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RURAL BROADBAND PROGRAMS and COMMUNITY ANCHOR INSTITUTIONS

Governments should explore funding, network sharing, and service obligations to ensure that rural and tribal community anchor institutions have affordable, high-capacity broadband.

by Tom Koutsky

The SHLB Broadband Action Plan includes the following:

Connecting Anchor Institutions: A Vision of Our Future

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Introduction

In thinly-populated rural and tribal areas, community anchor institutions (CAIs) can be vitally important to connecting residents to the rest of the world. Schools, libraries, health clinics, and many other anchor institutions rely upon high-capacity broadband to provide education, health, and information services to rural consumers. Unfortunately, because of the economic factors described below, anchor institutions in rural and tribal areas have an especially difficult time obtaining high-capacity broadband connections at affordable rates.

Ensuring every rural community has access to high-capacity Internet access through their anchor institutions will often require financial support and other government initiatives to stimulate deployment

Policymakers should give high priority to the broadband needs of rural community anchor institutions.

and promote competition. Connecting rural CAIs to high-capacity broadband can be a catalyst for further investment; when CAIs serve as the "anchor tenant" on a rural network, they improve the business case for community-wide network upgrades or further network expansion. When implementing programs designed to increase access to broadband service in rural areas, federal, state, and local efforts should give high priority to the broadband needs of rural community anchor institutions.

The Economics of Deploying High-Capacity Broadband Networks in Rural Areas

According to the Federal Communications Commission (FCC), Americans who live in rural areas are ten times more likely to be unserved than their urban counterparts.[1] Thirty-nine percent of rural Americans (23 million people) lack access to 25 Mbps broadband service (41 percent on Tribal lands), compared to only 4 percent of urban residents.

There are two reasons for this disparity between rural and urban areas. First, the cost of deploying broadband networks in rural areas is higher than in urban areas. Rural broadband networks often require substantial amounts of investment capital because they cover large territories with varied landscapes (mountains, rivers, forest, etc.) and geological terrains (sand, rock, soil, etc.). In a 2014 cost study conducted for the SHLB Coalition, CTC Technology & Energy estimated the cost of building robust fiber optic capacity to the nation's K-12 schools and public libraries that do not already have fiber access and documented the cost differences between metro and non-metro areas:[2]

Fiber Deployment Costs for Schools and Libraries

GEOGRAPHY	AVERAGE COST, K-12 SCHOOL	AVERAGE COST, PUBLIC LIBRARY
METRO	$40,000 - $104,000	$40,000 - $59,000
DESERT	$596,000	$275,000
PLAINS	$324,000	$55,000
RURAL WESTERN	$317,000	$94,000
RURAL EASTERN MOUNTAIN	$205,000	$56,000
RURAL EASTERN	$185,000	$60,000

The cost of deploying rural broadband networks is higher than in urban areas.

Second, because of low population density in rural areas, the costs of deploying broadband in rural areas must be recovered from a smaller user base. Even if the costs of laying a mile of fiber are the same in a rural or urban area, an urban area may have 500 users who can share the cost, but a rural area may only have five. Further, rural consumers often cannot afford to pay the monthly cost inherent in operating and maintaining broadband networks because rural household incomes are lower than urban.[3] As a result, the private sector business case for building high-speed network connections in many rural, sparsely-populated areas simply does not exist without governmental assistance.

Connecting Rural CAIs with High-Quality Broadband Is Important But Challenging

Broadband demands at community institutions are rising quickly. The FCC estimated in 2014 that school demand for broadband data would increase 100-500 percent from 2014 to 2016.[4] Moreover, anchor institutions have broadband needs that are very different from residential customers. For example, a library providing Internet access to dozens of desktop and laptop computers and tablets requires substantially more bandwidth than a home. While a 25 Mbps connection for one family may be sufficient, that capacity will provide barely enough connectivity for one classroom in the near future. Furthermore, to allow for the same opportunities in rural areas as compared to urban and suburban areas, rural broadband networks must be scalable so they can expand their capacity to meet growing demand.

Broadband and Rural Education

Rural schools are four times less likely to have a fiber optic connection than urban schools.[5] The Consortium for School Networking's most recent survey of school broadband infrastructure found that, compared to urban schools, rural schools were more likely to have slower Internet connections, were less likely to receive competitive (two or more) bids for service, and were more likely to report that monthly and upfront costs were the biggest challenges to obtaining greater bandwidth.[6] *The Washington Post* wrote that these bandwidth connectivity challenges have a negative impact on schoolchildren:

> . . . the financial decisions of telecom companies have put rural students at a disadvantage, leaving some without basic digital abilities that many in America take for granted. Federal regulators are working toward a fix for these out-of-reach schools, but it's unclear to what extent these efforts will solve the problem.
>
> The schools with sub-par Internet are scattered around the country, spanning from the far-flung communities of Alaska to the desert towns of New Mexico. The danger is that students who attend these schools will struggle for years with the critical tasks that now require online fluency: applying to colleges, researching papers, looking for jobs.[7]

For example, in Alaska, only 23 of 333 K-12 schools in rural areas (less than 7 percent) meet the FCC's 2020 broadband connectivity benchmark of 1 Mbps per student/staff, and 24 percent of schools are forced to rely on expensive satellite broadband service.[8]

Broadband and Rural Libraries

Nearly half of all public libraries (46.8 percent) are in rural areas[9] and many encounter high costs and lack of availability when trying to obtain broadband connectivity. The Institute of Museum and Library Services (IMLS) reports that average visitation per capita at rural libraries (6.7 visits per year) was significantly

higher than in city libraries (5.7 visits).[10] This is particularly striking in light of the fact that rural libraries are generally open to the public fewer hours than their urban and suburban counterparts. According to IMLS, this greater visitation in rural libraries reflects that "[s]mall and rural libraries, which are present in so many communities, serve a strategic role in extending public services to residents that may be hard to reach by other means."[11] Further, one study found that the use of public computers in rural libraries also increases rates of household broadband adoption, and this link was only found for libraries in the most rural counties.[12]

Despite this clear community need, rural libraries struggle to obtain high-quality broadband. Nationwide, virtually all public libraries offer free public Wi-Fi access (98 percent), and nearly 94 percent offer technology training.[13] But only 44% of libraries have a fiber connection and rural libraries lag 15-20 percent behind their urban counterparts.[14] A speed test study conducted by the University of Maryland Information Policy and Access Center for the American Library Association (ALA) showed that the median download speed for rural public libraries was 9 Mbps, while the median download speeds for urban and suburban areas were 30.5 Mbps and 18.8 Mbps respectively. Wi-Fi connection speed and upload speeds were also much slower in rural locations.[15]

Broadband and Rural Health

Rural health care institutions are closing across the United States indicating a crisis in the rural health care market.[16] According to one source, 74 health care institutions have closed since 2010 (17 in 2015 alone and another 11 in 2016 so far).[17] A research brief issued by iVantage in 2016 identifies an additional 210 hospitals that are most vulnerable to closure and an additional 463 that are less vulnerable, but still at risk.[18] The impact of these closures extends beyond health care. Rural hospitals are often the largest employers in a community, so a hospital closure can cause severe economic distress to the entire region.

Telemedicine could make providing health care in rural areas more economical by reducing travel time and allowing rural health institutions to see more patients at reduced costs. Unfortunately, many rural health care providers have an especially difficult time obtaining high-capacity broadband. For example, the

Many rural health care providers have an urgent need for broadband.

Manila Clinic is the only health care facility in Daggett County, Utah, which has a population of 1,127. Manila Clinic operates with only an asynchronous DSL connection and limited capacity to access or transmit medical information such as X-rays and pharmacy services. This service level does not meet the health care provider target of 10 Mbps recommended by the National Broadband Plan. When the clinic requested bids to connect to the Utah Telehealth Network, not a single provider responded, even with financial support from the FCC Rural Health Care (RHC) Program.[19] Similarly, the REACH Montana Telehealth Network has identified its top future challenge as "Bigger Pipes! Bandwidth BANDWIDTH." Its telehealth network has a mix of high-speed fiber and low-bandwidth, copper-based T-1 lines using routers that are over 10 years old.[20]

Broadband and Tribal Communities

Tribal communities[21] face especially difficult challenges when it comes to obtaining broadband services. According to one report, at least 40 percent of tribal libraries in the study sample did not have a broadband Internet connection.[22] The National Broadband Plan recommended the FCC increase its commitment to consultation with tribal leaders and the FCC created an Office of Native Affairs and Policy, tasked to promote deployment and adoption of broadband. In addition, in rural areas where the FCC is subsidizing broadband construction through the Connect America Fund, the FCC requires subsidy recipients to engage with tribal governments on tribal broadband needs, culturally-sensitive marketing, and network construction.[23]

More can be done, however. The National Broadband Plan recommended creation of a "Tribal Broadband Fund" to support sustainable broadband deployment and adoption on tribal lands.[24] In 2016, the Government Accountability Office (GAO) released a report that recommended the FCC develop performance goals and measures for improving broadband availability to tribal schools and libraries on tribal lands. In addition, the GAO recommended the FCC collect and release E-rate data that would allow it to measure the impact of E-rate on tribal schools and libraries.[25] While the GAO report says that the FCC agreed with these recommendations, it is not clear whether the FCC has taken these two steps to date. More recently, the Broadband Opportunity Council recommended that the Department of Interior Bureau of Indian Education launch an interagency initiative to "increase broadband connectivity and educational support at schools throughout Indian Country" by the fourth quarter of 2016.[26]

Policy Approaches to Narrowing the Rural Broadband Gap for Anchor Institutions

In the absence of a private business model for broadband deployment,[27] public policies need to respond to the challenge of connecting anchor institutions in rural areas. Here are some examples of policies to promote rural broadband deployment to, and use by, anchor institutions in rural areas:

- The FCC has been trying to address the growing broadband needs of rural health clinics for greater broadband access through its RHC program, but annual RHC funding is small (only $400 million per year, compared to about $4 billion per year for the E-rate program). The FCC created a new Healthcare Connect Fund (HCF) program in 2012 to supplement the traditional telecommunications program. The HCF was intended to drive fiber deployment to rural health clinics, but the HCF rules require applicants to provide 35 percent of the funding on their own, and the program's restrictive rules on eligible health care providers and expenses have made it difficult for applicants. Disbursements from the RHC program have been consistently much lower than the $400 million allocated to the program each year.[28]

- Some states have utilized joint purchasing and consortia arrangements to lower the costs of broadband connectivity. The University of Maine System structured a request for proposals in 2014-15 for connections to K-12 schools, libraries, state and local government offices, and research institutions in the state, setting a minimum target of 100 Mbps per location.[29] As a result, the average bandwidth in Maine schools increased from 187 Mbps to 515 Mbps with near-ubiquitous fiber access—all with no increase in overall cost.[30]

- The E-rate program provides significant financial support for schools and libraries and additional annual funding was added to the program beginning in 2015. The program includes additional supplemental funding of 5-10 percent for some rural schools and libraries, but, oddly enough, there is no additional rural discount in the two largest and highest poverty categories.[31] The rural discount could be increased and expanded to include more schools and libraries, thereby reducing rural applicants' match and incentivizing greater broadband investment in rural communities.

- The 2014 E-rate changes also gave schools and libraries the option to self-construct their own broadband network, rather than purchasing "lit" service from an established broadband provider. Some rural school and libraries are considering this option in order to control their own destiny and save costs. The FCC received applications from over 500 applicants exploring dark fiber in 2016 – the first year dark fiber was eligible – and this option is expected to grow in future years.

- To address the concern that there is too little competition to constrain prices in rural areas, the FCC recently required recipients of Connect America Fund (CAF) support to bid on E-rate requests for service. But the recipient of CAF support may still be the only provider in the area, so it is not clear

whether this obligation will truly succeed in increasing broadband options for rural schools and libraries. This requirement may also cause challenges in areas where there is a consortium, state network or research and education network who is partnering with a CAF recipient, as it is not clear whether the recipient must independently submit its own bid for services in addition to its participation with the consortium. Some other ways to promote greater competition in rural areas are to promote policies such as open interconnection and lowering special access prices among rural providers.[32]

- The US Department of Agriculture awarded over $3.2 billion for 320 projects under the Broadband Initiatives Program (BIP), primarily for "last mile" projects to provide broadband service directly to end users in rural areas. While the program allowed funds to connect anchor institutions, most of the BIP grants and loans focused on connecting residential consumers. GAO issued a report in June 2014 that criticized the BIP program for failing to monitor and report on the impact of the program on broadband availability and use.[33] The statutory language creating the Rural Utility Service gives a preference to award funding to existing RUS borrowers, which are often incumbent telephone companies. This practice has made it difficult for new entrants to compete for this funding. The Broadband Opportunity Council recommended that the RUS change its regulations by the fourth quarter of 2016 to open funding opportunities to alternative providers.

- Some states are designing rural broadband build-out programs to address the needs of anchor institutions. Unfortunately, many of these programs focus only on levels of service appropriate for residences and small businesses, not the high-capacity services needed by CAIs. Minnesota, however, has instituted a Border-to-Border Broadband Development Grant Program, a project that initially provided over $10 million to fund broadband construction in unserved and underserved regions throughout the state. The program specifically included service to community anchors as a key criterion for awarding broadband infrastructure grants.[34] The program will be expanded to $35 million for fiscal year 2017.

- Congress has embraced network sharing for FirstNet, a newly-created, quasi-governmental agency that is charged with building and operating a national public safety wireless broadband network for first responders. Created by Congress in the Middle Class Tax Relief and Job Creation Act of 2012, FirstNet is required to develop network construction sharing agreements with commercial mobile providers as an important means of lowering the overall cost of building the network.[35]

- Rural broadband policy does not always adequately address the needs of anchor institutions. For example, the FCC's Connect America Fund invests $4 billion per year into supporting networks in rural, high-cost parts of the country, but the FCC has set no specific benchmark or service standard for service to community anchors in those rural areas. Instead, the FCC only requires Connect America Fund subsidy recipients to consult with community anchor institutions when making network upgrade plans. These consultation and bidding requirements are supposed to happen on a case-by-case basis, but there is little oversight to ensure this FCC requirement is being enforced. Increased oversight would create greater incentives for the recipients of funding to comply with the obligation to consult with anchor institutions regarding their broadband needs.

Recommendations

The following policies would improve the ability of community anchor institutions in rural areas to have broader access to robust, scalable broadband:

1. **Federal, state, and local broadband funding programs must focus on the high-capacity broadband needs of community anchor institutions.**

   When promoting, incentivizing, or subsidizing deployment of broadband infrastructure in rural areas, governments should clearly and specifically include service to community anchor institutions. Further, the unique broadband needs of community anchors, in terms of speeds and quality of service, must be taken into consideration, as they are different from residential or small business broadband needs. Governments should oversee and enforce requirements to serve anchor institutions' broadband needs.

2. **Governments should increase their financial support for rural broadband networks to make it more financially attractive for private sector investments in rural networks.**

   Because of the high costs of deployment in rural markets and the lack of population density, the private sector is unlikely to invest in rural broadband networks without additional financial incentives. Some options for increasing incentives include:

   - The FCC should increase the rural discount factor for the E-rate program to provide greater funding for rural schools and libraries especially in "remote" rural areas and tribal lands.

   - State and federal programs that fund broadband investment should include the needs of anchor institution connectivity and consider issuing grants and loans that support build-out to rural anchor institutions (as in Minnesota and Maine).

   - The FCC should consider following through on the National Broadband Plan recommendation to create a Tribal Broadband Fund to promote deployment and adoption in tribal areas.

3. **Programs designed to promote broadband infrastructure in rural areas should encourage sharing and joint use of network facilities.**

   Network sharing can drop the per-unit cost of connecting community anchor facilities significantly and dramatically. Unfortunately, many existing broadband programs either prohibit sharing of infrastructure or impose complex regulation of sharing arrangements that make them extremely difficult to implement. For example, FCC universal service rules for schools, libraries, and rural health providers discourage institutions from leasing excess capacity for other uses on a subsidized network.[36] Oddly enough, this limitation on sharing applies even among community institutions—a school that has an E-rate funded fiber connection is limited in its ability to resell capacity on that connection to a rural health provider. State and federal policymakers who wish to help bridge the rural connectivity gap should follow the example set by Congress in the public safety context and require that, to the maximum extent economically feasible, community institutions should share network infrastructure and projects with one another and the neighboring business community.

4. **The FCC Rural Health Care Program should be reformed and modernized so the connectivity needs of rural health providers are fully addressed.**

   The FCC should:

   - Increase the 65 percent cap on funding from the Healthcare Connect Fund to 85 percent.

- Encourage shared capacity between health care providers, other community institutions, consortia, and public-private initiatives.

- Support consortia that include non-rural health facilities, so as to promote the use of urban-rural telemedicine solutions such as remote patient monitoring and specialist consultation.

5. **Governments should promote greater competition for service in rural areas through open interconnection and service obligations.**

Opening rural broadband networks to interconnection and allowing government funding to non-traditional entities can stimulate greater investment by new providers. This competitive dynamic can also help to lower broadband prices to more affordable levels.

6. **Governments should take greater efforts to promote broadband connectivity to anchor institutions in tribal lands.**

Several goals have been established to improve broadband services on tribal lands, but there is little evidence that these recommendations have been implemented. The Federal Government should immediately take action to implement the Broadband Opportunity Council recommendation to launch an interagency initiative to promote technology for tribal schools, and the Federal Government should also consider a tribal Broadband Fund as suggested by the National Broadband Plan. In addition, the FCC should establish robust connectivity goals for tribal schools, libraries, and health care centers through the E-rate and Rural Health Care programs, and collect and publish data that track progress on these goals.

Resources for Further Reading

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Endnotes

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The **Schools, Health & Libraries Broadband (SHLB) Coalition** is a 501(c)(3) advocacy organization that supports research and public policies that promote open, affordable, high-capacity broadband connectivity for anchor institutions and their communities. Founded in 2009 in Washington, DC, the SHLB Coalition receives financial support from its non-profit and corporate members and from the Bill & Melinda Gates Foundation. For more information, visit www.shlb.org/.

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