

Communities must plan for high-speed broadband or risk getting left behind.

By MADELINE BODIN

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## **BROADBAND ACCESS IS INCREASINGLY CRITICAL TO COMMUNITIES AND INDIVIDUALS.**

It is a must for smart city applications like wireless water meters, online permitting, and zoning maps that instantly show landowners what regulations apply to them. It's also a must for the everyday tasks of government, businesses, and residents—from hiring employees or finding a job to research, communication, and banking, to name a few. The capability for distance learning and telemedicine can improve lives and in some cases even save them.

Broadband has become as necessary as electricity. And, like the early days of electricity, it is not available everywhere, and even where it is available, it may be too expensive or too slow to deliver smart city services or meet the needs of businesses and residents. Communities without affordable broadband access are finding themselves being left behind by a world in which transactions—both economic and social—are increasingly conducted online. For communities already underserved and disadvantaged by other factors, the lack of access only compounds that inequity.

Fortunately, local planners have several roles to play in bringing broadband technology to their communities or improving on the service already available there. Some of these roles are quite traditional for planners, while others employ well-practiced skills in new realms.



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## But first, what is broadband?

The Federal Communications Commission defines broadband as digital speeds of at least 25 megabits per second for downloading and 3Mbps for uploading. (Up until two years ago, those numbers had been 4Mbps download and 1Mbps upload, which tech experts considered ridiculously low.) The newer numbers mean that some cable company (coaxial) and DSL (digital subscriber line) services are no longer considered broadband.

"The [new] FCC number is reasonable," says Christopher Mitchell, director of Community Broadband Networks, a project of the Institute for Local Self-Reliance, national nonprofit research and educational organization. But from an economic development standpoint, he adds that "if you are trying to attract businesses, and all you can say is you have the FCC minimum, you may not get very far."

Broadband is not just a digital speed, however. "Broadband is a utility that is fundamental to being part of the economic, political, and social life of our society. For some people who have substandard access, it has huge impact," says Greta Byrum, director of the Resilient Communities Program at New America, a digital-oriented think tank.

And while people generally think of lack of broadband access as a rural problem, it is also a problem in cities, particularly when it comes to the affordability of access. "It's a real, invisible inequity that effects people's democratic and economic participation," Byrum says.

That inequity is seen in places like New London, Connecticut, Byrum says, which risks losing businesses because its internet access is too slow for their needs. It was also seen in the Red Hook neighborhood of Brooklyn, New York, she says, where lack of affordable internet once reduced residents' access to city services and job opportunities.

Today, a local wireless mesh network, built by the local Red Hook Initiative with assistance from New America, is alleviating the problem but has not

solved it entirely. (A wireless mesh network is basically a wifi system where the routers talk to each other in addition to individual users.) New America is rolling out similar programs in at least one neighborhood in every borough of New York City, as well as in Detroit.

The problem of "digital redlining" is widespread. Last October, it was the subject of an investigation by the Pulitzer Prize-winning news outlet The Center for Public Integrity, which concluded that only 22 percent of the nation's poorest neighborhoods are served with internet carriers' fastest speeds, while these speeds are available in 40 percent of wealthy neighborhoods.

"Broadband has been seen as a luxury," says Eric Frederick, AICP, executive director of Connect Michigan, a subsidiary of Connected Nation, a nonprofit dedicated to expanding broadband access, adoption, and use. But, it's not—it's a utility, infrastructure.

"A planner's role in broadband isn't all that different as their role in any kind of infrastructure planning," Frederick says. "When you look at a site plan, you look at water, sewer, access to the grid, transportation. You make sure that the site is adequately served and know where the infrastructure is. Broadband shouldn't be any different," he says.

## Put it in the plan

"Planning for broadband is necessary to improve community economic development and quality of life," says Frederick. He says the place to start is at the beginning: in your comprehensive plan.

"Most people will say that technology infrastructure is an important part of city government," says Charles Kaylor, an assistant professor in the Department of Geography and Urban Studies at Temple University, "but including it in planning is not ingrained operating procedure."

Comparing the internet to an information superhighway is cliché, but it fits. Most planners won't have anything to do with the superhighway itself,

## 6 TYPES OF BROADBAND TECHNOLOGY

### 01

**Digital Subscriber Line (DSL)**—data is transmitted over traditional copper telephone lines.

### 02

**Cable modem**—data is delivered through the same coaxial cables that deliver pictures and sound to TV sets.

### 03

**Fiber**—fiber optic technology converts electrical signals carrying data to light and sends them through thin, transparent glass fibers.

### 04

**Wireless**—homes or businesses connect to the internet using a radio link with the service provider's facility.

### 05

**Satellite**—another form of wireless broadband that links to a satellite orbiting the earth.

### 06

**Broadband over Powerlines (BPL)**—broadband is delivered over the existing low- and medium-voltage electric power distribution network.

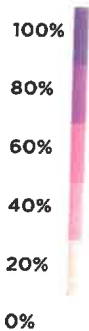
SOURCE: FCC.GOV/  
GENERAL/TYPES-  
BROADBAND-CONNECTIONS

## Visualizing the Digital Divide

Nearly a quarter of Americans are without broadband. For some households, it's a matter of geography; others simply can't afford the bill. Using census block data and the federal standard for broadband download speeds, this interactive map from The Center for Public Integrity shows the relationship between low-income areas and high-speed internet access. At [tinyurl.com/yc6tfuf4](http://tinyurl.com/yc6tfuf4), users can zoom in for a county-specific look at digital inequality.

### UNEQUAL ACCESS FOR LOW-INCOME HOUSEHOLDS

Residents of lower income areas without broadband



### DRILLING DOWN

by county

**Kings County, New York**  
(Brooklyn) residents without broadband access by household median income

- Below \$34,783
- \$34,783 to \$46,875
- \$46,875 to \$60,223
- \$60,223 to \$80,694
- Greater than \$80,694



A Digital Steward from the Red Hook Initiative checks a wifi hot spot on a rooftop in Brooklyn. The lack of affordable internet once reduced Red Hook residents' access to city services and job opportunities. Today, a local mesh network, built by the Red Hook Initiative, is alleviating the problem and has made the Red Hook neighborhood an unlikely standard-bearer for innovative wireless technology. Fifty 18- to 24-year-old stewards each year help maintain the network while getting technology training and career experience.

SOURCE: CENTER FOR PUBLIC INTEGRITY ANALYSIS OF FEDERAL COMMUNICATIONS COMMISSION, CENSUS BUREAU DATA. ROAD MAP BY STAMEN DESIGN (CC BY 3.0), OPENSTREETMAP CONTRIBUTORS.

but the “middle mile”—the access roads and county highways of the internet—is likely to fall under a municipality’s jurisdiction. The “last mile” of connections to individual premises will as well, just like the roads in a housing development. Ensuring access to broadband could be as much a part of a planner’s job as ensuring that every residence has access to the road network.

As planners are laying out a vision for their communities, they need to ask themselves how broadband infrastructure supports that, says Aimee Meacham, director of external affairs for Broadband USA, a program of the National Telecommunications and Information Administration. If your vision includes smart community applications and the Internet of Things, for example, broadband needs to be a part of the strategy.

“Broadband may not be its own chapter, but it could be included in the chapter on infrastructure,” says Frederick.

Planners familiar with Moore’s Law (computing speeds doubles every two years) may hesitate to commit something as changeable as data transmission into something as fundamental and long lasting as a comprehensive plan. The good news is digital infrastructure doesn’t change as quickly as iPhone models.

Fiber optic cable has been the gold standard in data transmission infrastructure for decades. Even as technology specifications change, the basics remain the same. Fiber optic cable runs through conduits. Wireless systems need towers, poles, or a location on a tall building.

Plans can last a long time, too. Eleven years ago, Paul DeWolfe, president and founder of Access Consulting, a Missoula, Montana-based firm that combines technology and structural engineering, created a broadband plan for the smallest towns in the five-county region of Idaho, including a town called Elk River (pop. 120), which had no access to broadband. Within a few years, the plan was used to get grants from Idaho Commission for Libraries and the Bill & Melinda Gates Foundation’s Staying Connected program to build a point-to-point broadband wireless connection over mountains and valleys to the Elk River Library. From there, a wireless mesh network connects the rest of the town to the library and the internet. Funding for the network came from a USDA Rural Development Community Connect Grant. The Elk River District Library now serves as the internet service provider for the whole town, including public and private users.



A point-to-point broadband wireless connection over Idaho’s mountains and valleys and a local mesh wireless network provide high-speed internet service to the small town of Elk River, which previously had no access to broadband.

“Broadband plans are a way to communicate with the public, with service providers, and with funders,” says Christine Frei, executive director of the Clearwater Economic Development Association, which serves the five-county region.

The surprise is that the plan is still being used today, over a decade later, to guide public-private partnerships and the replacement of some of the early wireless links with fiber.

Karen Rosenberger, AICP, grants compliance manager for the North Jersey Transportation Planning Authority, says that stating your broadband intentions in a local plan is important for getting funding. A project’s future may depend on it then becoming part of a plan at a regional authority like NJTPA.

And if the next revision of your comprehensive plan is a long way off? Start anywhere.

“Any planning document that you have should include broadband,” says Kathleen McMahon, AICP, a partner in Applied Communications, a Whitefish, Montana-based telecommunications and planning consulting firm. McMahon, who is the past chair of APA’s Technology Division, says that recommendations include traditional planning department documents such as a downtown plan, but also transportation plans and plans that a planning department might only be consulted on, such as an electric utility’s smart grid or a disaster preparedness plan.

“It’s a planner’s job to make sure that everyone has access to services,” McMahon says. “In the

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COMMUNICATIONS

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### Dig once

Another way municipalities can encourage broadband infrastructure—and save money in the long run—is to enact a “dig-once” policy. With a dig-once policy, any time a trench is opened, conduit for carrying fiber optic cable is installed. (Sometimes the fiber is installed then, too, but not typically.)

Routine maintenance like road work, and capital projects such as light-rail line construction, can both be occasions to install conduit, says Mitchell. It’s generally understood that any entity that wants to install fiber optics can use the conduit for a fee.

In 2012, the Obama administration called for dig once to become federal policy, but only went as far as asking the Department of Transportation to review state and local dig-once policies. Arizona, Utah, and Minnesota have statewide dig-once policies of various kinds. But because cities and counties generally have control over roadside rights-of-way, that is where the biggest strides have been made.

“Santa Monica, California, was at the forefront of the dig-once movement,” notes Meacham. The city began its policy in 1998, Mitchell says in an ILSR report “Santa Monica City Net: An Incremental Approach to Building a Fiber Optic Network.” The city found that installing the conduit earlier saved 90 percent of the cost of installing fiber optic cable later.

Santa Monica uses its fiber optic infrastructure in several ways, the report says. Its City Net connects municipal facilities, the school system, and a local college. It leases dark fiber—unused fiber optic infrastructure—to businesses and other carriers, with the money going to the city’s general fund. It also aggregates subscribers to get discounted rates.

Conduit in the ground can be like investing in corporate stock. Mitchell says he worked with Martin County, Florida, on a smart transportation project. “With the federal money they received they covered twice as many intersections because the conduit was already in the ground. Then, when they did the work, they put in more conduits,” he says. That new conduit was like reinvesting the stock dividends.

### Challenges

According to an FCC Internet Access Report released last year, 30 percent of all census blocks do not have any access to a broadband connection at the new, higher speed definition. Add the places where

the service is available but unaffordable, particularly for low-income residents, and a good chunk of the country is still not benefiting from broadband.

This may be because there is not a large enough profit motive for the private sector to provide service in low-margin rural and poor urban areas. But it also may be because a handful of companies hold a near monopoly on internet service access but are not subject to the universal service mandates of the regulated monopolies that built the country’s telephone and electric power systems a century ago.

That’s unlikely to change soon. The FCC signaled that it is on the side of that handful of monopolistic companies when it began to roll back net neutrality regulations in May. (Congress did the same when it wiped out internet privacy protections in March.) In late June, President Donald Trump said that rural broadband expansion would be part of his infrastructure plan, but it’s unlikely this will lead to anything like the federal stimulus money, once administered by the NTIA, that funded rural broadband systems (to the tune of \$7 billion) during the Great Recession; the funding started in 2009 and stopped funding new projects in 2015. (The NTIA even stopped updating its national broadband infrastructure map in 2014.)

Under these conditions, creating your own municipal network is appealing, but has its own drawbacks—in addition to the technical knowledge and start-up capital required. Nineteen states have laws that restrict municipal broadband networks in some way, according to the ILSR’s Community Networks project. “Most of these are not complete barriers, but they are discouraging,” says Mitchell. Some prohibit municipal networks from operating beyond their own borders. This means a city network can’t expand to serve its county. Others require, among other things, a majority vote in the state legislature to approve the municipal network.

If that’s enough to make you wish for a benevolent, private-sector fairy godmother to make it all happen for you, that’s what more than 1,000 communities wished for too, seven years ago, when Google announced a fiber project. Three communities (Kansas City, Missouri; Austin, Texas; and Provo, Utah) were chosen to receive Google’s favors. (Provo already had a fiber system and just wanted Google to run it.)

It was good while it lasted. Google quickly demonstrated that the desire for faster internet speeds is out there, and then took a step back. “Google is more or less out of partnering,” says

Mitchell. "They are certainly officially paused and many people think they are done."

Hope is not entirely lost, though. In July, Microsoft announced that it would partner with telecommunications companies to provide broadband service in rural areas in 12 states (Arizona, Georgia, Kansas, Maine, Michigan, New York, North Dakota, South Dakota, Texas, Virginia, Washington, and Wisconsin) by using the unused buffer frequencies between television channels. The FCC would have to approve the plan, and by press time, it hadn't weighed in.

Other private sector internet service providers are out there looking to partner with municipalities, too, Mitchell says. They tend to be small and regional.

Municipalities can partner with a private-sector internet provider in three ways, says McMahon:

- Aggregate users, especially anchor institutions like hospitals and universities, to get a better deal. For example, Lac qui Parle County, Minnesota, a rural county of 7,000, was getting slow internet service from its existing provider. The county took the lead in coordinating a request for proposals from the county's biggest internet users. The company that responded to the RFP funded a fiber optic network with stimulus funds and a loan from the county.
- Lease their own installed fiber to service providers. This is one of three options for municipalities that install their own fiber optic network (or other broadband infrastructure), McMahon notes. In addition to installing infrastructure only for the municipal government's use and creating a municipal broadband provider, municipalities can lease fiber they have installed to other internet providers.
- Take a hybrid approach, combining the two strategies above. For example, a municipality could install a fiber optic network, use it internally, and then lease out the rest of the network to an internet provider to serve public customers.

There are points of light for municipal networks, too. Mitchell says that states don't have the authority to prevent electric co-ops (not to be confused

with municipal electric companies) from creating broadband networks. Municipalities shouldn't run into state interference when creating broadband networks for only the local governments' own use, without public subscribers.

Broadband grants are not available through NTIA anymore, but, says Barbara Brown, a consultant formerly with Broadband USA, federal funding may be available through other programs, including the Farm Bill and the Rural Health Care Program.

### A familiar role

And a planner's role in all this? In addition to incorporating broadband into local plans, Frederick suggests that even acting as citizens, planners can use their well-practiced skills of public engagement, using maps, building consensus, and navigating both regulations and technical specifications to aid the process.

"Planning for broadband is not for the faint of heart," says Frederick, "but it's necessary to improve community economic development and quality of life."

Madeline Bodin is a freelance writer and frequent contributor to *Planning*.

## RESOURCES

### FROM APA

*Planning and Broadband* (PAS 569, 2012): [planning.org/publications/report/9026893](http://planning.org/publications/report/9026893).

*Future-Ready City: Planning for Broadband* (On-demand education, 2017): [planning.org/events/course/9126415](http://planning.org/events/course/9126415).

*Broadband Planning for a Sustainable Community* (On-demand education, 2016): [planning.org/events/course/9102801](http://planning.org/events/course/9102801).

*Local Planning for Broadband Infrastructure* (Webinar, 2008): [planning.org/tuesdaysatpa/2008/sep.htm](http://planning.org/tuesdaysatpa/2008/sep.htm).

### ONLINE

Community Broadband Networks (ILSR), with a community networks map, case studies, fact sheets and more: [muninetworks.org/content/resources](http://muninetworks.org/content/resources).

*Planning a Community Broadband Roadmap: A Toolkit for Local and Tribal Governments, Guide to Federal Funding of Broadband Projects*, Broadband USA: [2.ntia.doc.gov/broadband-resources](http://2.ntia.doc.gov/broadband-resources).