Improving Rural Internet Access

Submission relating to the Study on Broadband
Connectivity in Rural Canada,
To the Standing Committee on Industry, Science, and
Technology

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Purpose

Thank you for asking me to present to your committee and answer questions relating to broadband Internet policy on February 6, 2018. During the hearing, I developed a few ideas that I wanted to further share with the committee for consideration in its report on rural connectivity.

The Institute for Local Self-Reliance (ILSR) mission is to provide innovative strategies, working models and timely information to support environmentally sound and equitable community development. To this end, ILSR works with citizens, activists, policymakers and entrepreneurs to design systems, policies and enterprises that meet local or regional needs; to maximize human, material, natural and financial resources; and to ensure that the benefits of these systems and resources accrue to all local citizens.

Summary

ILSR believes some of the lessons we have learned in our work on broadband across North America will help in your report. We offer some lessons from a broadband grant program in Minnesota to expand rural Internet access, including consideration of subsidizing some providers over the objections of incumbent providers. We believe one of the key elements of a subsidy program is how it prioritizes subsidies to entities that have the best incentives to deliver high-quality services well into the future. On matters of technology, we believe the comparison of fibre to wireless often ignores the single most important consideration in such a comparison: over what time frame. Finally, we offer some concerns about the wisdom of viewing satellite or wireless as a long term solution due to the challenges of ensuring everyone in a given area can take service from those solutions.

Comments

Lessons from Minnesota

The state of Minnesota established a "Border-to-Border" Broadband Development Grant program in 2014 and has spent tens of millions of dollars in matching grants to improve Internet access in the most rural areas of the state. In a brief report entitled "Minnesota's Broadband Grant Program: Getting the Rules Right," we offered some reflections on what was working and what should be fixed.[1] Below are some of the lessons I believe to be applicable as you move forward.

In short, Minnesota's program takes applications for matching grants of up to $5 million or 50 percent of a project cost for plans to improve Internet access.[2]

Canada has set a target for Internet access at 50/10 Mbps, which is an appropriate goal over the timeframe intended. Minnesota has used a different target, but a key requirement in the program is that any technology subsidized by the program is scalable to greater capacity in the future. This requirement helps to lessen the need for additional subsidies covering the same premises in the future. Some providers that still wish to use technologies that are already obsolete or soon will be, such as DSL, have still found ways to do that but state subsidies have only been used for portions of the network that are scalable – such as fibre backbones and middle mile links.

The vast majority of grants in Minnesota have gone to local entities rather than large corporations. In many cases, local entities have used grants to expand into areas that have been effectively abandoned by the larger telephone companies, which prefer to concentrate their investment in urban areas offering a higher rate of return. We believe this is a feature of the program because local firms – and particularly non-profit cooperatives that are democratically accountable to their subscribers – are more likely to deliver high-quality services well into the future. The rural experience with the largest corporate firms in telecommunications has been quite poor since deregulation.

The most contentious aspect of the Border-to-Border fund has been in dealing with incumbents. The largest incumbent providers have not fought to defend their de facto monopoly in low-density areas but have worked quite diligently to protect their turf in population centers, even quite small ones. Unfortunately, without being able to serve population centers in rural regions, the business model for serving farms and remote locations may go from very difficult to impossible without ongoing subsidies.

Multiple states have enacted a flawed "right of first refusal" to deal with this situation. In many cases, this allows an incumbent that has refused to upgrade its services in small towns to wait until a rival approaches with a plan to serve the entire region and then veto it or at least carve out the most lucrative areas merely because they were already present.

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[1] https://ilsr.org/wp-content/uploads/downloads/2016/05/Minnesota-Border-to-Border-Report.pdf
[2] https://mn.gov/deed/programs-services/broadband/grant-program/

This may have been a reasonable approach 10 years ago when it could be argued that the companies had not yet had sufficient time to expand modern Internet access. But in 2018, incumbents have had plenty of time.

Grants and other subsidy programs should not protect incumbents that have failed to invest properly in modern services. However, there is a fairness problem when households lacking any reasonable Internet service have to wait longer for a solution while those who have something like slow DSL are upgraded to a modern solution. We believe the proper solution is to allow some level of blending of these populations. Providers that are willing to serve the most remote areas (unserved) should be able to blend those areas with local population centers that may have some, but not sufficient, modern Internet access (underserved).

A final challenge with the right of first refusal is that it can harm the development patterns in rural population centers. We have seen cases where Main Street can effectively be hollowed out by residents and businesses that leave the areas served with slow, less reliable, and often more expensive connections to relocate just across the dividing line for areas getting modern networks from subsidy programs. That can drive new infrastructure challenges for roads, water, and other systems.

Incentives of Network Owners

As noted above in lessons learned from Minnesota's matching grant program, ILSR has observed that providers that are locally rooted have tended to be more likely to receive grants. In our experience evaluating a smaller broadband grant program in Wisconsin (which we have not yet published), the locally-rooted projects also tended to invest in networks offering higher capacity connections. Whereas larger providers took subsidies and delivered DSL, smaller and more local providers used subsidies to deliver fibre or wireless connections that were superior.

As mentioned in my comments before the committee, the state of North Dakota has the vast majority of its territory served with fibre-to-the-premises despite being one of the most low-density states in the country. This success was the result of local cooperatives and independent telephone companies reinvesting the subsidies from the Universal Service Fund, other subsidies, and loans available to rural carriers.[3] Though the national telephone company serving North Dakota had access to all those tools as well, many of its territories either lack broadband access or barely surpass it as measured by the Federal Communications Commission.

The map below demonstrates that rural fibre is more feasible than is commonly assumed. However, we do not believe it is feasible for very large companies, who had different incentives and requirements to distant shareholders, to achieve this level of investment

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[3] See a relevant podcast interview with transcript https://muninetworks.org/content/north-dakotas-exceptional-fiber-networks-community-broadband-bits-podcast-288

with fiscally-responsible subsidies. These investments came from communities that had strong incentives to invest in themselves, prioritized it, and took advantage of reasonable subsidies to make it happen.

North Dakota's Rural Connectivity
Fiber-to-the-Home by Census Block

Fiber-to-the-Home (Overlay)   No Population
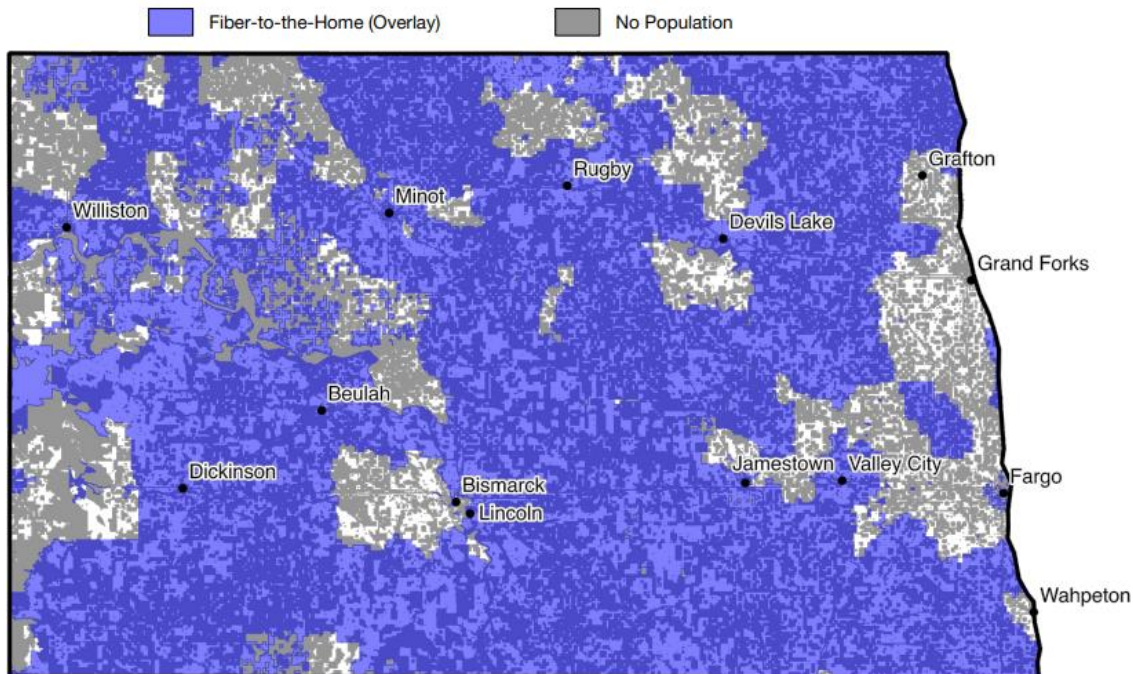
Source: FCC Form 477 Dec 2016 v1. US Census Urbanized Areas 2016.
Design: H. Trostle, Research Associate, Community Broadband Networks Initiative, Institute for Local Self-Reliance. February 2018.

Wireless vs Fibre

One question that inevitable arises is whether wireless is "cheaper" than fibre. Unfortunately, this question is far more difficult to answer than most assume because of the element of time. Which is cheaper, renting a home or buying it? Do you plan to live in it for 1 month or 40 years? The economics of fibre and wireless are also quite different over time.

Wireless typically has a comparatively low capital cost with a higher operating cost (though technologies vary in how much). Fibre has a very high capital cost with very low operating cost. In our experience working with municipal and small private providers, fibre is cheaper after 10-20 years. This will vary in the more remote areas or Rocky Mountains, for instance. Nonetheless, we believe fibre is the wiser long term investment both for quality of access and long-term subsidy expenditures. With apologies for using a

non-standard measurement in your context, we have found electric cooperatives building fibre-to-the-premise without subsidies to rural areas as low as 4 or 5 premises per linear mile. Some providers believe their business model works at 2-3 paying customers per linear mile if they are extremely careful.

However, we are not nearly as familiar with the economics of rural Canada as we are with rural United States. But we strongly encourage considering the cost of these networks over future decades, not just years. Wireless technology continues to improve but has been overstated consistently. When we began our program 12 years ago, we were told that Wi-Fi had made fibre obsolete. When that became too difficult to say with a straight face, we were told WiMax would do it and after that failed to take off, we were assured that 4G would solve everything. 5G will have a greater impact on service in large hockey arenas than rural regions. We do believe wireless serves important uses, but have long term concerns about its ability to deliver comparable connections to rural areas as urban households routinely get.

Satellite Technologies

In our experiences, the market has utterly rejected satellite. We have yet to find a household that uses satellite when DSL, cable, fibre, or terrestrial wireless is available in any meaningful way. Satellite has inevitable challenges with latency, remains far more costly for households than alternatives, and frequently comes with frustrating bandwidth caps. But when you have no other options, it is an important last resort. As with wireless, we have strong hesitations about viewing it as a long term solution – though low-orbit satellites will improve latency, our discussions with experts suggested doubts about the prices of such solutions being reasonable for households for many years.

Though many applications are already latency-sensitive, we believe new technologies will be even more so. For instance, the speaker-devices in homes and digital assistants are designed to work with extremely low-latency connections. Increasingly common applications will continue to demand more low-latency connections that satellite cannot provide. As such, we believe satellite should be viewed as a last resort for those who cannot get modern Internet access rather than a means of delivering high-quality Internet access.

Carrier of Last Resort

A final note that applies to the above discussion but is worth singling out is how both satellite and wireless approaches can leave some households behind. In our experience, modern wireless services tend to work for many in rural areas but wireless providers do write off some inconveniently located households. Whether on the wrong side of a ridge, surrounded by forest, or other situations, wireless solutions may not be able to serve every premise in a given area. The question is what to do then. Any subsidy program has to reckon with the fact that if it abandons a household, that household will be abandoned

permanently. Will the program require a wireless provider serve everyone in a given area? If not, under what conditions? We have feared that some subsidy programs will be too willing to let an ISP itself decide that it would be inconvenient or non-economical to serve certain households. Should a subsidy program go to an entity that will not certify it will serve everyone? Will wireless technologies allow everyone to gain service? These are key questions that should be worked out in advance because we believe homes left behind by programs such as this will never be economical to serve with the key infrastructure of the 21st century.

Thank you for your consideration.