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Five Ways for Communities to Shape Their Broadband Futures

By Robert Bell

CREATING THE INFRASTRUCTURE TO PARTICIPATE IN THE GLOBAL ECONOMY

Some communities, particularly in urban and suburban markets, have been well served by the private sector when it comes to deploying broadband to businesses, institutions, and homes. In a global economy where broadband has become the next essential utility, however, others have not been so lucky, because they do not offer the same attractive business case to telecom carriers. **This article identifies the issues that have driven local governments to become involved in bringing broadband to their constituents, and outlines five strategies** that communities have successfully taken to create the broadband infrastructure they need to participate in the global economy.

five ways for communities

TO SHAPE THEIR BROADBAND FUTURES

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In 1912 in the US, more farm households in remote rural areas had telephone service than households in major cities. In 1924, the state with the most telephones per person was not California or New York or Massachusetts, but the farm state of Iowa.

Why? In 1874 – two years before the invention of the telephone – Joseph Gliddens won a patent on his design for barbed wire. Manufactured in vast quantities, it was cheap and easy to install. Farmers and ranchers across the US nailed hundreds of thousands of miles of it to posts in order to fence in cattle and crops. Then, about two decades after the Gliddens patent, Alexander Graham Bell's original patents on the telephone expired. This kicked off a competitive race to wire the nation – or at least the big cities where lots of customers were conveniently close together. But paradoxically, it also created opportunities for farming cooperatives to offer phone service. Farmers bought batteries and telephones, and connected them to their barbed wire fences to create "party line" networks linking farms throughout the Midwest. Because their "wiring" was already in place, the farmers beat the phone companies to market.

Telecommunications has grown up differently in different places, but the stories have one thing in common. At their heart is tension between telecommunications as a business opportunity and telecommunications as a public good – between the profit motive and a public-service mandate. And that is as true today as it was in the 1890s.

The free WiFi network in Fredericton, New Brunswick, Canada uses the municipal government's fiber net as its backbone.

THE BROADBAND RACE

In the 1990s, carriers around the world began deploying broadband networks – DSL, cable, satellite and wireless – within neighborhoods, towns, and cities. At the same time, the costs of computer software and hardware, especially data storage, plummeted in obedience to Gordon Moore's famous law that the storage capacity of microchips doubles every 18 months. The result was the fastest growth of any communications technology in history. From 2000 to 2007, the number of Americans subscribing to broadband grew 684 percent. The French saw 2,800 percent growth during the same period, while the British boomed at a rate of 28,300 percent.

Robert Bell is executive director and co-founder of the Intelligent Community Forum (www.intelligentcommunity.org), a think tank that focuses on the creation of prosperous local economies in the Broadband Economy of the 21st Century. The examples in this article come from nominations for ICF's annual Intelligent Community Awards program, which provides the Forum with the research data it uses to promote best practices in economic and social development.

CREATING THE INFRASTRUCTURE TO PARTICIPATE IN THE GLOBAL ECONOMY

Some communities, particularly in urban and suburban markets, have been well served by the private sector when it comes to deploying broadband to businesses, institutions, and homes. In a global economy where broadband has become the next essential utility, however, others have not been so lucky, because they do not offer the same attractive business case to telecom carriers. This article identifies the issues that have driven local governments to become involved in bringing broadband to their constituents, and outlines five strategies that communities have successfully taken to create the broadband infrastructure they need to participate in the global economy.

Yet not everyone benefited equally. As they did in the 1890s, carriers naturally gave priority to places with the best short-term business case: urban areas, high-income neighborhoods, and business districts. Very high cost areas, such as rural regions, and low-income markets were at the bottom of the list and many remain there today.

But communities have not been willing to wait passively for private companies to invite them to the party. They have grasped that broadband is the new essential utility, as vital to economic growth as good roads and reliable power. Today, broadband is creating new kinds of companies like Yahoo and Google, even whole new industries. It is empowering small companies to be global exporters, including the export of skills and knowledge which were never before transportable across time zones or national borders. It is ensuring that schools in remote regions and inner cities have access to the latest information tools and reference sources. It links rural healthcare providers to leading medical centers and local law enforcement to national information grids. Individuals and businesses are going global in search of low-cost, quality vendors, and Web-based tools are increasing community involvement.

By boosting the economic and social well-being of communities, broadband can reduce the incentives for their young people to move away in search of opportunity and a better quality of life. It offers every community the opportunity to move from the periphery to the center in economic terms, and can play a key role in giving small towns a sustainable future in our ever-more-connected world.

The Gangnam District of Seoul, South Korea was ICF's 2008 Intelligent Community of the Year.

WHY GOVERNMENT GETS INVOLVED

Why do local, state or provincial governments get involved in bringing connectivity to their communities, reviving tensions between public and private interests? There are three reasons:

1. **The Connectivity Gap.** Broadband becomes a political and governance issue in communities that believe they suffer from a lack of affordable, high-quality access. The broadband gap may take several forms, from complete market failure to unaffordable prices to poor quality of service.
2. **Connectivity "Holes."** Even in communities with ample broadband resources, there are often locations that go unwired. They may be old industrial zones, low-income neighborhoods, or areas that pose a geographic challenge to network developers.
3. **Connectivity Promotion.** Sometimes communities want to invest in broadband in order to make a statement. They may choose to wire (or "unwire") the local airport, central business district, parks or other zones as a marketing or business development effort. They are sending a message that their community "gets it" when it comes to broadband.

Local and regional governments have found many ways to involve themselves in spurring access to broadband for their constituents. The most successful have all begun with the same first step: establishing a clear vision and communicating why broadband access matters. If constituents believe that broadband is just about downloading music or playing online games, they will not provide political support when it is needed. But if they see broadband as a path to prosperity and greater citizen participation, it will be quite a different story.

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FIVE PATHS TO A BROADBAND FUTURE

Once communities know what they want to do and why, they take different paths to get there. The Intelligent Community Forum has identified five approaches taken by the communities we have studied.

1. Development Policy

Remaining safely within the bounds of tradition, governments direct the usual tools of development policy at broadband deployment. They offer tax credits and craft rights-of-way policies to support network development. They conduct inventories of existing broadband networks and access points. They jawbone carriers into doing a better job of meeting their needs.

In **Loma Linda, California**, city government created a Connected Community project that envisioned every home, commercial and government building connected with a 10 Gbps network. As part of implementation, it created what it called the Loma Linda Standard for all new residential and commercial construction as well as remodeling affecting more than 50 percent of a structure. The standard defined how internal cabling, the "wiring closet," the demarcation and external conduit networks should be built to ensure that every resident or tenant had the potential to access high-speed broadband services. The standard created a "bias toward broadband" among developers that proved transformative for the community. From 2004 to 2007, nearly a dozen projects went into development that incorporated the Loma Linda Standard.

The city of **Whittlesea, Victoria, Australia** also seized the opportunity created by property development to set standards for a broadband future. Through a project it called WIRED Development, it changed local planning rules to require developers to install conduit as part of sub-division development and to turn ownership over to the city. Technical specifications for the conduit were included in the new rules. As part of the deal, the city agreed to lease the conduit at very attractive rates to carriers for the installation of a fiber-to-the-home network and delivery of "triple play" services. In 2005, the first developer to apply the rules issued a tender covering an 8,000-home development.

2. Networks for Government

Local and regional governments are big users of communications, and they are generally as free as any business to build private networks for their own use. To reduce costs and gain new capabilities, they construct a fiber or coaxial network linking all government offices, schools, libraries, hospitals, and other public facilities. Fears of terrorism have spurred many national governments to make funds available to communities to improve "first responder" communications, and communities have been quick to capitalize on this opportunity. They deploy wireless networks, using the fiber/coax network as a backbone, to extend network applications to police, fire, and emergency medical service vehicles as well. Having built out this sophisticated network, such communities often invest further in e-government applications that slash costs and improve service to constituents.

Corpus Christi, Texas, reduced operating costs with a muni WiFi network that also served the public.

What does this have to do with improving public access to broadband? By making these investments in networks and services, governments become a vital anchor tenant for broadband and stimulate demand for broadband services. Public investment will frequently attract carriers interested in building and managing the network under a managed service contract – and it can be a short step from there to deploying services to constituents as well. Successful e-government programs increase overall broadband demand, further enhancing the opportunities for the private sector.

Corpus Christi, Texas, offers a comprehensive example. The city installed a Wi-Fi network in 2004 to automate the reading of utility meters for its municipal-owned utilities. It saved substantial money and improved the accuracy of billing data. Once the network had proved itself, the city enlisted all of its departments to study current business practices and identify other chances to save money by going digital. After identifying over 80 potential business process improvements, the city decided to install a network covering the entire municipality. County, state, federal, and independent agencies were invited to share the network to communicate with assets in the coverage area. Local colleges partnered with local businesses to upgrade their information technology systems and find ways to use the network for communication, Web access, dispatch, fleet location, inventory control, and Internet marketing. The Corpus Christi school district issued wireless laptops to students in disadvantaged areas. With the hardware came virtual textbooks, Internet connectivity, direct parent-teacher communications, lesson plans, and other educational resource access. The local bus company even installed mobile Internet service on buses in express routes to attract more commuters.

Ottawa, the nation's capital, is investing in becoming the "Innovation Capital" of Canada.

3. Public-Private Partnerships

In other cases, government sets its sights on building a public-access network from the start but chooses not to spend taxpayer money on telecom infrastructure. This decision may be driven by regulation, such as laws forbidding the public sector from providing telecommunications. Politics may also play a role: more than one local or state/provincial government has gotten into hot water by building networks that were drastically underused.

Public-private partnerships take many forms, limited only by the imagination and legal framework in which the municipality operates. In **LaGrange, Georgia**, the city negotiated a deal in the 1990s that motivated a cable television company to develop a state-of-the-art broadband network. The city issued a municipal bond to fund network construction under an agreement in which the cable carrier agreed to lease back the network for its own use, with lease payments covering the debt service on the bond. In addition, the city retained a percentage of bandwidth for its own use, and went on to become a network and IT services provider to communities throughout the county.

In **Northeast Ohio**, the city of Cleveland, Case Western Reserve University, and major healthcare and arts and cultural organizations formed a nonprofit called OneCommunity. OneCommunity forged partnerships with the region's telephone and cable carriers, under which the carriers donated unused fiber-optic circuits to OneCommunity and OneCommunity contracted for last-mile services from the carriers. For OneCommunity and its members, it was an opportunity to lower their costs while vastly expanding their capacity. For the carriers, who were in the depths of the telecom recession, the fiber was a sunk cost generating no income, and OneCommunity was guaranteeing a revenue stream in return for the transfer of ownership. But OneCommunity's impact was more profound. By creating what it called an "ultrabroadband" network, it significantly boosted demand for communications across the region.

In **Ottawa**, the capital of Canada, local government spurred the formation of a volunteer group, the Ottawa Rural Communities Network (ORCnet) to build awareness about broadband and aggregate demand in rural areas. Through workshops, community meetings, and work with the telecom sector, ORCnet helped service providers build a business case for extending broadband into low-density markets. To sweeten the pot, local government put C$1 million into a public-private partnership that invested C$3 million in a network build-out for completion in autumn 2007, which largely closed the urban-rural broadband gap.

4. Dark Fiber and Open Access Networks

Yet another variation on deployment strategy leverages the municipality's control of its roads and rights of way to encourage the private sector to invest. In these communities, government stops issuing permits to carriers to lay cable or fiber and instead builds its own system of conduits and lays "dark fiber" throughout the network. It then leases access to the fiber to carriers.

By digging up the streets once and then closing them to further construction, local governments protect their citizens from the disruption of repeated road work. Competitive carriers – though not necessarily incumbents – react positively, because starting up service becomes as quick and easy as connecting equipment to both ends of the cable or fiber. The municipalities price the leases to cover their construction and maintenance

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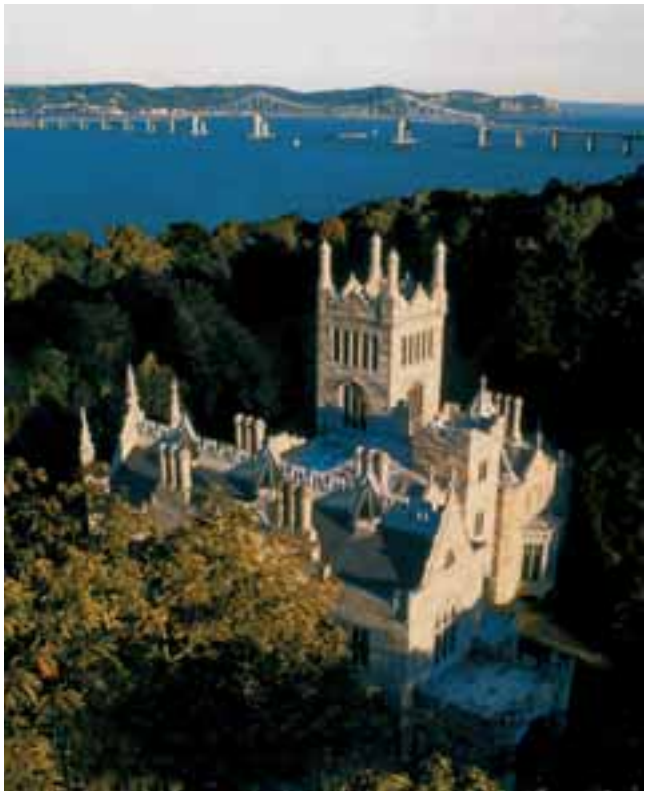
costs as well as providing a positive return on investment. In some cases, the municipalities go a step further by creating an "open network" management platform that permits carriers to provision services almost instantly, which encourages competition and innovation.

In Sweden, the city of **Karlskrona**, decided to make a revolutionary change in the way telecommunications were provided within its borders. Based on its success in attracting the corporate headquarters for mobile phone companies in the 1990s, Karlskrona branded itself "Telecom City" and directed its municipal utility company to build and operate a fiber network. The company, called Affarskverken, became a commercial ISP as well as a network operator. But the company's services failed to generate subscriber growth. In 2004, city leadership changed the rules, directing that Affarskverken leave the services business and become an open network on which other providers would deliver services to customers. These service providers were strongly encouraged not to lock customers in with long-term contracts as the city sought to position itself as a test-bed for new services. Affarskverken reconfigured its network into a competition-neutral, open-access platform that allowed service providers to build and manage services on demand. Over the next two years, new providers flocked to the network, including seven ISPs, five IPTV providers, two VOiPs companies as well as suppliers of movies, music, and local news.

The Loma Linda Standard did boost broadband coverage in California's **Loma Linda**, but it did nothing to bring more competitors into the market. The city went on to invest nearly US$30 million to build an open-access fiber network to meet its own communications needs and interconnect the fast-expanding array of new developments and renovation projects. Like Karlskrona, Loma Linda entered the "transport" business without becoming a service provider: in the jargon of the telecom industry, it became a "carrier's carrier" rather than a competitor. The municipality owns and operates a city-wide IP matrix consisting of multiple, redundant fiber optic loops with wireless communications coverage areas serving residential and business customers. Building cabling systems and other networks can connect to the city network so long as they follow the Loma Linda Standard codes. There is no requirement that anyone connect to the Loma Linda network but as a public utility it is able to offer considerable cost savings over alternatives. Increased competition has brought the price of fiber-to-the-home in Loma Linda down to $1 per day.

5. Direct Competition

The most aggressive posture a community can take is to invest public funds in setting up a broadband carrier, building a network and delivering service to outside customers. Local government typically takes this path after repeated attempts to interest incumbent carriers in upgrading networks have failed because the carriers could not make a business case for investment. Since municipalities need to earn a return sufficient only to pay capital and operating costs, they can frequently make such a case themselves – particularly if they already own and operate water, gas or electric utilities, as many small rural communities do. Owning these utilities means that the community already has facilities running into every home and business, as well as a backbone communications network in place to control operations.



Westchester County in New York State built an 800-mile fiber backbone to serve its mix of urban, suburban, and rural constituents.

Some communities simply decide to think differently about broadband. As the mayor of **Fredericton, New Brunswick, Canada** has put it, "we don't charge people to walk on our sidewalks; why would we charge them for broadband?" This was the argument used to help justify development of the Fred-eZone in Fredericton. Having built a money-saving network for government and institutional customers starting in 2000, the city used it as a backbone for a network of 300 WiFi access points covering an eight-square-kilometer (3 sq mi) zone, and made access free to all. The costs are considered part of the city's regular infrastructure operating budget.

When incumbent carriers ignored it in favor of neighboring New York City, **Westchester County** in New York State, responded by developing the Westchester Telecom Network, a multi-gigabit fiber backbone that now extends over 800 miles into every corner of the 500-square-mile county. The county government worked with 43 local governments, an independent library system, major hospitals, and dozens of school and water districts to pool communication budgets worth $50 million over five years. This long and intensive effort provided all the incentive needed for a

cable TV company, Optimum Lightpath, to build the network. Over 3,500 companies have connected directly to the Westchester Telecom Network, as well as more than half of all municipal agencies in the county, and all of the county's schools, libraries, and hospitals.

MEETING THE OBSTACLES

Whatever path a community follows, it can expect to find obstacles in its way. Generally speaking, the obstacles grow with the community's ambition. Developmental policy favoring broadband adoption is unlikely to be controversial, since such policies are widely accepted. Having government go into the telecom business, on the other hand, can ignite controversies rising to the national level. What are some of the most common obstacles?

Sustainable Economic Models. Not every community can or should build its own network in competition with the private sector. No community should rely blindly on the wisdom and generosity of private-sector partners to meet the community's needs. In 2007 in the US, there were headlines about problems with municipal broadband networks. Communities including San Francisco, Chicago, and Houston had previously entered into partnerships with EarthLink in which the carrier agreed to pay all development costs for a wireless network. The agreements called for a minimum level of free service to low-income residents, in return for operating a paying service for others, with advertising revenue to help make the budget add up. In August 2007, the company reversed itself and demanded that cities pay for network construction. When its terms were rejected, EarthLink withdrew from the projects. Columnists bewailed the demise of muni wireless, but the real lesson was perhaps the oldest one in human history: you can't get something for nothing. The planned networks never had sustainable business models. It just took EarthLink some time to deliver the bad news to its customers. Communities considering any role in building telecom systems must find an economic model that makes basic business sense and is conservative in its estimates of revenue and expenses.

Competitive Response. When governments decide to spend public money on any kind of telecommunications investment, they should expect a competitive response from the private sector. This can come as a shock. Governments are not used to competition. They are further disadvantaged by the fact that, in democracies, all of their plans and budgets are public knowledge, whereas the private sector is entitled to keep secrets.

Private-sector competitors can respond in several ways. Legal and regulatory challenges are a nearly universal first response. Depending on the legal environment, the challenge may be offered in Council and other municipal public meetings, through appeal to state or provincial agencies, or by introducing legislation at the state, provincial or even national level that creates roadblocks. Thanks to effective business lobbying, seven of the 50 US states have laws restricting the right of municipalities to offer communications services, and a further 13 specifically regulate municipalities in this area.

When communities win the right to deploy networks, however, there can be more challenges to come. Determined private-sector competitors can and frequently have priced their services at or below the offerings of the city, willing to risk losing money in order to maintain market share. Public investment also frequently motivates private carriers to make investments that they would not otherwise make. This is a net public benefit, whatever its impact on a municipal network project. But wise city planners take this possibility into account by ensuring that the business case makes sense even under strong competitive assault.

Managing Expectations and Priorities among Constituents and Partners. When government embarks on network development, it can be a long road. Successful Intelligent Communities create a high degree of collaboration among a broad range of partners: local government agencies, school districts, institutions such as hospitals and universities, local communications and technology providers, businesses and business groups, and community groups and important citizen leaders. It is a complex ecosystem with many moving parts, each with different needs and concerns but all drawn to an opportunity to make the community a better place – as well as for some kind of personal gain or avoidance of personal loss.

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In any collaborative endeavor, human beings have two motives, and success typically requires that you address both. There is the higher purpose: economic growth, social inclusion, building a better future, cultural preservation, what have you. This is the "headline" that garners initial excitement and support. But the endeavor must also serve the self-interest of each party involved, whether it is for better service, increased income or reduction of risk. In a collaborative project, all parties will typically share an interest in the higher purpose, but each may have a different self-interest, and organizers should put time and effort into understanding the different motives and structuring the endeavor to serve as many of them as possible.

It is also vital to have a small group of effective, well-respected individuals define the vision for the project, agree on reasonable expectations and, most important of all, deliver a consistent message. Steady leadership that persuades everyone of the importance of the goal – and keeps everyone focused on it over the long haul – makes the difference between success and failure.

CONCLUSION

Mention municipal broadband, and most people think you are talking about direct competition with the private sector. But direct competition is just one of many strategies and by no means the most common. Intelligent Communities everywhere want the same thing: to get their citizens the broadband utility they need at a price they can afford. Controversy may rage about predatory competition from government or greedy private carriers, but it matters little. What matters is making it happen.

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