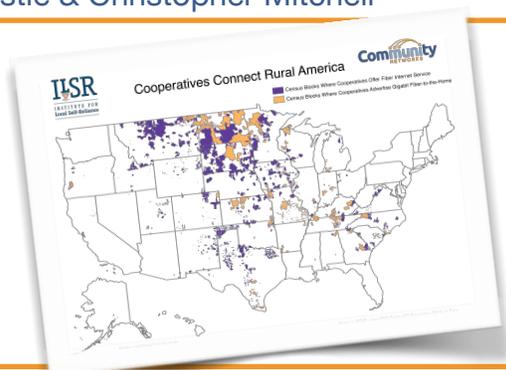# Cooperatives Fiberize Rural America:

A Trusted Model For The Internet Era

By H. Trostle & Christopher Mitchell

Introduction

Rural regions in the United States largely lack high-quality Internet access, a fact that is well known with various solutions being publicly discussed at both the state and federal level. However, too few have noticed that a substantial minority of rural areas actually have Internet infrastructure that is better than what metro regions have on average. Locally-rooted infrastructure cooperatives have already invested significantly in fiber-optic networks and are an under-appreciated tool for expanding access rapidly in a fiscally-responsible manner across rural America.

Rural communities have solved many past infrastructure problems by creating utility cooperatives. In the 1930s, farmers came together to build non-profit, member-owned electric cooperatives. These co-ops were able to borrow money from the federal government to build a grid across low-density and sometimes rugged terrain, everywhere from Maine to southern California. Decades later, people did the same to create telephone cooperatives.

Cooperatives should be the foundation for bringing high-speed Internet service to rural America. Internet service from satellite, dial-up, and DSL is too slow and unreliable for modern applications. Small towns and farming communities need high-speed Internet service to support their local economies, educate themselves, and generally improve their quality of life. Cooperatives have quietly proved that they can build Fiber-to-the-Home networks that are capable of speeds of more than 1 Gigabit per second (1,000 Mbps). As of December 2016 according to FCC data, 87 cooperatives offer residential gigabit service.

Small Internet Service Providers (ISPs) are also making investments in their rural communities, but large ISPs, such as AT&T and CenturyLink, have overlooked rural areas. This is where cooperatives can solve the problem.

This brief explores the impact that rural cooperatives have already made on Internet access. It concludes with action steps and policy recommendations for universal access to high-quality Internet service in America.

Problem: Bad Rural Connectivity

Rural communities face many challenges from dwindling populations to inaccessible health care. The limited opportunities available in rural homes drive many young workers to suburbs and metro regions, causing further population loss and further reducing opportunities for those remaining in their rural communities. The opportunities afforded by high-speed Internet access can breathe new life into rural communities, making them once again great places to live, work, and play.

The rural U.S. makes up only 14 percent of the population, but covers 72 percent of the land area.[1] In 2010-2016, researchers witnessed the first ever overall population decline in rural counties in U.S. history.[2] Rural-urban migration is a fact of life, but this is the first time that the rural U.S. has lost more population than can be replaced by natural population growth. Although rural areas account for so little of the population, they have been difficult to connect with Internet access. Only 4 percent of urban Americans lack access to broadband service compared to 39 percent of rural Americans.[3]

Rural economies suffer without high-speed Internet access. For small businesses, credit card and debit card transactions are delayed by slow connections. Potential entrepreneurs have difficulty accessing information online and promoting their concept without a reliable connection. Tourist towns need high-speed Internet access to attract visitors and encourage them to return. In a recent survey by

statistics firm Statista, 80 percent of respondents reported that Internet access was crucial for hotel service - even more important than room service.[4]

It's not just the economy. Rural Internet access can improve health care and education. Nearly

Key Terms

Federal Communications Commission (FCC) – a federal government agency that regulates U.S. communications laws and policies.

Broadband – Defined by the FCC as 25 Mbps (download) / 3 Mbps (upload). Generally used as a shorthand for good Internet access.

Cooperative – A non-profit, member-owned organization that provides a needed service. Members pay a small fee to join and have voting rights within the organization.

United States Department of Agriculture (USDA) – a U.S. department that is a key source of grants and loans for cooperatives via its Rural Utilities Service (RUS) department.

Fiber-to-the-Home – A type of network technology that physically connects each home to a fiber-optic line. Fiber-optic connections work by transmitting information as pulses of light. It has more capacity than Cable or DSL.

"Gig" or Gigabit (Gbps) – Internet service speeds of 1,000 Mbps (more colloquially used to describe a connection that has no congestion regardless of what applications are used).

Internet Service Providers (ISPs) – Companies or organizations that provide Internet access.

Form 477 – A specific FCC form to monitor the deployment of broadband service in the U.S. ISPs provide information at the census block level.

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[1] USDA Economic Research Services defines rural as the total population of nonmetro counties.
https://www.ers.usda.gov/topics/rural-economy-population/population-migration

[2] https://www.ers.usda.gov/topics/rural-economy-population/population-migration/recent-population-change

[3] The FCC uses the 2010 census block identification to estimate rural population.
https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2016-broadband-progress-report

[4] https://www.statista.com/chart/9620/hotels-just-give-me-wi-fi

7 in 10 teachers assign homework that requires Internet access.[5] With sub-par connectivity, rural students are at a disadvantage when trying to complete their homework or independently enrich their education. High-speed Internet service also enables more educational opportunities, such as live interactive STEM courses from across the state.[6]

Nearly 30 percent of U.S. veterans live in rural areas, and 75 percent of them are more than 55 years old.[7] This older segment of the population has unique health needs. Many rural communities, however, lack access to preventative services, and rural communities have higher rates of chronic illness and poor overall health.[8] Telehealth initiatives could alleviate some of these disparities by providing access to routine, preventative care. Veterans and the elderly can receive telehealth services in order to stay in their communities longer and receive more frequent care. Such a shift would also lower the cost of providing medical care.

Despite this opportunity, rural regions are often stuck with dial-up, DSL, or satellite service. These technologies are too slow and unreliable to support rural economies. Some states have developed programs to subsidize rural connections in addition to some existing programs from the federal government. However, none of these programs have the scale to ensure most rural regions have modern Internet access. Fortunately, rural cooperatives have stepped up, some taking advantage of

these state and federal programs and others simply finding a way to invest in the technologies necessary to deliver better Internet access.

The Cooperative Solution

For nearly 100 years, rural communities have relied on cooperatives to bring needed utilities to their homes and businesses. In the early 20th century, private electricity companies refused to extend service to most of rural America. Private investors did not believe farms and rural towns had sufficient electrical demand and instead focused on building out to urban areas and more specifically industrial areas. The federal government stepped in with the Rural Electrification Act of 1936, setting the stage for rural utility cooperatives.

Approximately 260 telephone cooperatives and 900 electric cooperatives today serve much of rural America. Electric cooperatives provide reliable power to more than half of the entire U.S. land area, nearly 2 million square miles. More than 30 states have at least one telephone cooperative.

Many cooperatives provide Internet service as a natural extension of their existing infrastructure. Telephone cooperatives started with Internet access by providing dial-up and DSL service over their copper telephone lines. Most telephone co-ops are already transitioning to all-fiber networks, upgrading everyone in their territory from the old copper phone lines of

5 https://www.nytimes.com/2016/02/23/technology/fcc-internet-access-school.html

6 https://muninetworks.org/content/community-network-services-cns-brings-stem-education-and-more-rural-southwest-georgia

7 https://www.legion.org/veteranshealthcare/ruralhealth

8 https://www.ruralhealthinfo.org/topics/rural-health-disparities

50 years ago.[9] About 60 rural electric co-ops have embarked on fiber optic projects to increase Internet access for their members, a number that is growing rapidly from just a handful in 2012.[10]

Why Fiber?

Fiber networks offer faster, more reliable service than other types of networks. They have been hailed as "future-proof" infrastructure and have long technological lifespans. Additionally, fiber networks support multiple uses for homes and businesses, including Internet service, telephone, video, and security. Fiber networks have high capital costs initially, but lower operating costs than many other types of networks over the long-term.
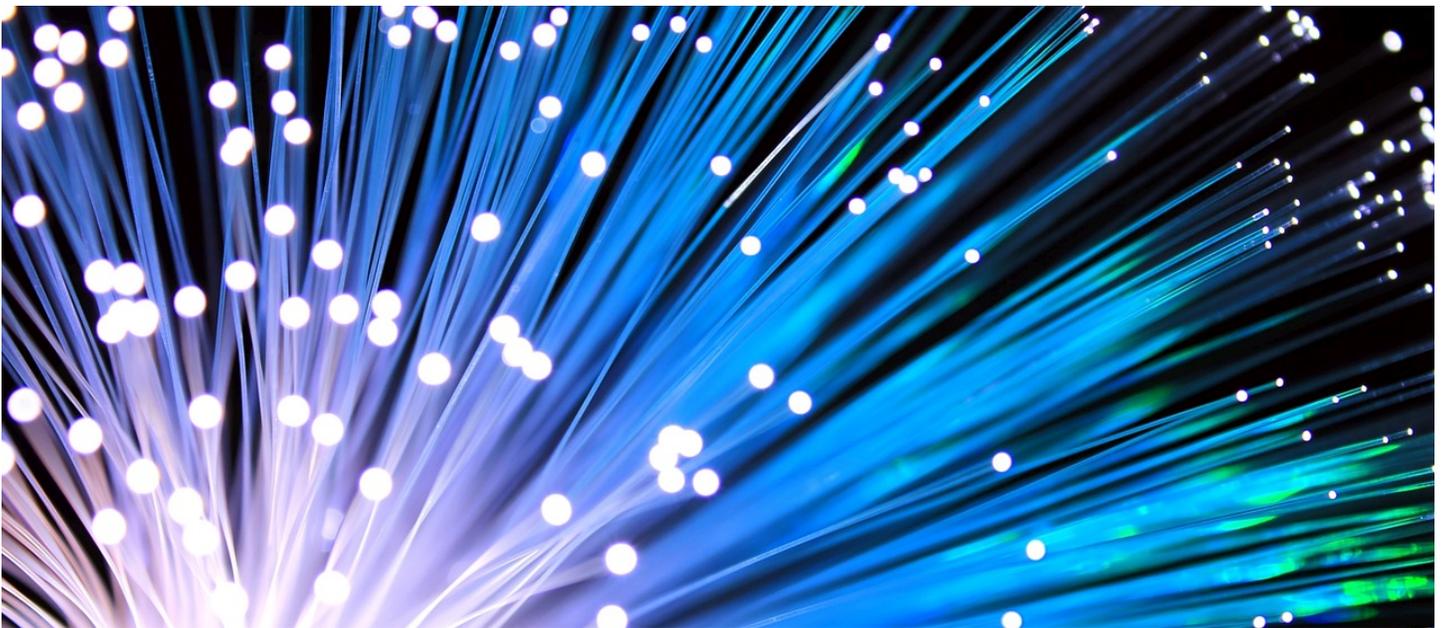
Many electric cooperatives may already have fiber in place for another purpose. Several started by building fiber optic lines to substations and large demand centers to increase the reliability of the electric system through better monitoring. This forms the backbone of the network for Internet access to businesses and residents.

Cooperative Fiber Map

The map features the 350+ organizations that are telephone and electric cooperatives or their subsidiaries that are currently offering fiber Internet access to homes or businesses. It is based on data from the FCC Form 477 December 2016 v1, and it is compiled at the census block level.[11] This map may slightly overstate coverage: an ISP may claim a census block as served if an ISP serves, or can easily serve, at least one location in that census block. Rural census blocks often cover larger areas than urban census blocks.

This map includes information on projects through December 2016; new projects that started in 2017 will not be reflected on this map.
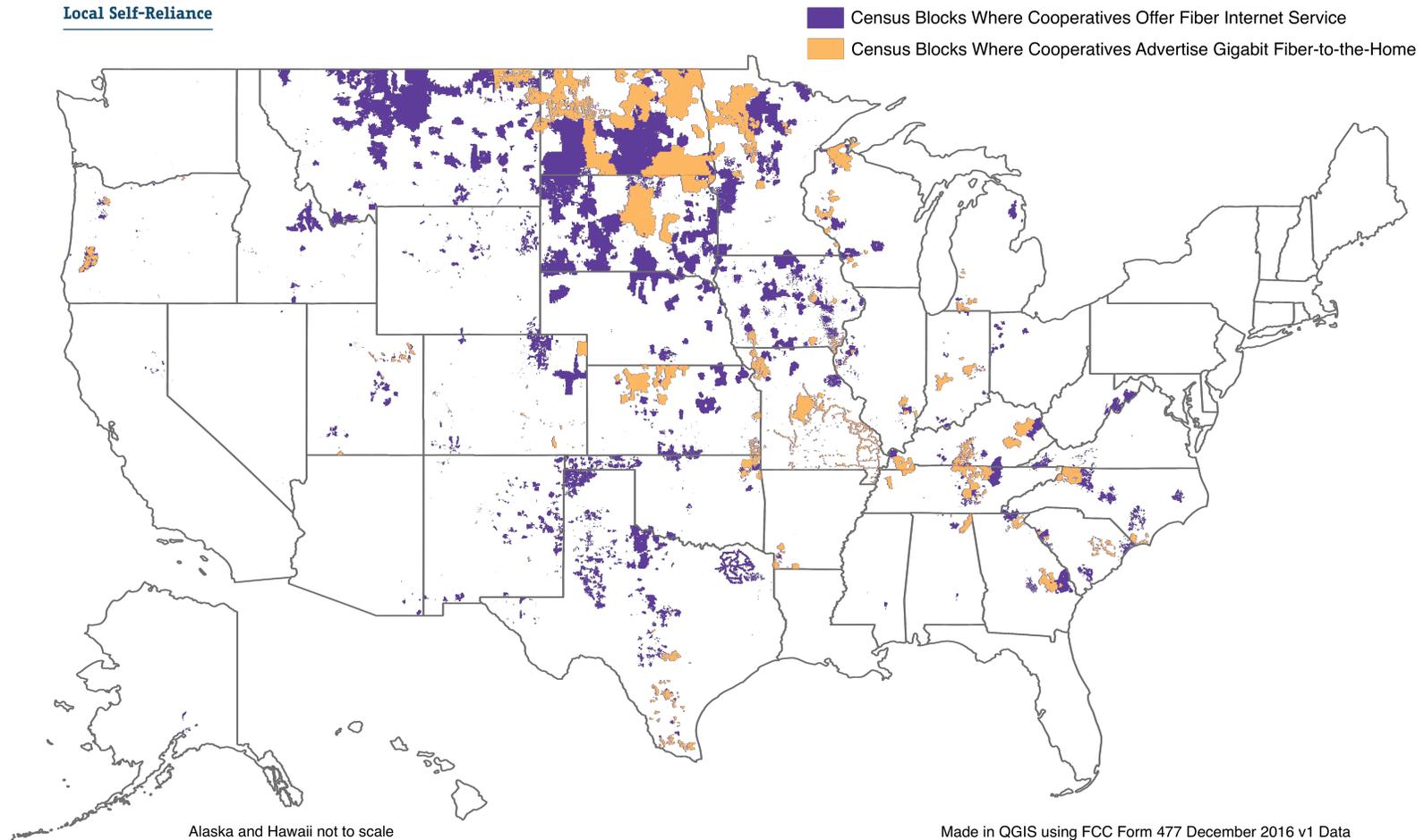

[9] https://muninetworks.org/content/rural-cooperatives-page

[10] https://muninetworks.org/content/rural-cooperatives-page

[11] https://www.fcc.gov/general/broadband-deployment-data-fcc-form-477

Cooperatives Connect Rural America

Census Blocks Where Cooperatives Offer Fiber Internet Service

Census Blocks Where Cooperatives Advertise Gigabit Fiber-to-the-Home

Alaska and Hawaii not to scale

Made in QGIS using FCC Form 477 December 2016 v1 Data

A Note On Advertising Gigabit Fiber-to-the-Home

Some cooperatives choose not to offer a gigabit to their members even if the technology allows it. One reason may be a limitation on the backhaul, the connection to the wider Internet. The Rural Broadband Association (NTCA) has a gigabit certification program in order to draw attention to how many small telephone companies and cooperatives have built these next-generation networks.[12]

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[12] https://www.ntca.org/awards-recognition-programs/gig-certification.html

The Future is Cooperative

The vast majority of organizations on this map are telephone and electric cooperatives that have served their communities for decades. But we know of at least two relatively newly formed cooperatives and have covered their stories on MuniNetworks.org.

> In Michigan, a man wanted telephone service for his consulting business in the 1990s and the community needed 911 service for their families. They built the Allband Communications Cooperative that now manages a Fiber-to-the-Home network and supports rural research.[13]

> RS Fiber in Minnesota came out of a consortium of rural towns and counties that recognized the need for high-speed Internet access.[14]

Forming a new cooperative is challenging, which is why we believe the most common solution for rural regions not currently served by cooperatives will be for nearby cooperatives to expand their service territory.

Electric cooperatives have the potential to connect much of rural America. Although only 10 percent of electric cooperatives in the U.S. have a fiber Internet access project, many are now considering the challenge - crafting feasibility studies, attending broadband conferences, and collaborating with others in their communities. We have been told it is the most common conversation at meetings of rural electric co-ops.

However, some states have laws that discourage cooperatives from engaging in Internet projects. For instance, a 1999 North Carolina law limits the state's electric cooperatives' access to capital for Internet access projects. Specifically, the law prevents USDA funds from being used for broadband infrastructure, and cooperatives have had to find ways around it.[15] The 1996 Telecommunications Act preempts states from enforcing such laws against co-ops, but they are nonetheless on the books and few co-ops want to waste time or money challenging the law.

Funding For Projects

Fiber network projects have significant capital expenditures at the start of their projects, and even once completed, cooperatives may find that they need additional funding for marketing campaigns or computer literacy projects. More than 40 cooperatives have taken advantage of several federal funding programs to make these investments feasible, while others have built fiber networks with little federal funding.

Some cooperative projects received grants or loans from the federal stimulus program, the American Recovery & Reinvestment Act (ARRA), which included the Broadband Technology & Opportunity Program (BTOP) administered by the National Telecommunications and Information Administration (NTIA) as well as the Broadband Initiatives Program (BIP) administered by the U.S. Department of Agriculture (USDA).

Other cooperatives took advantage of the Federal Communications Commission's (FCC) Connect America Fund (CAF) Rural Broadband Experiments Program. To name only a few

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[13] https://muninetworks.org/content/rural-telephone-cooperative-forges-its-own-path-michigan

[14] https://muninetworks.org/reports/rs-fiber-fertile-fields-new-rural-internet-cooperative

[15] https://muninetworks.org/reports/north-carolina-connectivity-good-bad-and-ugly

recipients of the grant: Allamakee-Clayton Electric Cooperative in Iowa, BARC Electric Cooperative in Virginia, and Paul Bunyan Telephone Cooperative in Minnesota.

The USDA currently manages several programs as well. Some are through its Rural Utilities Services (RUS) division and others are through programs like Cool & Connected, which provides planning assistance for broadband deployment and community development. RUS manages the Community Connect Grants, the Distance Learning & Telemedicine Grants, the Farm Bill Broadband Loans & Loan Guarantees, and the Telecommunications Infrastructure Loans & Loan Guarantees programs.[16]

Some cooperatives initially applied for grants and loans, but were not dissuaded when rejected. Co-Mo Electric Cooperative in Missouri applied multiple times for ARRA funding, but each application was rejected. The communities still clamored for service, so they moved forward on their own. Co-Mo Electric self-financed a gigabit Fiber-to-the-Home network.

The story of rural Internetification is just starting to be told, but it is clear that cooperatives will have a large role. The sooner policymakers realize that, the faster and less expensive it will be to connect everyone.

Resources

MuniNetworks.org – updated daily, a clearinghouse of information on Community Network projects across the U.S.

Community Broadband Bits Podcast – Interviews on how communities are building community networks.
  Episode 243 with Mel Coleman on North Arkansas Electric Cooperative's pilot project.
  Episode 240 with Darren Farnan on United Fiber in rural Missouri.
  Episode 229 with Jon Chambers on rural electric cooperatives' potential.

Reports – In-depth research on fiber projects for Internet access.
  RS Fiber: Fertile Fields for New Rural Internet Cooperative (2016) A report on how communities in rural Minnesota formed a new cooperative to build a fiber network.
  North Carolina Connectivity: The Good, the Bad, and the Ugly (2016) An overview of Internet access in North Carolina and how telephone and electric cooperatives are solving the problem.

Community Connectivity Toolkit - A DIY guide on how to build local power and get started on a community network project.

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16 https://www.rd.usda.gov/programs-services/all-programs/telecom-programs

Recommendations

Federal and state governments must recognize that cooperatives are one of the best tools for ubiquitous, rural, high-speed Internet access.

1. Design funding programs with cooperatives in mind.
   a. Letters of credit from the largest banks may be hard to come by for smaller cooperatives.
   b. Make applications as simple and easy as possible. Staff time is limited at small cooperatives.
   c. Develop grant and loan programs rather than creating incentives in the tax code for infrastructure investment.

2. Encourage cooperatives by removing barriers and encouraging partnerships.
   a. Remove barriers to electric cooperatives exploring the possibility of fiber network. Cooperatives should not be prevented from applying to federal grants that they are eligible for because of malformed state laws.
   b. Encourage partnerships, including with existing muni networks. For instance, Appalachian Electric Cooperative is partnering with the municipal network in Morristown, Tennessee, to bring high-speed Internet access to rural areas outside the city.[17]

3. If you live in a rural area, talk to your neighbors, co-op manager, and board members about the potential for Internet networks. Successful cooperative projects are community-led projects. About 70 percent of electric cooperatives have less than 10 percent average turnout for their board member elections.[18]
   a. Co-Mo Electric Cooperative in Missouri had excited members go door-to-door and gave out yard signs to encourage folks to get involved with the project.

Many community members also wrote letters of support for the project.
   b. In New Mexico, the local business community voiced their needs at Kit Carson Electric Cooperative board meetings to encourage the co-op to build a fiber network.
   c. Delta Montrose Electric Association in Colorado overcame an initial reluctance to develop and Internet access project after overwhelming demand from its members.

4. Make it clear that rural connectivity is about more than entertainment. Farmers, programmers, and entrepreneurs all need high-speed Internet access. Rural connectivity also supports needed research.
   a. Allband Communications Cooperative started a non-profit called ACEWR, which collaborates with universities and research institutions across the United States. It is a prime spot for research on local wildlife, endangered species, and conservation projects. The nonprofit also has an online workforce development program to train locals in new skills, empowering them to succeed in the 21st century economy.

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For up-to-date information, follow @ILSR and @MuniNetworks on Twitter. Learn more at MuniNetworks.org and sign up for the newsletter.

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[17] https://muninetworks.org/content/tennessee-potential-partnership-between-morristown-muni-and-aec-co-op-community-broadband-bi

[18] https://ilsr.org/just-how-democratic-are-rural-electric-cooperatives