with the three legs of the digital inclusion stool:

- 1 Research and evaluate the impact of policy on broadband expansion.**  
Good policy requires good data. Throughout this project, we found research related to the economic affect broadband has on communities. The studies documented the correlation between broadband and economic opportunity, but questions remain as to what policies best encourage broadband expansion. Policies vary greatly from one state to the next, especially as it relates to which types of entities—large carriers, small independent for-profit providers, municipalities and cooperatives—are allowed to build and operate networks. Elected officials would find it easier to make informed decisions if they had access to research on the effectiveness of these policies on boosting broadband deployment and improving affordability. Broader research on improving affordability and adoption would also help inform the field.
- 2 Support and expand workforce development programs** focused on digital skills training. Digital skills are a must for the in-demand jobs of today and tomorrow. Innovative approaches to preparing workers can provide a pathway to living-wage jobs that don't require a four-year degree, or, in many cases, even a two-year degree. Simply training workers on basic office-related programs like email and word processing can boost their employability. Registered apprenticeship programs can further expedite the process of developing and onboarding qualified workers. Workforce development programs targeting LMI individuals may also attract interest from banks seeking CRA-related activities, as outlined in *Engaging Workforce Development: A Framework for Meeting CRA Obligations* by the Federal Reserve Banks of Dallas and Kansas City.<sup>146</sup>
- 3 Support computer donation programs** targeting those in need. Businesses, government agencies, universities and other anchor institutions frequently replace computers in two-year to four-year cycles. Surplus computers have little monetary value, typically just pennies on the dollar. When donated, though, they can make a significant difference—whether the computer goes to a low-income mom pursuing her education, or a student learning to code. A donated computer can be a low-cost, high-impact way to change one's economic trajectory. Such initiatives, particularly when targeting LMI populations and combined with workforce training programs, could also attract interest from banks seeking CRA-related activities.

It is our goal that this report provides a better understanding of the digital divide and the role any of us can play in narrowing it. We also hope it serves as a catalyst to expand the reach of existing innovative practices and sheds light on areas needing more work.

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<sup>146</sup>Elizabeth Sobel Blum and Steve Shepelwich, "Engaging Workforce Development: A Framework for Meeting CRA Obligations," Federal Reserve Bank of Dallas and Federal Reserve Bank of Kansas City, December 2016, <https://www.dallasfed.org/-/media/Documents/cd/pubs/workforce.pdf?la=en>

Finally, we hope this report encourages people to ask what's missing and what needs to be done next. The report was shaped by experiences we heard in the community. To share your experiences narrowing the divide please email us at [digital@kc.frb.org](mailto:digital@kc.frb.org).

“We need to keep communication open about what's working well. The worst thing we can do is have lots of great pilots growing up in isolation.”

Roundtable participant, Omaha

## RECOMMENDED READING

### A COMPILATION OF USEFUL INFORMATION

This study benefitted from an array of articles in mainstream media and academic journals. We included links to each one in the footnotes, so they are easy to find. This recommended reading list focuses on guidebooks or websites that can help groups take action to close the digital divide. They are listed in the order they were mentioned in the report, under the title of the chapter in which they appeared.

## 2. LESSON: EVER-CHANGING TECHNOLOGY MEANS THE DIVIDE WILL NEVER GO AWAY.

**“Closing the Digital Divide: A Framework for Meeting CRA Obligations,” Federal Reserve Bank of Dallas, December 2016. <https://www.dallasfed.org/-/media/documents/cd/pubs/digitaldivide.pdf>**

The report provides financial institutions with an understanding of how broadband meets the “primary purpose” definition of the Community Reinvestment Act, a road map of best practices for closing the digital divide, and a list of tips for preparing their case for digital opportunity investments, among other elements.

**“Guide to CRA Grantmaking for Digital Equity and Economic Inclusion,” National Collaborative for Digital Equity (NCDE), August 2018. <http://digitalequity.us/resources.html>**

This brief guide to using the Community Reinvestment Act for digital inclusion contains examples of digital investments and tips on how to create effective CRA proposals aimed at narrowing the divide. NCDE updates the guide regularly.

### **3. RURAL BROADBAND. LESSON: NEW BUSINESS MODELS AND/OR PUBLIC FUNDING ARE CRITICAL TO SERVING UNPROFITABLE AREAS.**

**“Becoming Broadband Ready: A Toolkit for Communities,” Next Century Cities, January 2019. <https://nextcenturycities.org/wp-content/uploads/Becoming-Broadband-Ready-Toolkit-web.pdf>**

Next Century Cities is a nonprofit membership organization founded to support communities and elected officials in providing broadband. It offers a toolkit that covers topics such as: building a community movement; establishing policies and procedures such as “dig once” and “simplified permitting;” creating a digital inclusion plan; identifying legislative and regulatory barriers; exploring connectivity options such as co-ops or open access networks; exploring financing options; and more. The toolkit includes real-life examples and a helpful glossary and checklist.

**Broadband Now: What ISPs serve your ZIP code?  
<https://broadbandnow.com/All-Providers>**

BroadbandNow has identified 2,670 internet service providers in the U.S., their coverage and download speeds. Enter your ZIP code at <https://broadbandnow.com/All-Providers>, and the website tells you which DSL, copper, cable, fiber-optic, fixed wireless and mobile broadband providers serve where you live. Scroll down for an “internet provider competition map” for your region, showing how many providers serve which census tracts.

**Community Network Map – Institute for Local Self-Reliance  
<https://muninetworks.org/communitymap>**

The interactive map includes more than 800 communities. It tracks a variety of ways in which local governments have invested in wired telecommunications networks as well as states with laws that discourage such approaches. The map can be configured for a lot of detail, or to focus on just one element, such as dark fiber, gigabit speeds, citywide fiber, etc.

**Broadband Scorecard Report – R Street  
<https://www.rstreet.org/2018/11/29/2018-broadband-scorecard-report/>**

Companies that want to deploy broadband must deal with regulatory barriers imposed by government. Much of the regulation comes from the Federal Communications Commission, but state and local governments also play a role. This 2018 study evaluates all 50 states and assigns each a score based on how conducive their laws are to broadband deployment.

### **4. ADOPTION. LESSON: WORK WITH, NOT FOR, THE COMMUNITY.**

**Discount Internet Guidebook – NDIA and Public Knowledge  
<https://www.discounts.digitalinclusion.org/> (the guidebook)  
[https://www.discounts.digitalinclusion.org/10\\_resources.html](https://www.discounts.digitalinclusion.org/10_resources.html) (searchable list of discount offers)**

The guidebook is a practical guide for digital inclusion practitioners, such as libraries and government agencies. It describes affordable broadband plans for low-income households offered by commercial internet providers, with information about who is eligible, how to apply and more.

## 6. AFFORDABLE EQUIPMENT. LESSON: IT TAKES TIME AND ADEQUATE EQUIPMENT TO OVERCOME RESISTANCE TO TECHNOLOGY.

### **Certified Electronics Recyclers – U.S. Environmental Protection Agency**

**<https://www.epa.gov/smm-electronics/certified-electronics-recyclers>**

There are two certification standards for electronics recyclers—the eStewards® Standard for Responsible Recycling and Reuse of Electronic Equipment© and the R2-Certified Recycling Standard for Electronics Recyclers. This site offers information about both programs, and an interactive map of where recyclers are located and what services they offer.

To find the nearest Microsoft Registered Refurbishers, visit <https://www.msregrefurb.com/RRPSite/OnlineDirectory.aspx>

## 7. EVALUATION AND COLLABORATION. LESSON: PEOPLE ARE HUNGRY TO LEARN FROM OTHERS.

### **“Digital Inclusion: Outcomes Based Evaluation” – Benton Foundation**

**<https://www.benton.org/publications/digital-inclusion-outcomes-based-evaluation>**

Outcomes-based evaluation provides a way for programs that promote digital inclusion to understand the impact of the services provided. This report describes the challenges facing community-based groups and others in using outcomes-based evaluation to measure the success of their digital inclusion programs and offers recommendations to address those shared barriers.

### **“The Digital Inclusion Coalition Guidebook” - NDIA**

**<https://www.coalitions.digitalinclusion.org>**

NDIA developed “The Digital Inclusion Coalition Guidebook” to capture and share lessons learned from six existing coalitions. The guidebook offers advice for starting and building a coalition and on the types of things that digital inclusion coalitions typically do.

## APPENDIX A: DEFINITIONS

Broadband-related definitions are not universally agreed upon, though the following provides a general working understanding of the terms.

### **Availability versus adoption**

FCC data in 2017 showed 96 percent of urban households and 61 percent of rural households live in areas where high-speed broadband infrastructure is available. “Availability” means the house is “located in a region that has at least partial infrastructure access.”

“Adoption” means a household has a subscription that allows them to use high-speed broadband at home. The latest American Community Survey data, from 2015, finds the nationwide residential broadband adoption rate is 76.6 percent.

One study has found only minor economic benefits from having broadband infrastructure available, “while increased broadband adoption was linked to individual-level and community-level economic improvements.”<sup>147</sup>

## Broadband

Not all internet access operates at the speed needed to be considered broadband. The FCC defines broadband as a minimum of 25 Mbps download and 3 Mbps upload. The last time the definition changed was in 2015, when it was raised to its current level from 4 down/1 up. Like humans, the internet has a backbone. That’s what transmits data between cities, countries and continents, and it is composed mainly of fiber-optic cables. Consumer internet companies take the internet that “last mile” from the backbone to the home or office.<sup>148</sup> There are various options for taking the internet the last mile: DSL, cable and fiber. BroadbandNow offers pros and cons of each.<sup>149</sup>

Internet option	Pros	Cons
DSL, delivered over copper phone lines by phone companies like AT&T. Outside urban and suburban areas, DSL often is the only wired internet option. Speeds: 5-35 Mbps down; 1-10 up.	Affordable Widely available Dedicated connection	Slower speeds Prone to storm damage Long contracts
Cable, delivered over copper coaxial television cable by TV companies like Spectrum and Cox. Bandwidth generally is shared with neighbors, so speeds vary with use. Speeds: 10-500 down; 5-50 up.	High internet speeds Affordable TV bundles Widely available	Limited rural availability Speeds slow during peak use times
Fiber, delivered over fiber-optic lines by companies like Verizon Fios and Google Fiber. Covers 25 percent of the United States so far. Speeds: 250-1,000 down; 250-1,000 up.	Gigabit speeds Fast upload rates Reliable service	Higher price Limited availability

<sup>147</sup>Broadband Infrastructure Alone Does not Bridge the Digital Divide,” *Digital Inclusion News*, Aug. 24, 2017, <https://www.digitalinclusion.org/blog/2017/08/24/broadband-infrastructure-alone-does-not-bridge-the-digital-divide/>

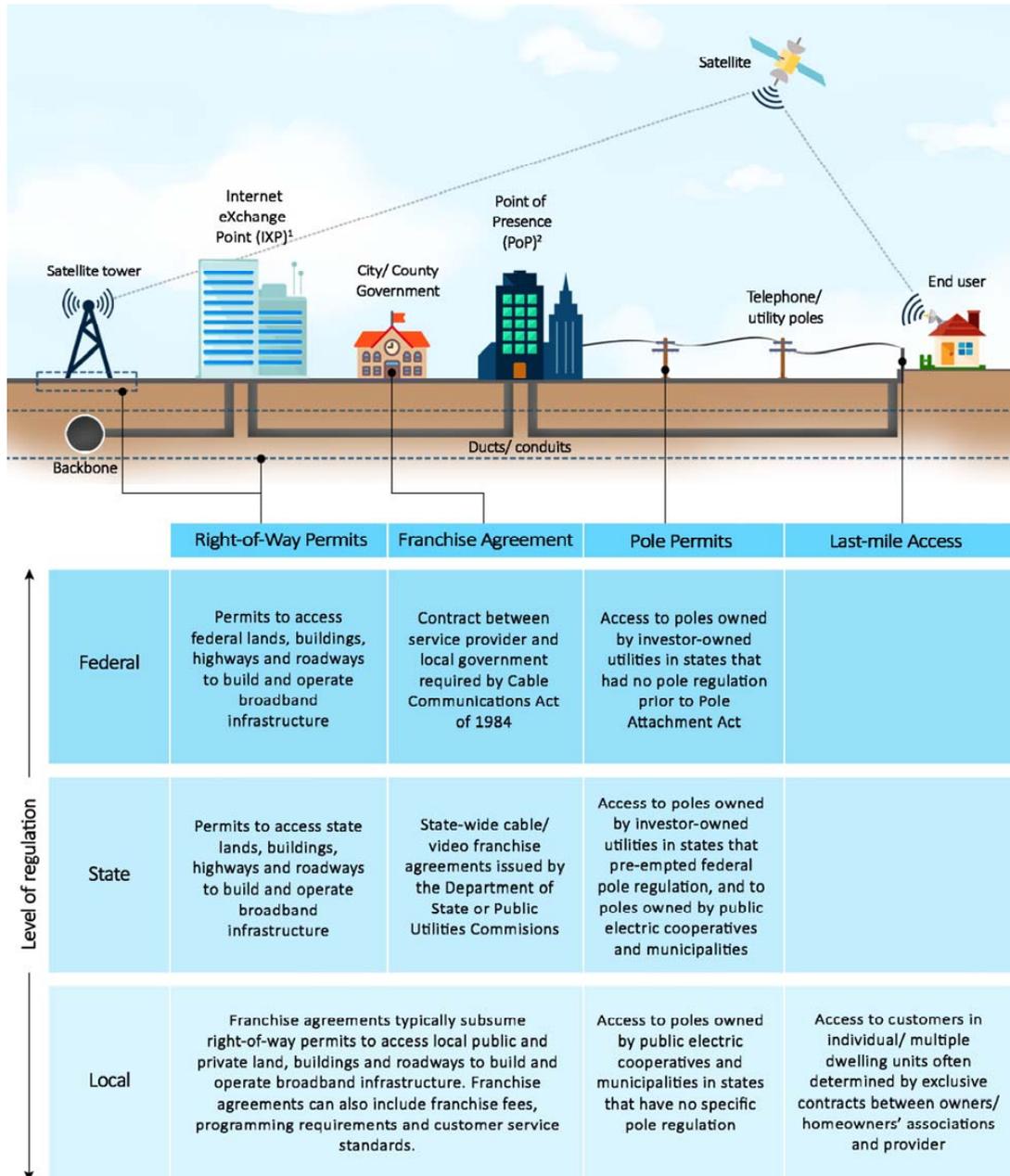
<sup>148</sup>DSL vs Cable vs Fiber: Comparing Internet Options,” BroadbandNow, <https://broadbandnow.com/guides/dsl-vs-cable-vs-fiber>

<sup>149</sup>Ibid.

## Broadband infrastructure

America's broadband infrastructure typically is privately built but regulated by public entities. The graphic below is used with permission of the Brookings Institution.<sup>150</sup>

### America's privately built, publicly regulated broadband infrastructure



<sup>1</sup>Internet eXchange Point (IXP)- Typically, a location that facilitates the costless/ low-cost exchange of internet traffic between the networks of different Internet Service Providers through mutual peering agreements.

<sup>2</sup>Point of Presence (POP)- Typically, a location where a long-distance carrier's cables end and connect into a local network, such as a regional or city network. From the point of presence, internet traffic is routed to the end user.

Source: The Brookings Institution

<sup>150</sup>Adie Tomer, Elizabeth Kneebone and Ranjitha Shivaram, "Signs of Digital Distress: Mapping broadband availability and subscription in American neighborhoods," (Washington: Brookings Institution, 2017), page 7, figure 1, <https://www.brookings.edu/research/signs-of-digital-distress-mapping-broadband-availability/>

## **Digital equity**

Digital equity is a condition in which all individuals and communities have the information technology capacity needed for full participation in our society, democracy and economy. Digital equity is necessary for civic and cultural participation, employment, lifelong learning and access to essential services.<sup>151</sup>

## **Digital inclusion**

Digital inclusion refers to the activities necessary to ensure that all individuals and communities, including the most disadvantaged, have access to and use of information and communication technologies. This includes three main elements: 1) affordable, robust broadband internet service; 2) internet-enabled devices that meet the needs of the user; and 3) access to digital literacy training. Experts increasingly are likely to include these additional elements: high-quality technical support; and applications and online content designed to enable and encourage self-sufficiency, participation and collaboration.

Digital inclusion must evolve as technology advances. Digital inclusion requires intentional strategies and investments to reduce and eliminate historical, institutional and structural barriers to the access to and use of technology.<sup>152</sup>

## **Digital literacy**

Digital literacy is the ability to use information and communication technologies to find, evaluate, create and communicate information, requiring both cognitive and technical skills.<sup>153</sup>

## **Served**

Definitions vary. The Schools, Health and Libraries Broadband Coalition uses a definition meant to guide what new legislation should work toward, so that communities invest in meeting the needs of the future rather than the present. They also provide definitions for both residential and anchor institutions:

“Served,” when used to describe a **residential location or area**, means broadband is available at affordable prices that provide:

1. a download speed of at least 100 Mbps;
2. an upload speed of at least 50 Mbps; and
3. latency that is sufficiently low to allow real-time, interactive applications.

“Served” also can describe an anchor institution location. Anchor institutions are enduring organizations that are rooted to their locations, such as hospitals, schools and government buildings. If an anchor institution is served, it means broadband is available at affordable prices that provide:

1. a download speed of at least 1 gigabit per second per 1,000 users;
2. an upload speed of at least 1 gigabit per second per 1,000 users; and
3. latency that is sufficiently low to allow multiple, simultaneous, real-time, interactive applications.

BroadbandNow is a service that attempts to simplify the broadband shopping experience by showing where there is and isn't competition. It defines “underserved” as the percent of the population with access to fewer than two wired providers.

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<sup>151</sup>National Digital Inclusion Alliance, [www.digitalinclusion.org/definitions](http://www.digitalinclusion.org/definitions) (accessed June 4, 2019).

<sup>152</sup>Ibid.

<sup>153</sup>Ibid.

## APPENDIX B: STATES IN THE TENTH DISTRICT TAKE ACTION TO PROVIDE BROADBAND

Each state government in the Tenth District has formed a task force or commission, and/or charged a state agency with coordinating provision of broadband statewide, typically with an emphasis on rural areas.

### Colorado

There are two major players in state government.

The **Colorado Broadband Office** is part of the Governor's Office of Information Technology. In 2018, the office helped pass SB18-002, which will provide \$100 million to the Broadband Fund over five years.<sup>154</sup> Gov. John Hickenlooper signed the bill in April 2018. The bill takes money from a fund that has long subsidized rural telephone service.

**Department of Local Affairs** (DOLA) is the state agency charged with helping to strengthen Colorado's communities. Among its activities, DOLA has a broadband program, which supports the efforts of local governments to improve broadband service to their residents. The broadband program promotes interjurisdictional communication, better access to services, and planning and middle-mile infrastructure grants.<sup>155</sup>

### Kansas

There are two major players in state government.

The Kansas Department of Commerce created the **Office of Broadband Development** to lead a statewide effort to expand broadband coverage and capacity for all Kansans. That office is responsible for a task force on broadband expansion.

The Kansas legislature passed a bill to form the **Statewide Broadband Expansion Planning Task Force** in 2018. The task force includes 17 voting members. It includes the chair, vice chair and ranking minority member of the House Standing Committee on Energy Utilities and Telecommunications and the same from the Senate Standing Committee on Utilities. Other members are appointed by stakeholders such as the state's Association of Counties, League of Municipalities and Rural Independent Telephone Coalition.<sup>156</sup>

The legislature directed the task force to "work collaboratively to develop an approach that includes, but is not limited to, the development of criteria for the creation of a statewide map for defining and evaluating the broadband needs" of Kansans. It also asked the task force to consider FCC actions, potential funding sources to expand broadband infrastructure and priorities for expanding broadband across Kansas.<sup>157</sup>

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<sup>154</sup>Message from the Executive Director," Nov. 8, 2018, Colorado Broadband Office, <http://broadband.co.gov/message-from-the-executive-director/>

<sup>155</sup>"Broadband Program," Colorado Department of Local Affairs, <https://www.colorado.gov/pacific/dola/broadband-program> (accessed June 5, 2019).

<sup>156</sup>"Broadband Expansion Planning Task Force; Senate Sub. For HB 2701, 2018 Summary of Legislation, [http://www.kslegislature.org/li\\_2018/b2017\\_18/measures/documents/summary\\_hb\\_2701\\_2018.pdf](http://www.kslegislature.org/li_2018/b2017_18/measures/documents/summary_hb_2701_2018.pdf) (accessed June 5, 2019).

<sup>157</sup>"2019 Statewide Broadband Expansion Planning Task Force," charge to the task force, Kansas Legislative Research Department, <http://www.kslegresearch.org/KL-RD-web/Committees/Committees-StatewideBrdndExpPlanningTF.html>, (accessed June 5, 2019).

## Missouri

The **Missouri Broadband Development Office** is the major player in state government. Missouri established the office in 2018 as a partnership between the Department of Economic Development and the Department of Agriculture. It is intended to strengthen partnerships and connect efforts to improve broadband access statewide. The office will help communities participate in federal programs such as the USDA Rural Development loan program. It will conduct research on how other states have brought high-speed internet to the agricultural community. One of its first large projects will be building a map of existing fiber-optic lines.<sup>158</sup>

In January 2019, in his first State of the State address, Gov. Michael Parson announced several long-term investments in Missouri infrastructure, including \$5 million to provide Missourians with access to high-speed broadband.<sup>159</sup>

## Nebraska

The **Nebraska Information Technology Commission** (NITC) prepares a statewide technology plan each year, and provides biannual recommendations on technology investments and adopts technical standards. The legislature established the nine-member commission to provide advice, strategic direction, and accountability on information technology investments in the state. To achieve its mandate, the NITC relies on coordination and collaboration to influence a wide range of information technology issues. The NITC is assisted by six advisory groups: the Community, Education, eHealth, GIS, and State Government Councils and the Technical Panel.<sup>160</sup>

The state also created two temporary projects aimed at broadband.

The **Nebraska Broadband Planning Initiative** aimed to increase broadband adoption and utilization. It was funded by a grant (2010-15) from the U.S. Department of Commerce's National Telecommunications and Information Administration to the Nebraska Public Service Commission. It involved several partners and was distinguished by its community engagement.<sup>161</sup>

The state created the **Rural Broadband Task Force** in mid-2018 to “review issues related to availability, adoption and affordability of broadband services in rural areas of Nebraska and make recommendations ...” Gov. Pete Ricketts appointed eight members to the task force, including people who could represent rural schools, businesses, agribusiness, public power, telecommunications and health-care providers. Other members of the 14-member task force include heads of state agencies and chairs of legislative committees.<sup>162</sup>

The task force will submit its report to the legislature by Nov. 1, 2019.<sup>163</sup>

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<sup>158</sup>“New State Office Seeks to Bring High-Speed Internet to Rural Missouri,” St. Louis Public Radio, May 8, 2018, <https://news.stlpublicradio.org/post/new-state-office-seeks-bring-high-speed-internet-rural-missouri#stream/0>

<sup>159</sup>“Governor Parson Delivers 2019 State of the State Address,” Jan. 16, 2019, <https://governor.mo.gov/press-releases/archive/governor-parson-delivers-2019-state-state-address>

<sup>160</sup>“Nebraska Information Technology Commission,” Dec. 20, 2018, <http://nitc.nebraska.gov/about.html>

<sup>161</sup>“About Nebraska Broadband: How We Started,” <http://broadband.nebraska.gov/about-nebraska-broadband>, (accessed June 5, 2019)

<sup>162</sup>“Governor Ricketts Announces Rural Broadband Task Force Members, Office of Governor Pete Ricketts, July 30, 2018, <https://governor.nebraska.gov/press/governor-ricketts-announces-rural-broadband-task-force-members>

<sup>163</sup>*Ibid.*

## **New Mexico**

The **New Mexico Broadband Program** has two major objectives: to define broadband availability and to enhance the adoption of broadband. It accomplishes the objectives through statewide projects dealing with mapping, planning, capacity-building and technical assistance.

The **New Mexico Department of Information Technology** (DoIT) started the Office of Broadband and Geospatial Initiatives (OBGI) in 2016. It is an expansion of the New Mexico Broadband Program. OBGI consolidates state resources to help the greater good and encourages ISP transparency via state-owned public mapping resources. The maps show the type of technology and its geographic reach (cable, DSL, fiber, mobile wireless, etc.), list of available broadband providers, and available speeds in terms of minimum and maximum advertised downloads and uploads.<sup>164</sup> DoIT's geospatial system and underlying data support a variety of initiatives, dealing with broadband for education, libraries, business, safety and health.

## **Oklahoma**

The **Oklahoma Broadband Initiative** began with a mapping project to determine which areas were and were not served. The mapping project started around 2011.

The next step was the **Oklahoma Community Anchor Network** (OCAN). The state laid fiber optic cable to provide broadband internet access to community anchor institutions such as hospitals, universities, libraries and public safety organizations. Several state agencies own, manage and maintain wired and wireless telecommunications infrastructures. Through OCAN, the state is able to create an aligned network and to encourage public/private partnerships, according to the project website.<sup>165</sup>

## **Wyoming**

In 2018, Gov. Matt Mead signed into law SEA No. 0036, establishing a \$10 million broadband infrastructure grant fund and funding for a new state broadband coordinator position at the Business Council. The bill also created a **Broadband Advisory Council**. The Broadband Advisory Council produced a plan to enhance broadband, which the Business Council released in September 2018.

The plan is intended to drive goals set in a previous report, *Transforming Wyoming*, a 20-year Economic Diversification Strategy, which highlighted areas where “broadband connectivity is critical to Wyoming’s long-term strategy for growth and economic prosperity.”<sup>166</sup>

The plan relies on a variety of partners. One of them is the Department of Enterprise Technology Services, which the state created in 2012 to connect anchor institutions, including schools and state government facilities, with broadband. Another is the Wyoming Department of Transportation, which “has been a leader in working with the private sector to allow them to install fiber and conduit in highway rights-of-way.”<sup>167</sup>

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<sup>164</sup>New Mexico Broadband Mapping Program,” New Mexico Department of Information Technology, <http://www.doit.state.nm.us/broadband/mapping.shtml>, (accessed June 5, 2019)

<sup>165</sup>“Oklahoma Community Anchor Initiative (OCAN) Overview,” State of Oklahoma Broadband Initiative, <https://broadband.ok.gov/ocan-overview>, (accessed June 5, 2019).

<sup>166</sup>“Broadband Development,” Wyoming Business Council, 2018, page 4.

<sup>167</sup>Ibid.





FEDERAL RESERVE BANK *of* KANSAS CITY