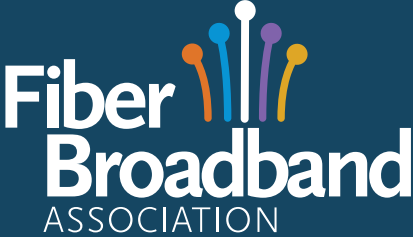


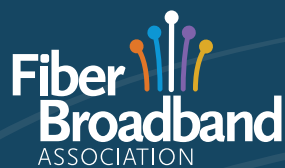


# Fiber Guide



[www.fiberbroadband.org](http://www.fiberbroadband.org)

*Accelerating the Connected Future*



We represent the ultrafast, connected future. A future built on fiber. We're an industry building powerful, reliable, and fast network platforms and services that connect homes, businesses, and communities to economic opportunities and better living, everyday. As the way we live, work, and do business moves ever more online, members of the Fiber Broadband Association build and support networks that are futureproof—built once and built right.

*Updated November 2018*

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# Why Fiber



## *What is Fiber?*

All-fiber networks (sometimes referred to as fiber-to-the-home—FTTH—or fiber-to-the-premises—FTTP), are built to connect homes and businesses to lightning fast Internet connections. The fiber optic cables that make up these networks are the fastest and most reliable broadband technology and are capable of delivering vastly higher bandwidth than traditional copper wires or wireless. All-fiber networks are directly connected from the central office all the way to a subscriber's building. There is no other technology along the path except fiber optics.

Fiber optic cables are made up of thin strands of glass that carry information by transmitting pulses of light, which are usually created by lasers. The pulses are turned on and off very quickly. A single fiber can carry multiple streams of information at the same time over different wavelengths, or colors, of light, enabling more robust video, Internet, and voice services. Fiber cables are capable of transmitting multi-gigabit Internet speeds compared to the mere megabytes typical of copper connections.

Best of all, ongoing improvements in fiber optic equipment are constantly increasing the available bandwidth that can travel through fiber networks.

## *This is the Age of Fiber Optics*

The amount of Internet bandwidth that we need grows every year. Worldwide bandwidth use roughly doubles every two years. Anything you do online requires bandwidth. Some activities like sending a tweet or updating Facebook need very little bandwidth, but others like streaming your favorite TV show or movie require a lot. Bandwidth potential is like a road: some activities require a single lane while others require a multi-lane superhighway.

Cisco predicts that in North America, there will be 12.9 networked devices per capita by 2021, up from 7.7 per capita in 2016. And consumer Internet traffic will reach 71.3 exabytes per month in 2021, the equivalent of 18 billion DVDs per month, or 24 million DVDs per hour.

However, the real value of increased bandwidth is not about what is possible today, but rather what it will enable in the future. No one could have predicted that on average there would be five connected devices per household. But now, everything—from computers and mobile phones to connected refrigerators and thermostats—is connected, and that number will continue to grow with the explosion of connected devices and the Internet of Things.

So much data zips around the world today in commerce, education, entertainment, and personal communication that copper wires and radio waves just can't keep up. Because fiber optic cable has so much capacity, it now forms the backbone of the Internet, cable TV networks, and telephone networks (including cellular networks, private business networks, and even data center networks). And the next generation communications networks we hear so much about—5G—will run on fiber. Without fiber, none of these systems would be cost-effective and most would not work at all.

*The benefits of all-fiber networks are enormous. Here is a look at just a few:*

- 1** **Faster Internet:** Building a network capable of keeping up with growing consumer demand for videos, music streaming, and online gaming is no easy task. However, all-fiber networks are up to the challenge. Fiber is consistently able to provide the fastest download and upload speeds compared to older technologies like cable, DSL, and wireless.
- 2** **Increased Home Values:** Almost 30 percent of people in the U.S. either live in rented or owned multi-family housing. A recent study from the Fiber Broadband Association (formerly the FTTH Council) showed that fast and reliable broadband is now rated the single most important amenity for multiple dwelling units (MDU) residents. The study also showed having access to fiber broadband increases rental and property values in MDUs by 8 percent and 2.8 percent respectively.
- 3** **Community Development:** Cities and towns across the country are deploying fiber optic infrastructure by developing municipal broadband networks that help speed up deployment in underserved areas. By relying on nontraditional providers and public/private partnerships, local governments are using all fiber networks to position their communities for tomorrow's jobs and economic growth.
- 4** **Fiber Networks Help Local Economies:** There's growing evidence that fiber connectivity encourages businesses to stay, helps businesses grow and become more productive, and attracts new businesses particularly in high-tech industries.
- 5** **Sustainable:** Glass is made from sand—an inexhaustible resource that uses far less energy and creates far less pollution to manufacture than does extraction of copper from its ore.

## *The All-Fiber Network Landscape*

Already, fiber connections are available to more than 200 million homes globally—a tenth of all the households in the world—and worldwide, an estimated 107 million households subscribe to fiber-based services, including voice, video, data, and more.

In the United States, almost one-fourth of households have fiber connections available, but only about one out of nine households subscribe to fiber-to-the-home. That's less than the average for the rest of the developed world. But American broadband providers are catching up. Over 150 communities have gigabit Internet speeds or higher available to residents with thousands of different entities deploying more fiber every day. And as each new network comes online, more and more households are taking advantage of these lightning fast connections.

## *Who Is Building All-Fiber Networks*

Most of the all-fiber connections in the U.S. come from large telephone companies. Verizon's FiOS network has captured a lot of media attention, as has AT&T's U-verse, which is also based on all fiber. But that doesn't tell the whole story.

Of the more than 1,000 entities providing all-fiber services in the U.S. today, most are actually small entities. Nearly all started in the telecommunications business, but a few new companies are forming specifically to build fiber networks. In addition, other nontraditional providers are emerging, including cooperative electric utilities, property developers, and technology companies.

Fiber-fed communities have an advantage in attracting everything from advanced manufacturing to contact centers to data centers. They can nurture the tech startups and home-based businesses that will provide tomorrow's jobs. They can provide better education and health care for residents, deliver government services more efficiently, and engage citizens in government. Just ask the communities competing for a new Amazon headquarters. In its 2017 announcement, Amazon confirmed that high-speed broadband infrastructure is a crucial factor for siting its new headquarters.

## **Empowering Communities with Fiber**

FTTH communities are empowered communities. They are communities that, thanks to the opportunities of next generation networks, have more control over the factors that shape the lives of their residents, businesses, and institutions. They are communities with competent support systems that make life better—through education, healthcare, economic opportunity, public safety, and efficiency in the delivery of government services. And fiber-to-the-home communities are places where leaders from the public and private sectors use technology to capitalize on tomorrow's opportunities.

**Education:** Fiber communities are places where the zip code a child is born in does not dictate the education they get. Schools in fiber communities can offer remote access to lectures and self-paced curricula, shared learning facilities that draw parents into the classroom on their own time and help them bring learning home, and access to experts and instruction far beyond the district, county, or time zone the student lives in.

**Health Care:** Fiber communities are places where having a medical condition or advancing in age does not mean limited choices and steadily decreasing quality of life. In fiber communities, remote health care helps people stay in their homes longer and access lifesaving expertise and techniques.

Sensors attached to a fiber network can unobtrusively monitor individuals, beaming that information to a qualified care team. The sensors allow the team to recognize very early signs of illness, distress, and functional decline so intervention can be offered before a crisis. This means savings in health care, but more importantly, that people can decide where they want to age or how to manage a chronic medical condition—empowering them in a way never possible before.

Many health services can be augmented by a fiber connection. High-definition two-way video over fiber enables telemedicine in specialties ranging from dermatology to psychiatry to radiology. Removing the barrier of physical distance saves time and money.

**Home Safety:** Fiber communities are places where your home actively keeps you safe. In “smart homes,” supported by symmetric fiber connections, residents know more about what's happening at home, even when they aren't there. They can monitor and control energy systems, turning off electrical appliances or adjusting the thermostat or air conditioning—and see the data on their energy use, helping save money.

A smart home is a safer home—one where residents can manage security systems from afar and check that children made it home from school safely or that an elderly relative is doing well.

Fiber communities have smart businesses and buildings too, because these communities are leading the world in the Internet of Things.

**Entertainment:** Fiber-to-the-home communities are places where having fun is not just staring at a box. Families can enjoy high definition 4K and 3DTV to watch their favorite shows, but can also use the fastest Wi-Fi available (powered by fiber) to stream fitness classes to the newest equipment. In a fiber home, other family members simultaneously enjoying their own video, IPTV, or high bandwidth gaming do not cause the connection to lag.

**Government:** Fiber communities are places where the local government is in the business of information, where services can be delivered more efficiently and its citizens can be more engaged. Fiber enables video-linked public services centers, allowing residents in remote areas to get one-on-one advice or hold meetings with government officials and offices at a far lower cost than staffed service centers could provide. These are places where governments can take advantage of the deluge of data collected by sensors—from traffic and environmental quality monitoring sensors to high quality video—to quickly dispatch the right bus to the right stops to get residents to where they need to go, alert the public to ozone action days, or mobilize emergency services in a crisis.

**Business:** Fiber communities are places that have the economic engine for attracting more companies and creating new job opportunities. Residents of fiber-to-the-home communities are the developers of innovations in health care, in education, in business services, in energy, and in crisis management.

Fiber-to-the-home communities are the centers of innovation that are worth visiting, working in, and living in.



# What's Next:

## Top Five Fiber Industry Developments

### *Good Gets Better*

Over 50 years ago, Dr. Charles Kao and his associates published ground-breaking research (for which Dr. Kao ultimately won the Nobel Prize) on how communications could be transmitted across fiber optics. Since then, the technology and the industry have steadily evolved, also driving updates in services, applications, and devices on these networks.

Over the years, the fiber industry has made this technology even faster, smarter, and easier to deploy—and we're just getting started. As data use continues to skyrocket and next generation 5G wireless services are closer to deployment, fiber is being pushed deeper and deeper into the network. And technologies, business models, and market forces are evolving to meet those demands.

Here are the biggest recent developments in fiber that have changed the market and which the Fiber Broadband Association's Technology Committee believes will have lasting impacts going forward:

### *One: Convergence between Providers and Network Types*

The last few years have seen a rise in municipal and utility fiber-to-the premise networks. At the same time, thanks to market disruption from competitive local exchange carriers, traditional incumbent operators have also invested in more fiber. They're joined in this fiber upsurge by cable operators. Not only are there more new faces in fiber broadband, they're also increasingly making use of deployment partnerships. Everyone wants to be considered a fiber provider now.

### *Two: Fiber Network Improvements*

High speed broadband isn't just a nice-to-have; more people are starting to see it as an essential service. Indeed, a recent study from RVA Networks, LLC sponsored by the Fiber Broadband Association showed that fast and reliable broadband is the number one most important amenity for people who live in apartments or condos.

Deployment of fiber systems has been underway for a decade and a half, and in that time the technology has continued to evolve. Blazing-fast gigabit speeds, from 1 gigabit to, recently, 10 GigPON, have hit the market. Fiber network designs have evolved, and providers are now making use of both split and distributed architectures; and they've gotten smarter with integrated fiber test access ports (TAPs) and monitoring. We're also seeing cloud-based and intelligent tools like software-defined networking (SDN) and network function virtualization (NFV) technology for the central office. These technological improvements make deploying fiber easier and less expensive, and make the experience even better for customers.

### *Three: Enhanced Installation Techniques*

Designing fiber networks has become more data-driven overall, integrating tools like geographic information systems (GIS) to make it easier to plan and document new networks more accurately and effectively. This helps to significantly expedite the installation process.

Setting up fiber in an existing building has never been less disruptive to owners or residents. Invisible surface mount technology inside apartment buildings and homes hides unsightly cabling. And new panels and cabinetry have been developed for buildings with multiple broadband providers.

There have also been notable improvements in fiber broadband materials and equipment that have made installations better in the last few years—including low loss and bend insensitive fiber, pre-connectorized outside plant (OSP) cables, updated microcable and microduct technologies, cheaper and more compact fusion splice machines, intuitive splice closure designs which reduce overall installation time, high density patch cables, better means of accessing and terminating fiber cables, and more.

### *Four: Cost of Deployment*

In the past year billions of funding has been made available for broadband deployment through federal agencies such as the Federal Communications Commission and the United States Department of Agriculture and by state governments in places like Ohio, New York, West Virginia, and Wisconsin. And because fiber has achieved cost parity with other broadband technologies, it has seen a recent deployment boom. This is especially true in Canada, where this year their government announced the Connect to Innovate program that will invest \$500 million to bring high-speed Internet to 300 rural and remote communities. Canada, according to RVA LLC, had [45 percent growth in homes marketed](#), reaching five million homes passed and 1.8 million homes connected to fiber.

## *Five: Fiber Densification for Wireless*

The next generation wireless networks depend on fiber. A significant amount of fiber cable will be necessary to connect the dense network of 5G small cells—one square mile could need up to 60 small cells—and handle skyrocketing data needs.

It has to be fiber: copper has limited bandwidth, microwave isn't scalable enough, but fiber is just right for the job. It also has to be a lot of fiber. Providing full 5G service to just the top 25 metropolitan areas in the United States would need, for example, 1,390,816 miles of fiber cable.

Fiber broadband isn't just critical for 5G. RVA, LLC and the Fiber Broadband Association also found that cities with fiber have, on average, 35 percent more smart city applications than cities without fiber. Fiber has become a cornerstone of the race for both 5G and Internet of Things functionality.

# 5G and Fiber



Since the 1990s, four generations of cellular network technologies have propelled us from “bag phones” using slow 1G voice networks to sleek devices using 4G LTE. Today we can watch seemingly limitless video content on mobile devices, monitor our fitness using a wristband, and answer the front door after seeing who is standing outside using a smartphone app.

Now the mobile industry—and other tech enthusiasts—are talking about the next evolution of wireless technology, typically called “5G”. 5G is not just an increase in bandwidth on a mobile phone, unlike previous generations of mobile tech, but rather a strategy and massive shift in how mobile operators will deliver services, manage competition, reduce their costs, and monetize. 5G radio access technologies will include next generation cellular specifications, but will also include next generation Wi-Fi specifications and most likely newer wireless technologies for specialized communications (e.g. Internet of Things specific).

That's because our connected future is so varied: devices of the future will include large numbers of autonomous vehicles, augmented/virtual reality (AR/VR) devices, infrastructure sensors for smart transportation and public safety applications, and airborne drones. 5G will enable these kinds of technologies at exceptional scales, data rates, and low latencies. To support all of this, 5G is expected to provide gigabit speeds, sub one-millisecond latency, and the capacity to connect an astonishing 2.5 million devices per square mile.

## *Driving 5G with the Internet of Things*

Until recently, people used the Internet to connect with each other, conduct brief transactions, and get information. Now, we connect physical objects to the Internet and to each other through small, embedded sensors. The ecosystem this creates, the Internet of Things, is one of ubiquitous, distributed computing, where “smart” devices securely collect and transmit data to other devices automatically and in real time.

The Internet of Things, which has industrial, consumer, and civic uses, will drive economic growth and further change the way we live, work, and run our cities. These technologies will be critical for our economy: Consumer Technology Association projections show that in 2016 alone, Internet of Things applications helped drive 30 percent of the consumer technology industry’s overall \$287 billion in retail revenues. This does not include industrial, commercial, or city-level applications.

The promise of 5G is great—and, indeed, essential to the widespread adoption of Internet of Things technologies—but so too are the challenges to network deployment. 2G and 3G wireless networks often used copper-based backhaul to connect cell sites. While these networks have served consumers well, carriers and network operators all over the country are converting these legacy systems over to fiber. Why? Because fiber is a future-proof technology, capable of supporting higher capacities and the low latencies that our 5G networks will need.

Areas targeted for 5G coverage will also require lots of fiber to be successful. This is not just for capacity reasons, but also for network diversity, availability, and coverage, since all three of these performance goals are achieved through a greater number of interconnected paths of fiber.

But 5G will also place enormous demands on fixed-wireline networks. New 5G technologies will use much higher radio frequencies than today’s cellular networks do. While these higher frequencies carry larger amounts of data, they also have very short ranges. For 5G to work well, many additional small radios or “cells” must be installed close together—as close as 200 feet apart. To provide multi-gigabit service to many users and applications, these small cells will need to be connected to hundreds of thousands—perhaps millions—of miles of new fiber optic cable. As wireless networks grow—through small cells and macro cells—fiber will continue to be the first choice technology as the building blocks to the network.

Even without 5G, we are experiencing a huge boom in mobile connectivity. By 2021, the world will have 27.1 billion networked devices, up 58.47 percent from 17.1 billion in 2016. Forty-three percent of these devices will be mobile-connected, and they will consume far more data; a smartphone in 2021 will consume an average of 14.9 GB of data monthly, four times the 2016 level.

## *Seeing it in the Market*

We can see the need for fiber to support 5G in some of the movement, mergers, and acquisitions in the industry. Windstream recently finalized its purchase of EarthLink, gaining 29,000 route miles of fiber. Similarly, CenturyLink recently purchased Level 3, giving the company an additional 200,000 route miles of fiber. Analysts believe that 5G and network densification are at the heart of moves like this. In their evaluation of CenturyLink's purchase, Barclays analysts noted that "fiber is a critical component of 4G densification and 5G network deployment. Specifically, denser networks will be needed to support the expected rise in mobile data, a dramatically broader array of connected devices, and increased machine-to-machine transactions, all at materially lower latency and at higher quality of service levels. Thus, fiber will be a critical component of next gen network infrastructures." Similarly, Cowen Equity Research said in a research note that a potential Frontier fiber asset sale could reflect the growing interest and value that private equity and other infrastructure providers see; purchasing fiber assets will support business services and the backhaul necessary for upcoming 5G wireless deployments.

## *Removing Barriers*

At the most basic level, wireless technologies free people from the constraints of place and enable them to lead fuller lives. However, these technologies are limited in range and bandwidth. Fiber technologies offer virtually unlimited bandwidth over very long distances between fixed locations. Billions of wireless devices generate performance demands on networks. These demands can only be satisfied with the prodigious amounts of bandwidth made available by fiber networks.

Policymakers can help make sure these networks actually get built. 5G and fiber providers will need access—on a reasonable and non-discriminatory basis—to public and private rights-of-way, poles, ducts, and conduits, and commercial and residential buildings. Over much of the past two decades, the Fiber Broadband Association has recommended policy measures to make such access possible. The emergence of 5G makes these policy steps more important than ever.

# North American Fiber Update

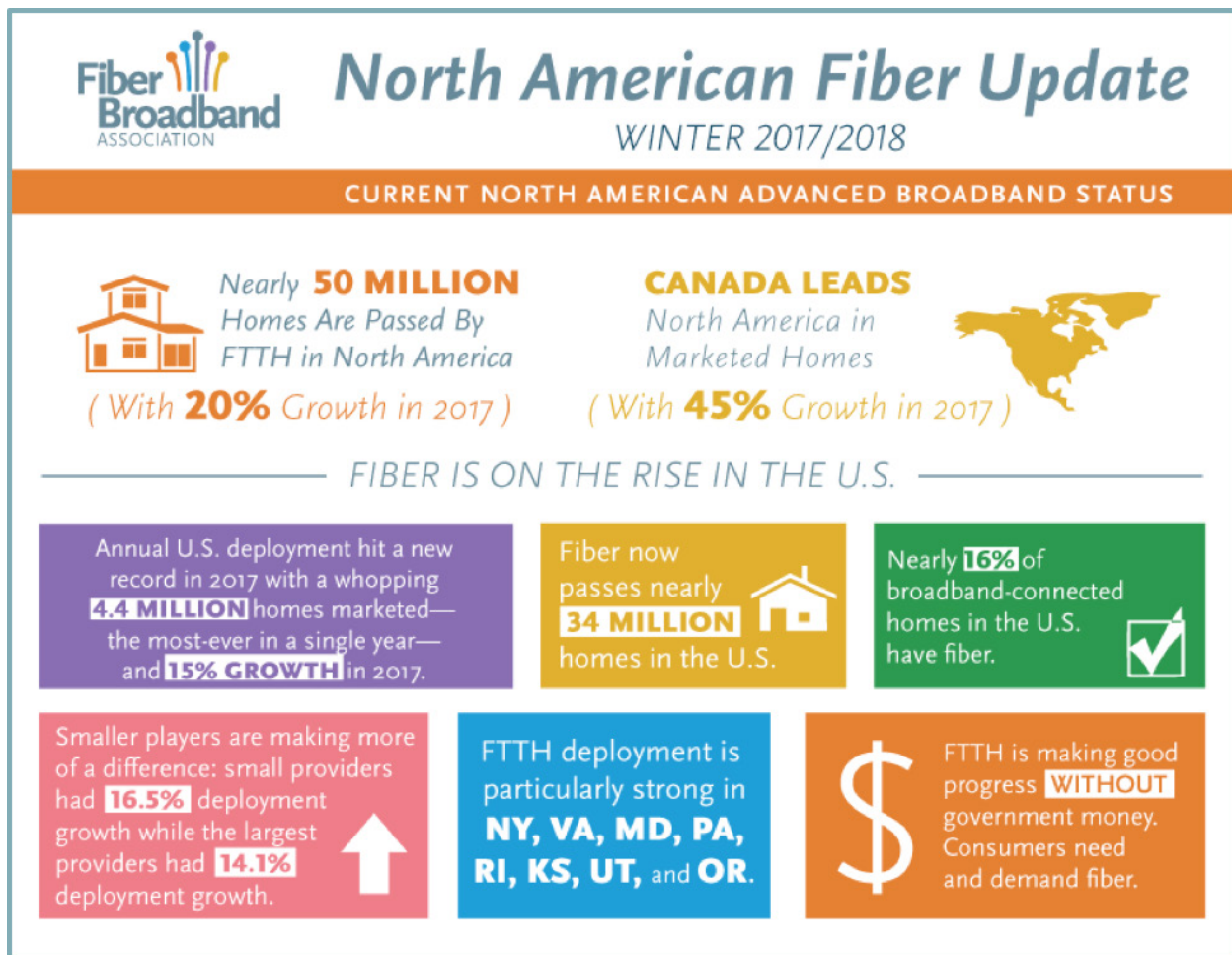


Figure 1: Highlights of the current state of fiber broadband numbers (Fiber Broadband Association and RVA, LLC, December 2017)

## Fiber in North America

Nearly 50 million homes are currently passed by fiber in North America, reflecting a [20 percent growth of marketed homes](#) in 2017.

While the United States has the most fiber-marketed and connected homes in North America—34.5 million homes marketed, representing 29 percent of households in the United States, and 15.4 million homes connected—Canada leads the region in percent growth of marketed homes and the percentage of marketed households.

The number of homes passed by fiber in Canada rose by 45 percent in 2017, reaching five million homes marketed and 1.8 million homes connected to fiber. Thirty-seven percent of households in Canada are currently marketed by fiber.

Mexico is not far behind Canada in the number of connected homes, with 1.6 million homes connected, but has nearly double the number of marketed homes—8.5 million marketed homes as of 2017. Nineteen percent of Mexican households are marketed by fiber.

The Caribbean has the lowest fiber numbers across all metrics in the North American region. There are .23 million homes marketed and .12 million homes connected to fiber. One percent of households in the Caribbean are marketed by fiber.

## *Fiber in the United States*

Annual fiber deployment in the United States hit a new record in 2017 with 15 percent growth and a whopping 4.4 million homes marketed, the most-ever in a single year. As mentioned above, 29 percent of American households—totalling nearly 50 million—are passed by fiber. The current data also shows that nearly 16 percent of broadband-connected homes in the United States have fiber broadband.

The rapid growth of fiber networks in North America is due in large part to the increased participation of smaller FTTH providers as well as increased consumer demand, reflected in FTTH's continued progress despite a general lack of specific government funding. Deployment growth from the largest providers grew at a rate of 14.1 percent, while the smaller providers had 16.5 percent deployment growth.

The current fiber take-rate in the United States is hovering around 45 percent, a slight dip from its peak of just a few percentage points higher in September 2015. This is correlated with new builds in the United States, which take time to market. The take-rate is expected to change once these builds are marketed.

Fiber-to-the-home deployment varies from state to state, with the highest deployment currently concentrated in the Northeast and Mid-Atlantic regions, followed by the Midwest.

## *Fiber in Our Lives*

It turns out that increased fiber connectivity in a community is correlated with higher gross metropolitan product (GMP) growth. RVA, LLC [found that](#) mid-sized American metropolitan areas with over 60 percent fiber-to-the-home connectivity had 64 percent better GMP growth than that of mid-sized American metropolitan areas with less than 25 percent FTTH connectivity.

Broadband quality has become a major factor in where people choose to live. High-speed Internet is a factor for 88 percent of people deciding where to buy a home, and for 91 percent of people deciding which community to live in. The data even shows a difference on the individual house, condo, or apartment level—when comparing a home with FTTH and a comparable home without FTTH, people need an average of an 4.6 percent discount to consider the non-FTTH option.

# Fiber Makes Cents for Real Estate

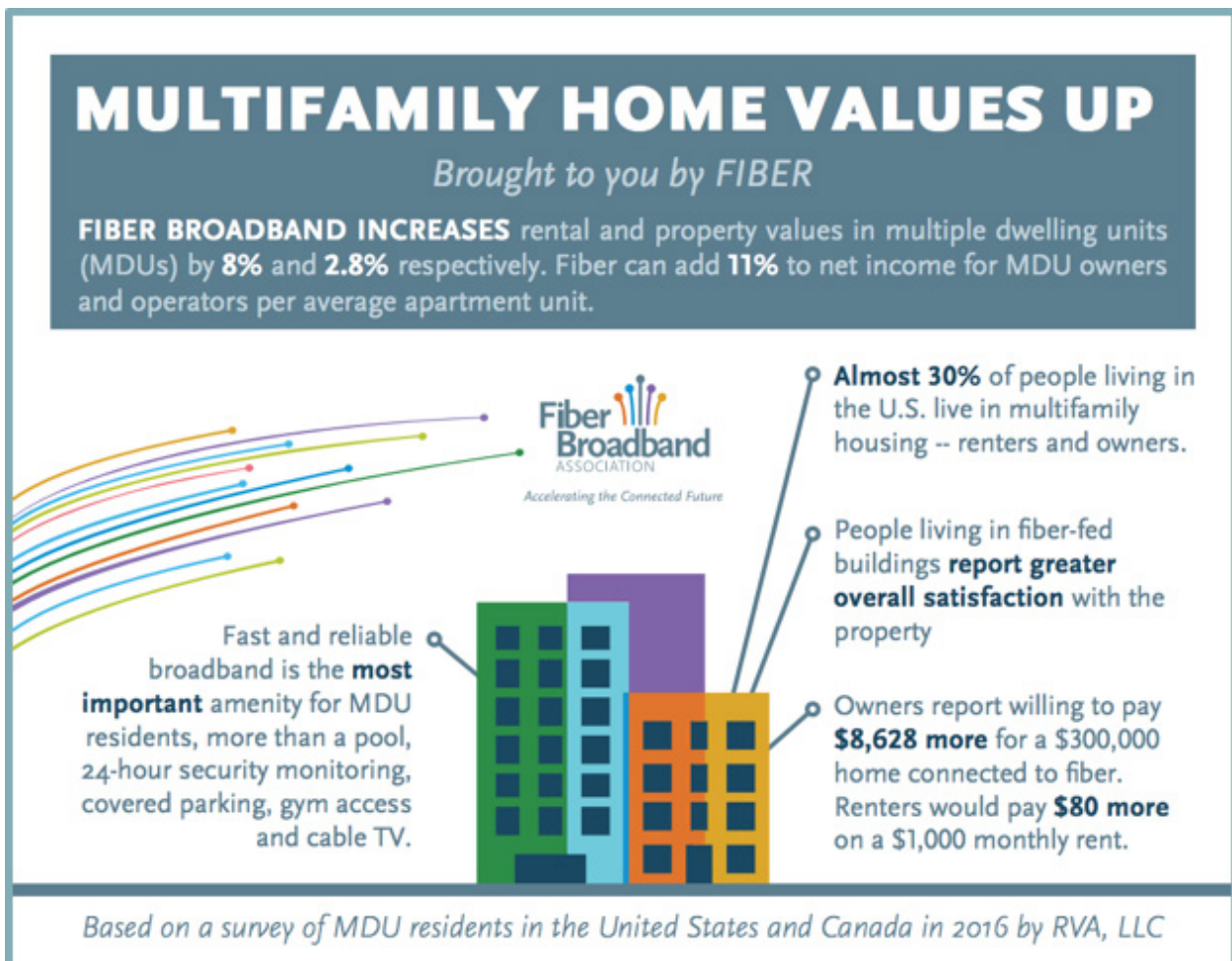


Figure 1: A 2016 survey of MDU residents in the United States and Canada shows that fiber raises the amount people are willing to pay to live in a given MDU.



# FIBER TO THE MDU

FIBER BROADBAND ASSOCIATION

**50%**

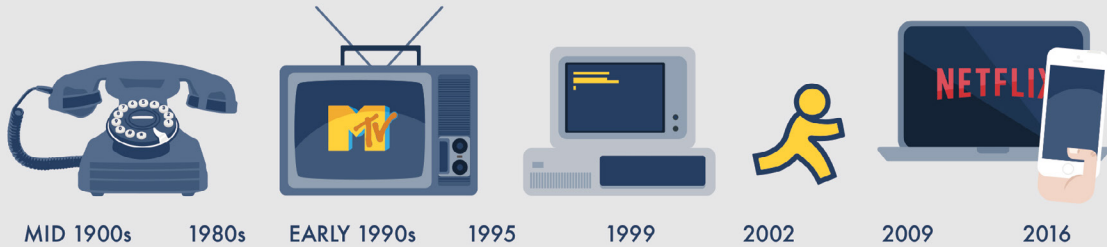
of new buildings built in 2016 include fiber to each living unit.

**100%**

of new buildings should include fiber.  
Why?

**1**

**Fiber is future proof** and able to meet rapidly increasing bandwidth needs.



MID 1900s    1980s    EARLY 1990s    1995    1999    2002    2009    2016

COPPER



\* Copper has required regular upgrading and is now reaching its limitations.

FIBER



MOST VALUED AMENITY

**Fiber is best:** Quality of broadband increases residential property value.

**2**

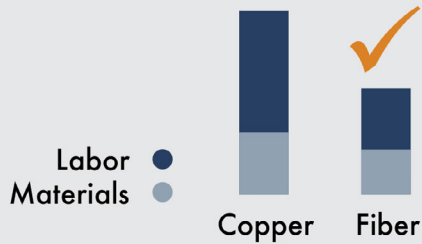
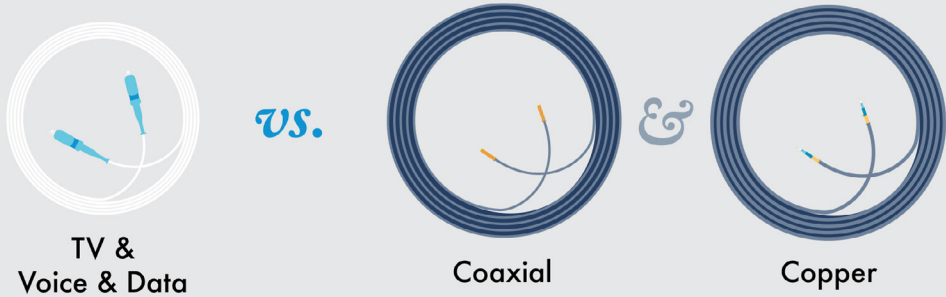
**2.8%**

Increase to Own

**8.0%**

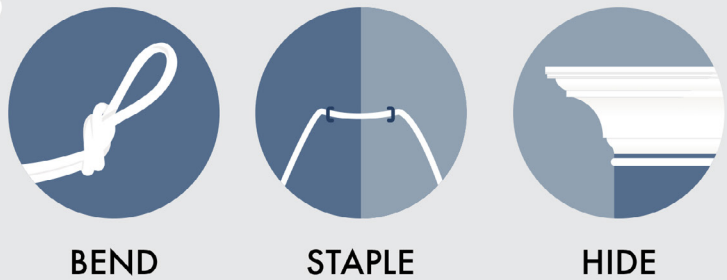
Increase to Rent

**3** **Fiber is simpler:** Build one fiber network instead of two (copper and coaxial).



**Fiber is less expensive.** **4**

**5** **Fiber is less intrusive** and easy to install.



**100%** of new buildings need fiber!

For more information, visit our website: [www.fiberbroadband.org](http://www.fiberbroadband.org)

Fiber broadband is good for residents, but can also save money in long-term building maintenance and bring in more money from renters and buyers. Here's how:

## ***Building Residents Want Fiber***

A behavior shift is happening; we're increasingly embracing technology in our homes and consuming more bandwidth. We want to watch the content we want, when we want to watch it from streaming "over-the-top" services. We buy devices that monitor the temperature, lights, and security of our homes and entertainment systems with 4K televisions and high-bandwidth gaming systems. We won't tolerate buffering. So the broadband infrastructure where we live has become a key factor affecting our housing choices.

## ***Fiber Saves Buildings Money***

Fiber does not need to be replaced as often as other competing technologies, which is key in an age where data use and demand are increasing at breakneck speeds. Other wireless technologies require regular, expensive upgrades—copper, for example, has made six major changes to its cabling since the 1990s alone. But fiber is built to last and can consistently keep up with intense data consumption.

Even though fiber quality and performance have improved over the years, fiber's basic design has stayed the same since the 1980s. Simply put, it just works, and it works well. In the past, buildings needed multiple cabling structures to deliver different kinds of services—a coaxial cable for video services, for example, and a copper telephone cable for telephone services. With fiber, you can build just one network instead of two. One high-reliability single-mode glass fiber can take care of all services delivered to the home, from TV to voice to data, which means that buildings can save time, money, and materials during the deployment process.

Because fiber can be bent, stapled, or hidden in inconspicuous ways throughout buildings, deploying is also easy and less intrusive for residents already living in a building. Unlike other forms of cabling, which can be large, ugly, and a source of resident complaints, fiber can be, as the saying goes, "out of sight, out of mind."

## ***Fiber Brings in Money for Buildings***

Fiber is also a major necessity for residents. A [2017 National Multifamily Housing Council \(NMHC\) survey](#) of 120,000 apartment renters found that high-speed Internet was the highest-rated home feature—beating out features such as soundproof walls, in-unit washers and dryers, and more. According to data from RVA LLC, high-speed Internet is also a factor for 88 percent of people deciding where to buy a home, and for 91 percent of people deciding which community to live in. People want high-speed, reliable Internet—and fiber is the best way to get it. Fiber is the fastest broadband option, featuring upload speeds 2.8 times better than competing technologies and up to 61.3 percent less time waiting for online content to load.

Fiber attracts residents, who are willing to pay more for this top-notch access to high-speed Internet and report greater overall satisfaction with the property as a whole. Fiber-equipped properties have an 8 percent greater rental value and a 2.8 percent greater sales value than properties without fiber. Renters would pay \$80 more on a \$1,000 monthly rent, and owners would pay \$8,628 more on a \$300,000 house—the equivalent of adding two fireplaces or a remodeled bathroom—all for the benefit of having fiber broadband.

### ***Learn More from the Fiber Broadband Association***

The Fiber Broadband Association has several resources available for members to learn more about fiber broadband in the real estate realm:

- 1** [\*How Do I Make My Building Fiber-Ready?\*](#) offers specific guidance for deploying fiber in residential buildings, which building owners and developers can use to cash in on fiber broadband.
- 2** [\*Reevaluating the Broadband Bonus: Evidence from Neighborhood Access to Fiber and United States Housing Prices\*](#) investigates the relationship between high-speed Internet service and housing prices.
- 3** [\*MDU Value of Advanced Broadband to MDUs\*](#) delves into the impact of broadband on both residents and the MDU properties.

# Connecting Rural Communities with Fiber

## ***The Problem: a Rural Digital Divide***

About 60 million Americans live in rural areas today—and more than 30 percent of rural residents lack access to what the FCC considers sufficient broadband, compared to just 2.1 percent of residents in urban areas.

This rural digital divide is as troubling as it is familiar: NTIA research shows that in 1998, 34 percent of Americans in urban areas used the Internet, but only 28 percent of Americans in rural areas did. All of our lives have gone more digital since then, but the urban and rural connectivity gap has remained an issue: in 2015, 75 percent of Americans in urban areas used the Internet, versus 69 percent of rural Americans.

This stark contrast between urban and rural connectivity, maintained over all of these years, is a big problem. Without comparable connectivity, people who live in rural communities lose out on countless educational, vocational, and telehealth opportunities.

The rural digital divide also puts a stranglehold on business development in rural areas. [Seattle Web Search reports](#) that 63 percent of consumers look online for information about local businesses. Without adequate connectivity, rural businesses miss out on potential customers. Without the access or bandwidth to use technologies like cloud computing, rural businesses also risk being left behind in the digital economy.

Across the board, not having adequate connectivity in rural areas is a disservice to all of us—to the millions of Americans being shut out, and to those of us in urban areas who are missing out on what our rural peers have to offer.

### ***A Solution: Fiber***

Fiber broadband is one key path forward in addressing this critical issue. Fiber doesn't just offer faster download and upload speeds than other technologies: it's an affordable, reliable, and future-proof way to make sure that rural areas get adequate connectivity today and continue to get it tomorrow.

Getting rural residents up to speed is only half of the battle. We're using more data than ever before; without sufficient expansion capacity, any method of connecting rural communities would get us back to square one in no time. Luckily, fiber is as high-capacity as it is low-cost.

It can transmit much more data, using just one network instead of two cabling structures: one copper and one coaxial. This saves money in terms of materials as well as labor. Thanks to its enduringly simple design, fiber also does not need to be replaced as often as other technologies, like copper does.

### ***Our Members are Already Connecting Rural Communities Fiber***

We know that it is possible to connect rural communities with fiber because companies like Hiawatha Broadband Communications, Inc. (HBC), a Fiber Broadband Association member, are already doing it.

“At HBC, our mission is to bring quality, high-speed broadband to the thousands of rural homes and businesses in underserved areas in our region,” said HBC President and CEO Dan Pecarina.

HBC, which is based in Winona, Minnesota, and formed in 1997, has helped foster economic advancement in communities throughout Minnesota for the past two decades thanks to fiber optic technology for television, Internet, and telephone services.

## *Advocacy Helps Get Us There*

Policymakers need to hear from communities, providers, and residents about how and why to make fiber easier to deploy. Over the years, the Fiber Broadband Association has been deeply involved in conversations around the [Connect America Fund \(CAF\)](#), which is a program of the Federal Communications Commission that provides money for broadband deployment in rural areas. The Fiber Broadband Association has worked to make it easier for operators across the country to deploy broadband across the full spectrum of business models—from municipal operators to all-private entities to public-private partnerships to cooperatives.

We've submitted multiple comments to the FCC in support of the CAF Fund and arranged opportunities for FCC staff to talk to our members about policy, requirements, and next steps.

We have also made the Fiber Broadband Association's voice heard on the need for dig-once policies and the need to remove both public and private barriers to investment, such as unreasonable fees for access to poles, rights of way, and unreasonable franchise requirements.

It is an honor to put our influence, our networks, and our resources to work to help make it easier for rural communities, residents, and businesses to get connected.

## *With Government Interest, the Timing is Right*

Our advocacy efforts are coming at an opportune time; both Congress and the current administration have demonstrated their interest and willingness to act to make rural broadband infrastructure better.

President Donald Trump issued a presidential memorandum opening up access to infrastructure on Department of Agriculture lands. He also issued an executive order compelling the General Services Administration to standardize the process for attaching communications equipment to federal buildings. Both measures opened the door for investments in broadband infrastructure across the country, including in rural areas.

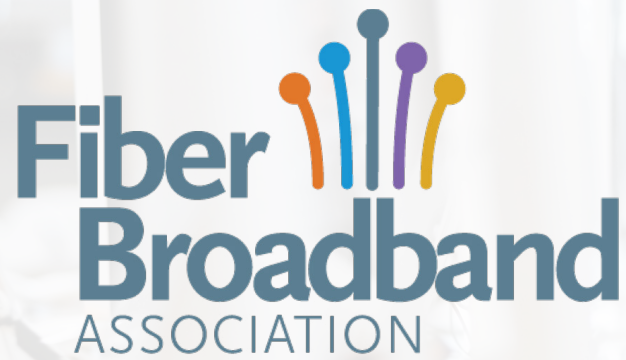
In Congress, representatives from both sides of the aisle have all introduced proposed bills to streamline the deployment process for broadband technologies like fiber broadband.

As Heather Burnett Gold, former President and CEO of the Fiber Broadband Association, stated: "We are thrilled that lawmakers see this as a bipartisan issue and are joining us in taking steps to accelerate the connected future for all Americans, regardless of their location, and make fiber easier, faster, and more cost-effective to deploy."



## *Learn more from the Fiber Broadband Association*

The rural digital divide is a serious problem requiring serious solutions. Visit [www.fiberbroadband.org/rural-broadband](http://www.fiberbroadband.org/rural-broadband) to learn more about what the Fiber Broadband Association is doing to help connect all Americans, not just those of us who live in cities.



*Accelerating the Connected Future*

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