

Broadband Models for Unserved and Underserved Communities

Communities hoping to improve their broadband service have several different models to choose from. Here's how to go about making the choice.

By US Ignite and Altman Solon

This article is adapted from a white paper released this month by US Ignite and Altman Solon. The full white paper is available at <https://tinyurl.com/y7pa3yrn>.

Most U.S. cities have fast, reliable broadband networks available to at least a subset of homes, but a large share of the population still lives in areas that remain underserved and unserved. Although the U.S. government and independent private sector efforts are helping narrow this digital divide, municipalities themselves are increasingly addressing the lack of broadband in their communities.

High-speed internet networks have the potential to push U.S. society into the future. They are critical outdoors, where they enable increasingly smart devices, vehicles and even entire cities. They also are pivotal in homes, which often double as digital workplaces and entertainment supercenters. This is truer now than ever before, with millions of people relying on internet connections to work, shop and socialize from home. Conservative assumptions lead to estimates that more than 6,500 U.S. municipalities still lack access to the fast, reliable internet that makes all this possible.

Currently, the FCC is offering \$20.4 billion through its Rural Digital Opportunity Fund (RDOF) for areas without internet access at or above 25 Mbps. Likewise, small ISPs, larger cable operators and national carriers are all expanding. Unfortunately, these solutions cannot bring all U.S. cities the fast, reliable broadband they need.

Not all cities will benefit from these subsidies and investments, and even the ones that do may still end up with unreliable or slow broadband. Many existing broadband networks require major investments and overhaul to support rapidly evolving broadband use cases, but frequently receive only small, incremental upgrades.

Where incumbent providers and federal funding fall short, cities are creating municipal ISPs, finding novel ways to incentivize private partners to enter their markets and/or working hand in hand with private developers and ISPs to reach their goals.

These municipal broadband programs are not a new solution but rather a growing one. Nationwide, 8 percent of well-served cities (those in which 50 percent of the population has access to 250 Mbps) – slightly more than 1,000 in total – are served by some form of municipally enabled program. These programs are seen from large cities to small rural towns of a few thousand residents.

Municipally enabled networks are not specific to a particular region; they are spread across the United States. Though municipal involvement is more prevalent in some areas than others, there are few states with no municipal broadband programs. These programs face challenges from legislative barriers to operational complexity, but many have found successful approaches.

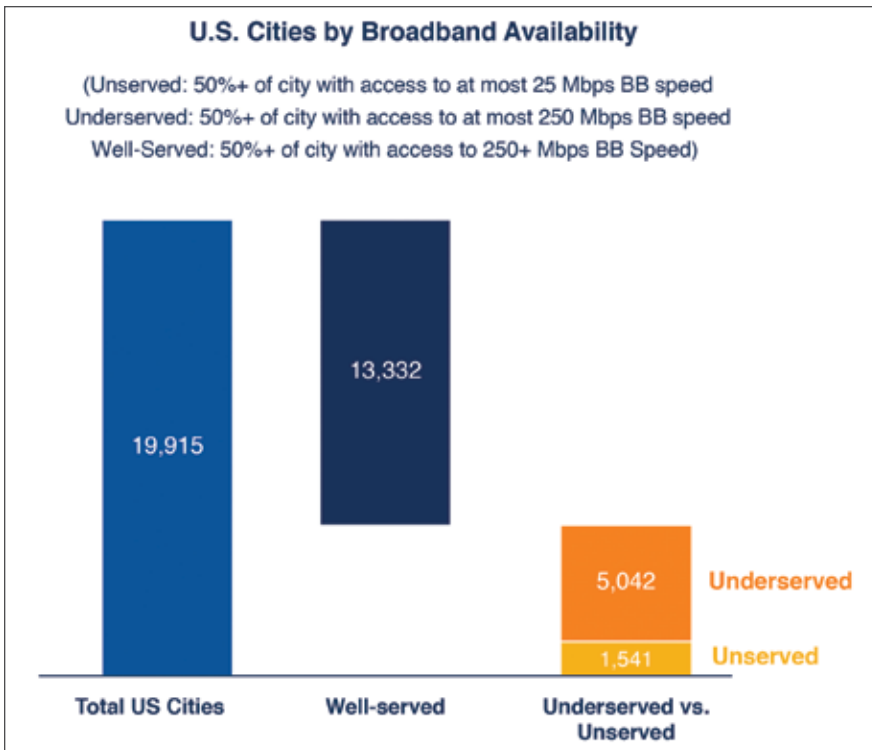


Figure 1

US Ignite and Altman Solon assembled an extensive database of more than 1,000 municipal broadband programs, analyzed publicly disclosed information and case studies, and conducted in-depth interviews with key city officials.

BUSINESS MODELS

Our analysis of more than 1,000 municipal broadband models found that the primary way municipalities differentiate their broadband programs is by their engagement in network ownership, operations and service

delivery. This variability in ownership gives rise to five models differentiated along a value chain of asset ownership and broadband delivery, shown in Figure 2.

Although a majority of cities with municipal programs (68 percent) have chosen to build and operate networks themselves, there recently has been a shift toward engaging the private sector more, either as partners only in delivery of the service (17 percent of cities) or as owners of all or a subset of the infrastructure (remaining 15 percent).

The prevalence of direct municipal ownership and operation is especially high amongst smaller cities that may not have any options for private cooperation. More generally, we found that cities consider four key factors when making decisions about which municipal broadband model to pursue: capital availability, existing infrastructure, partnership options and objectives and risk tolerance.

Depending on where cities fall on these criteria, there may be a business model that is a more optimal choice for them. To steer cities in the right direction, US Ignite and Altman Solon have distilled the choice into a decision tree that can help communities develop the best strategy (see Figure 3).

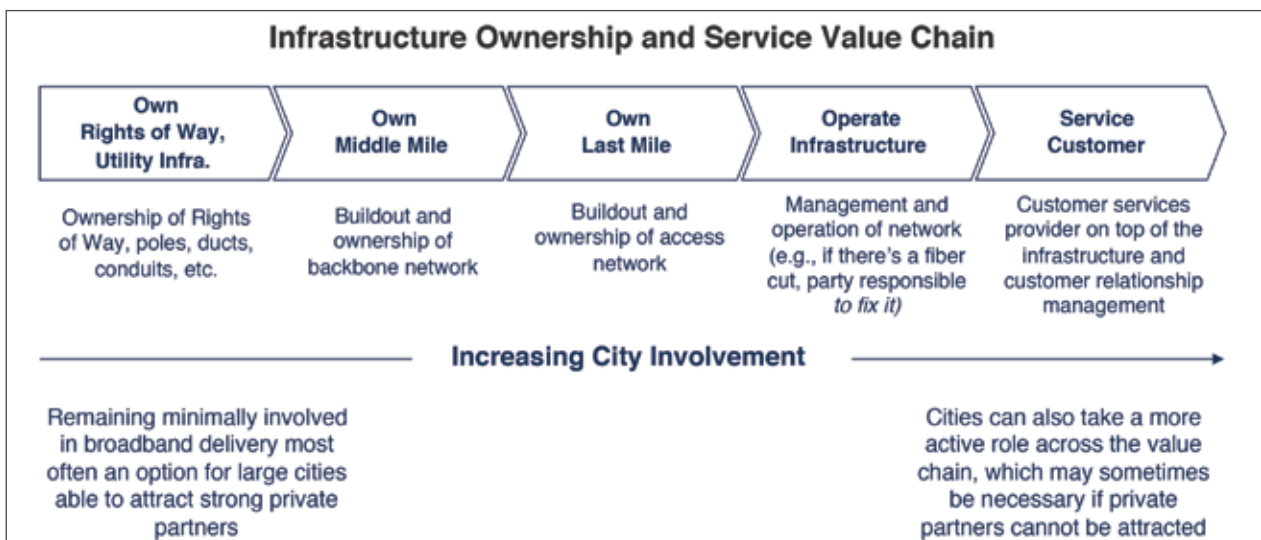


Figure 2

Municipal Broadband Model Decision Tree

Capital Availability	Existing Infrastructure	Partnership Options	Objective and Risk Tolerance	Optimal Business Model
Good Access to Capital / Funding	Good Existing Infrastructure / Capabilities	Viable ISP Partner(s)	Community Benefits	Full Municipal Broadband – maximizes community benefits when capital / infrastructure are available
			Meeting Financial Goals	Publicly-owned, Privately Serviced – reduces risk when full control over service not as important
		No Partner Options	Community Benefits	Full Municipal Broadband – maximizes community benefits when capital / infrastructure are available
			Meeting Financial Goals	Full Municipal Broadband – is the only option when no ISPs will partner
	Limited Existing Infrastructure / Capabilities	Viable ISP Partner(s)	Community Benefits	Publicly-owned, Privately Serviced – reduces risk in absence of operational capabilities
			Meeting Financial Goals, High Risk	Publicly-owned, Privately Serviced – maximizes return potential while leveraging ISP partnership
			Meeting Financial Goals, Low Risk	Private Developer Open Access – limits risk to the city but maximizes chances of success w/ ISP partner
		No Partner Options	Community Benefits	Full Municipal Broadband – is the only option when no ISPs will partner but there's capital
Meeting Financial Goals				
Limited Access to Capital / Funding	Good Existing Infrastructure / Capabilities	<i>Does not matter</i>		Hybrid Ownership – hybrid models are optimal when capital is limited but there's existing infrastructure, regardless of other factors
	Limited Existing Infrastructure / Capabilities	Viable ISP Partner(s)	Community Benefits	Private Developer Open Access – maximizes city control in light of limited funding / infrastructure
			Meeting Financial Goals	Full Private Broadband – maximizes chances of success while ensuring goals are met
		No Partner Options	<i>Does not matter</i>	

Figure 3

A decision tree like this may suggest that picking a business model is easy, but it is quite the contrary. The decision tree offers a good rule of thumb, but cities face unique circumstances, and doing thorough diligence across all potential options should always be the starting point. To do that analysis accurately, a city first needs to understand how much capital is required and what the financial returns of the program may be.

FINANCIAL CONSIDERATIONS

Municipal broadband programs are long-term investments, and these projects can take up to five to 10 years to complete. Fiber is a resilient and future-proof element of telecom infrastructure, but it is also expensive to deploy. This means investment in fiber is hardly a no-brainer for all municipalities. Cities looking to invest to close the digital divide in their communities should

prepare for payback periods of 15-plus years, particularly across smaller and/or rural communities. These paybacks often have deterred interest from the private sector and make careful planning and business analysis critically important for any municipal broadband program.

The capital expenditures associated with building a fiber-to-the-home network include a range of fixed and variable costs. All-in capital requirements for a broadband program

in a city with 100,000 residents could end up around \$150 million.

Operating costs can vary greatly as well, and those depend on the experience and efficiency of the broadband provider, amount of synergy with the core city staff (if any), and types of services delivered to the customers. Cities that want or need to offer TV to residents must prepare for lower margins given high and rising content costs (although this can be mitigated with over-the-top offers). Cities most often budget between \$40 and \$100 of opex monthly for each residential subscriber they sign up.

Not all cities will have to cover all these costs. Those that bring in a private ISP or developer to help service the customers and/or build the network can split operating costs, capital costs, or both with that third party. In return, they would most typically offer free or low-cost access to city infrastructure, fixed payments, or some variable

revenue share typically tied to the number of subscribers in the municipal broadband program.

In addition to impacting the share of required costs, the business model also dictates the amount of revenue cities can generate from the program. On the high end, cities that deploy and operate full municipal broadband themselves can generate direct revenues of up to \$140 per residential customer every month, without considering additional revenue streams from businesses and other anchor institutions. On the low end, cities that choose full private broadband models will generate limited revenues, aside from permitting and tax fees, which could even be waived in many cases to entice private engagement.

Financial performance varies greatly not only by the model, but even from city to city. Using an average set of assumptions for a city of 100,000 residents, we estimate typical internal rates of return (IRRs)

between 9 percent and 16 percent for city-owned last-mile infrastructure, with a significant amount of capital required but also significant cash flow potential once the program is mature. Cities not ready to take on this amount of risk could pursue hybrid models or fully give up network ownership to third parties. Those investments will be relatively low risk, resulting in high IRRs but also (typically) more-limited cash flow upside.

Financial performance varies from city to city, but the inability to budget appropriately is a main reason some programs fail, reinforcing the need to develop a detailed business case as the first step in any city's implementation plan.

IMPLEMENTATION AND LESSONS LEARNED

There are four key challenges common to most cities pursuing a municipal broadband program.

REGISTER NOW!



The BBC Summit Is Going
VIRTUAL

September 22 – 24, 2020

SPECIAL RATES

Full Conference:
\$450

Public Officials:
\$350

Exhibits Only:
\$150

If you've already registered for the live event that was to be held in August, your registration has been converted into the virtual platform so no need to re-register. Login information will be sent to you shortly before the event dates. If you have not registered, please reserve your seat today.

To Exhibit or Sponsor contact: Irene G. Prescott
irene@bbcmag.com | 505-867-3299

For other inquiries:
877-588-1649 | www.bbcmag.com



- 1 Budgeting:** Detailed budgeting is critical to success. A detailed analysis – including designing a full network plan – is essential during the planning phase. Not overlooking any major cost sources is also important. Those most typically include labor for delivering the service, managing and maintaining the network and costs to support any debt and interest payments. As costs increase, being clear-eyed and considering private-sector involvement is important; many private ISPs have much lower operating costs because of their scale and experience, and having private developers build and operate a network can significantly reduce the cost associated with network operations and maintenance.
- 2 Funding:** Especially when the total budget is high, securing the right funding may become a roadblock. More “traditional” funding options include soliciting contributions from anchor institutions, selling bonds, enlisting local utility involvement, securing federal and state grants and asking private partners to co-fund the builds. When those are not an option and/or are not enough, cities often get creative. For example, some have residents contribute money to the program, by either paying for several months of service upfront or pooling money across neighborhoods and buying bonds from the city. Such creative approaches may work for certain cities when securing more traditional funding is not an option.
- 3 Diligence:** Even when budgets are finalized and capital secured, it is also tempting to just copy a success story from another city. Skipping the diligence on evaluating which business model to pursue, however, can lead cities down the wrong path. There are numerous examples of cities that ultimately had to pivot from the initially selected business model because they dived in too quickly.

4 Related benefits: When paths are chosen and business models are selected, cities should think holistically about how else they can use their programs to serve their communities and ensure that networks have the architecture to support their plans. For example, residential service is often the primary motivation, but cities should not forget about enabling internet access to the commercial sector, which can spur job and value creation. In addition, few cities have thus far used their municipal fiber to enable smart-city solutions, but these solutions can spread digital literacy to more residents. So far, the municipality focus has been on fiber services, but there are also scenarios in which mobile or fixed wireless broadband are more appropriate for last-mile connectivity. Communities should consider where fiber investment is valuable and how it can be tied to other network technologies as needed.

These challenges are common regardless of the selected business model, but cities pursuing models with more municipal involvement are more prone to many of these. To maximize chances of success, special attention should be paid to budgeting and costing, and revenue generation should be prioritized and accelerated to the extent possible. For example, targeting the densest business and residential areas first or starting with commercial-only services is one way to generate a steady inflow of cash to help cover program costs.

Working with the private sector avoids many of the budgeting and costing issues mentioned above, but it brings about a different set of challenges. First, attracting the attention of private ISPs, particularly for smaller cities, could be a challenge. Cities should be persistent in soliciting private engagement and think creatively about how to entice private cooperation. For example, streamlining permitting and rights of way, enabling access to backhaul and middle-mile infrastructure (if such

exists or can be leased), becoming the anchor institution for a private ISP or co-sponsoring an open-access network and enlisting a private developer to sign up the ISPs all can improve chances of finding a partner.

Once a partner is identified, it is also important to clearly define rules and goals for the program to maintain some degree of control and ensure city objectives are met. This is especially true for the open-access programs that require participation of a private developer and one or several ISP partners. These models have been relatively rare in the United States, but open access has proven successful in Europe and should be considered as an option for any city considering a municipal broadband program today, particularly as it strikes a good balance between providing the control a city needs while de-risking the investment and operations.

Although the digital divide that remains in the United States is unlikely to be fully closed soon, municipalities can still be powerful agents of change. We hope this study will pass along the hard-won lessons of prior programs and aid municipalities considering broadband expansion to better serve their residents. The faster people work together to bridge the digital divide, the sooner everyone will benefit from the technologies of the future. ❖

For a copy of the full report and case studies, please contact the director of community development at US Ignite, Lee Davenport, at lee.davenport@us.ignite.org.

US Ignite is a high-tech nonprofit with a mission to accelerate the smart community movement. It works to guide communities into the connected future, create a path for private sector growth, and advance technology research that's at the heart of smarter development. For more information, visit www.us-ignite.org. Altman Solon is a global strategy consulting firm that works across the telecommunications, media and technology sectors. For more information, visit www.altmansolon.com.