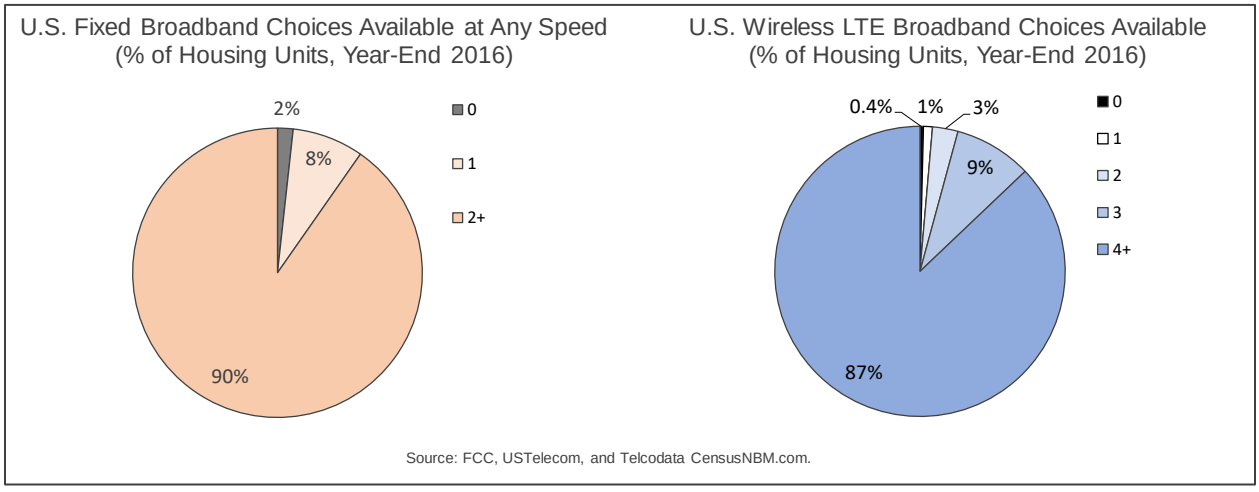
U.S. BROADBAND AVAILABILITY YEAR-END 2016

By Patrick Brogan, Vice President of Industry Analysis

U.S. broadband providers continued deploying and upgrading networks to bring consumers across the nation ever-faster service and competitive choice, according to a USTelecom and CensusNBM analysis of the most current Federal Communications Commission (FCC) broadband availability data for year-end 2016. Ongoing, widespread deployment of competitive broadband networks is the result of substantial capital investment in a dynamic, evolving market. Wireline, wireless, and cable providers invest more than $75 billion annually and have spent more than $1.6 trillion since 1996 to build competitive networks. The data indicate that deployment is widespread, but challenges remain to boosting coverage in rural areas.

USTelecom reiterates its view that any assessment of broadband availability and competition must start with an examination of broadband at any speed using any technology and must account for the dynamics of deployment and technological advancement over time. As of year-end 2016, 98 percent of Americans had at least one fixed broadband network platform available at any speed and 90 percent had at least two fixed platforms at any speed. As of year-end 2016, 99.6 percent of Americans had at least one mobile broadband network available; and nearly all Americans had a choice among LTE providers. See Chart 1. In addition, satellite providers offer national coverage and have recently launched next generation satellites that meet FCC broadband speed standards.

Chart 1



The FCC categorizes broadband as either fixed or mobile. The most current available data from the FCC are for year-end 2016 for fixed broadband and mobile wireless broadband. Fixed broadband consists of wired broadband and fixed wireless broadband. Wireless Internet Services Providers (WISPs) use terrestrial fixed wireless technology to deliver broadband services. For the purposes of the analysis below, USTelecom uses the term fixed broadband to refer to

terrestrial fixed broadband, which excludes satellite broadband. Wired broadband is a subset of fixed broadband, and it predominantly consists of broadband over fiber, digital subscriber line, and cable modem technologies. Mobile wireless broadband is separate from fixed wireless and fixed broadband.

The figures in Chart 1 reflect the foundational deployment of competitive broadband facilities. U.S. providers have been deploying broadband infrastructure using a range of technologies for more than two decades. As a result, basic underlying competitive infrastructure from multiple providers is available in the vast majority of the country. Moreover, broadband technologies are constantly evolving, with successive generations becoming increasingly powerful. Thus, upon the foundational infrastructure of underlying facilities, broadband providers invest tens of billions of dollars annually to extend and upgrade networks. As any provider or group of providers deploys advanced technologies, competing providers respond by deploying differentiated technologies of their own, driving a competitive process of ever-expanding network capabilities.

Against the backdrop of this competitive dynamic, it is important to keep in mind that broadband remains one of the most capital-intensive industries in the economy and the geographic reach of the U.S. is vast. In such an environment, providers simply cannot deploy the latest technology upgrades instantaneously across their entire network footprints. Wide-scale deployment is expensive and time consuming. Deployment and upgrades typically occur first in dense, low-cost areas and progress to more rural, high-cost areas over time. Snapshot analyses at a single point in time based on selective speed thresholds and technologies miss this dynamic: they understate both the availability and competitiveness of broadband. Worse, arbitrary speed thresholds can lead to misdiagnoses of market failure and calls for regulatory intervention. Therefore, it is imperative to look at both current and historical trends across technologies.

Competitive availability at higher speeds is growing rapidly as providers upgrade their widely deployed broadband networks. For example, available data allow us to look at wired broadband deployment, typically from wireline telecommunications and cable operators, at different speeds over time. The data indicate that competitive deployment is strong and growing. As of year-end 2016, 97 percent of Americans had at least one wired broadband network platform available to them and 86 percent had at least two wired options. See Chart 2. Competitive availability – defined narrowly as at least two wired providers – at 25 megabits per second (mbps) download (DL) and 3 mbps upload (UL) was 50 percent at year-end 2016, up from 31 percent at year-end 2014 and 25 percent at year-end 2012. Wired broadband at 10 mbps DL and 1 mbps UL was available to 67 percent of households from at least two providers at year-end 2016, up from 63 percent at year-end 2014 and an estimated 59 percent at year-end 2012. See Chart 3.

Chart 2

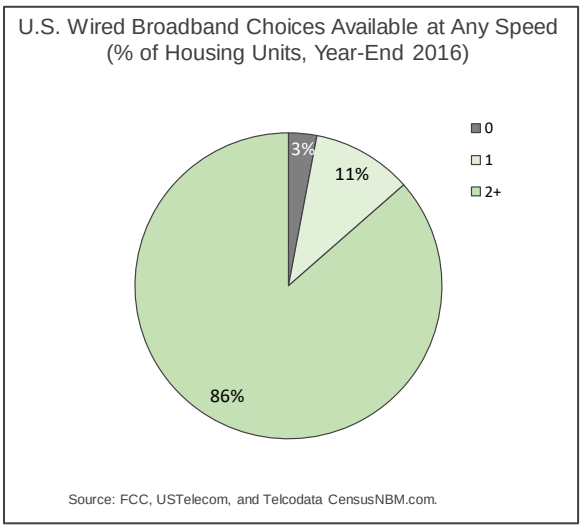
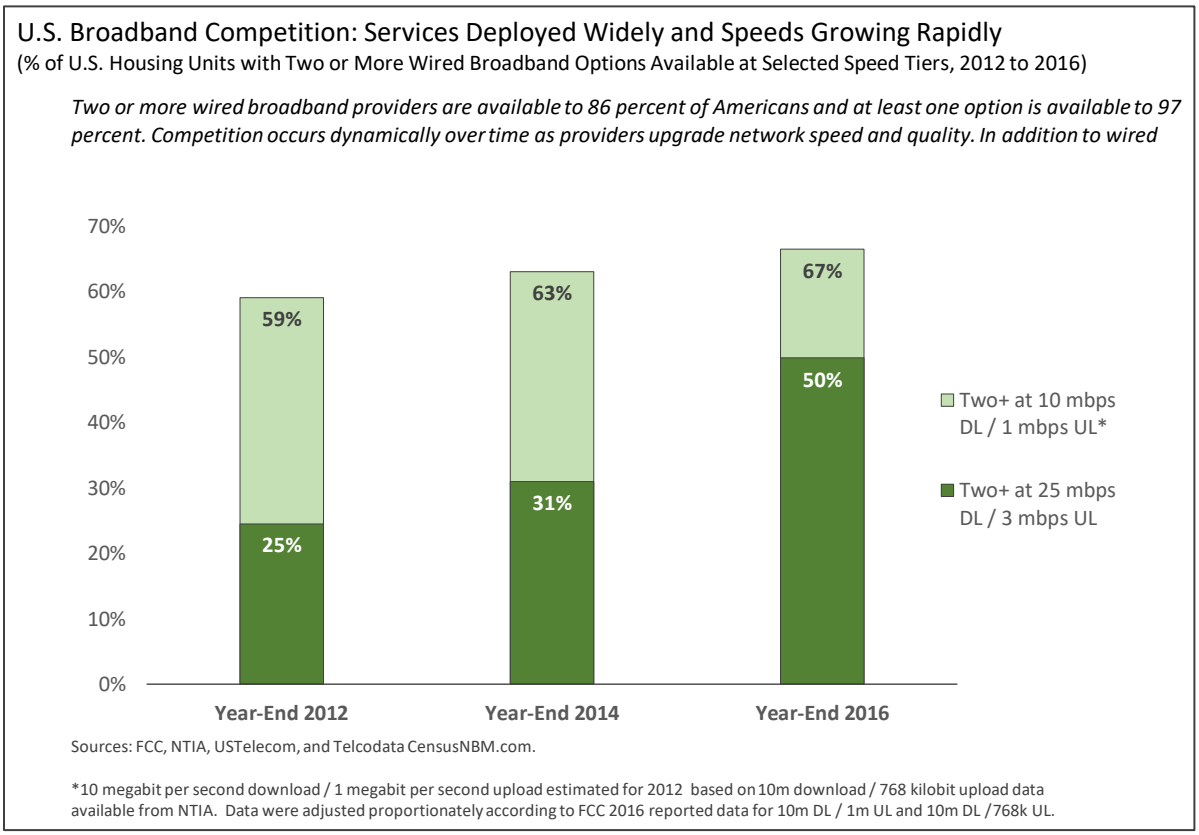


Chart 3



The FCC data also indicate that some portion of U.S. households can choose from three or more providers. For wired broadband, it is unclear the extent to which all of this is fully facilities-based competition. Of the 86 percent of Americans that had a choice of two or more wired broadband providers, 23 percent of Americans had a choice of three or more, according to the FCC data. We can identify at least one-fourth as full facilities-based providers: former cable over-builders, such as Wide Open West and RCN, covered at least 5.6 million housing units;

identifiable municipal network operators covered at least 1.6 million housing units; and Google Fiber covered approximately 884,000 housing units. Together these account for availability to 8.1 million housing units, or approximately six percent of Americans. The remaining three-fourths may include providers using their own facilities, providers who partially resell others' facilities, or some combination of these.

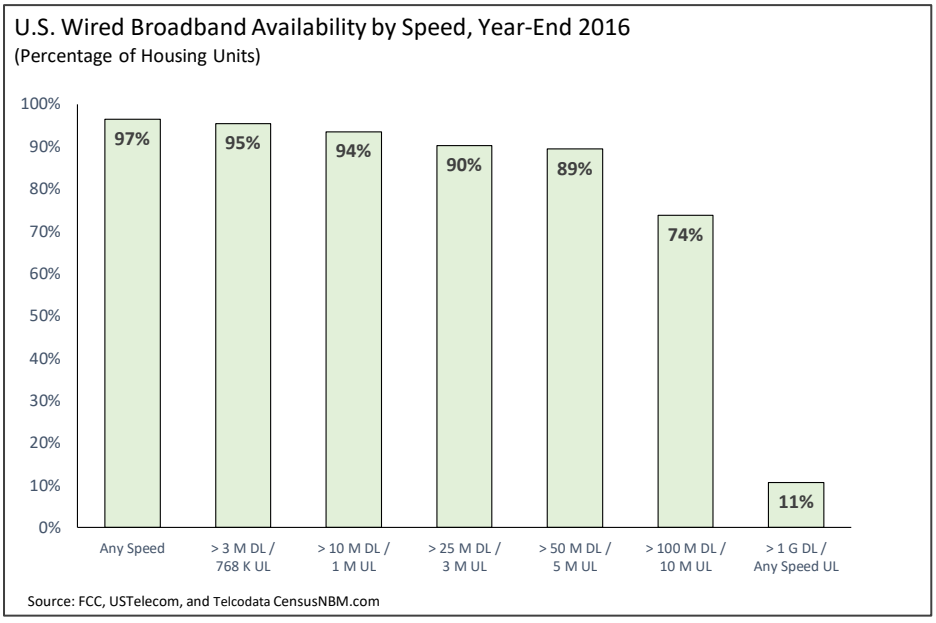
As of year-end 2016, fixed wireless service at any speed was available to 37 percent of Americans. The reported portion of Americans with three or more fixed broadband providers, which includes both wired and fixed wireless, available to them is significantly greater than for wired broadband, due to the inclusion of fixed wireless. Three or more fixed broadband options at any speed were available to 42 percent of Americans as of year-end 2016, compared to 23 percent for wired broadband only, according to the FCC data.

Mobile broadband from multiple providers is also widely available throughout the U.S. As shown above in Chart 1 above, as of year-end 2016, mobile broadband using 4G LTE wireless technology was available to 99.6 percent of Americans. Ninety-nine percent had a choice of two or more providers and 96 percent could choose among three or more. Four or more LTE mobile broadband options were available to 87 percent of Americans.

Broadband Availability and Deployment at Different Speeds over Time

Unsurprisingly, given the deployment dynamic discussed above, the FCC data for year-end 2016 show that the broadband availability rates are higher speeds at lower speeds. This is the case whether looking at wired broadband or the broader category of fixed broadband. See Chart 4 and Chart 5, respectively. However, consistent with the competitive deployment dynamic, the *overall* availability of higher speed services has been growing over time (see Chart 6); and the *competitive* availability of higher-speed services has been growing over time (see Chart 3).

Chart 4



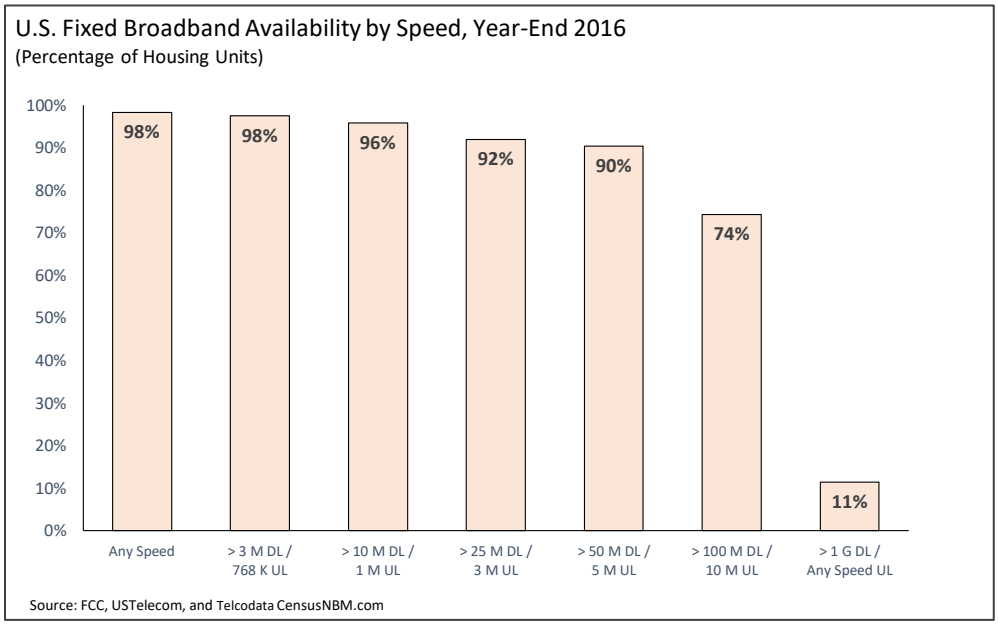
For wired broadband as of year-end 2016 (Chart 4):

- 97 percent of Americans could get broadband at any speed, up from 96 percent at mid-2016;
- 95 percent at 3 mbps DL and 768 kilobits per second (kbps) UL, up slightly from mid-2016 but unchanged at 95 percent after rounding;
- 94 percent at 10 mbps DL and 1 mbps UL, up from 93 percent at mid-2016;
- 90 percent at 25 mbps DL and 3 mbps UL, up from 89 percent at mid-2016;
- 89 percent at 50 mbps DL and 5 mbps UL, up from 88 percent at mid-2016;
- 74 percent at 100 mbps DL and 10 mbps UL, up from 68 percent at mid-2016; and
- 11 percent at 1 gigabit per second (gbps) DL and any speed UL, up from 9 percent at mid-2016.

For fixed broadband as of year-end 2016 (Chart 5):

- 98 percent of Americans could get broadband at any speed, up slightly from mid-2016 but unchanged from 98 percent after rounding;
- 98 percent at 3 mbps DL and 768 kbps UL, up from 97 percent at mid-2016;
- 96 percent at 10 mbps DL and 1 mbps UL, up from 95 percent at mid-2016;
- 92 percent at 25 mbps DL and 3 mbps UL, up from 90 percent at mid-2016;
- 90 percent at 50 mbps DL and 5 mbps UL, up from 89 percent at mid-2016;
- 74 percent at 100 mbps DL and 10 mbps UL, up from 68 percent at mid-2016; and
- 11 percent at 1 gbps DL and any speed UL, up from 10 percent at mid-2016.

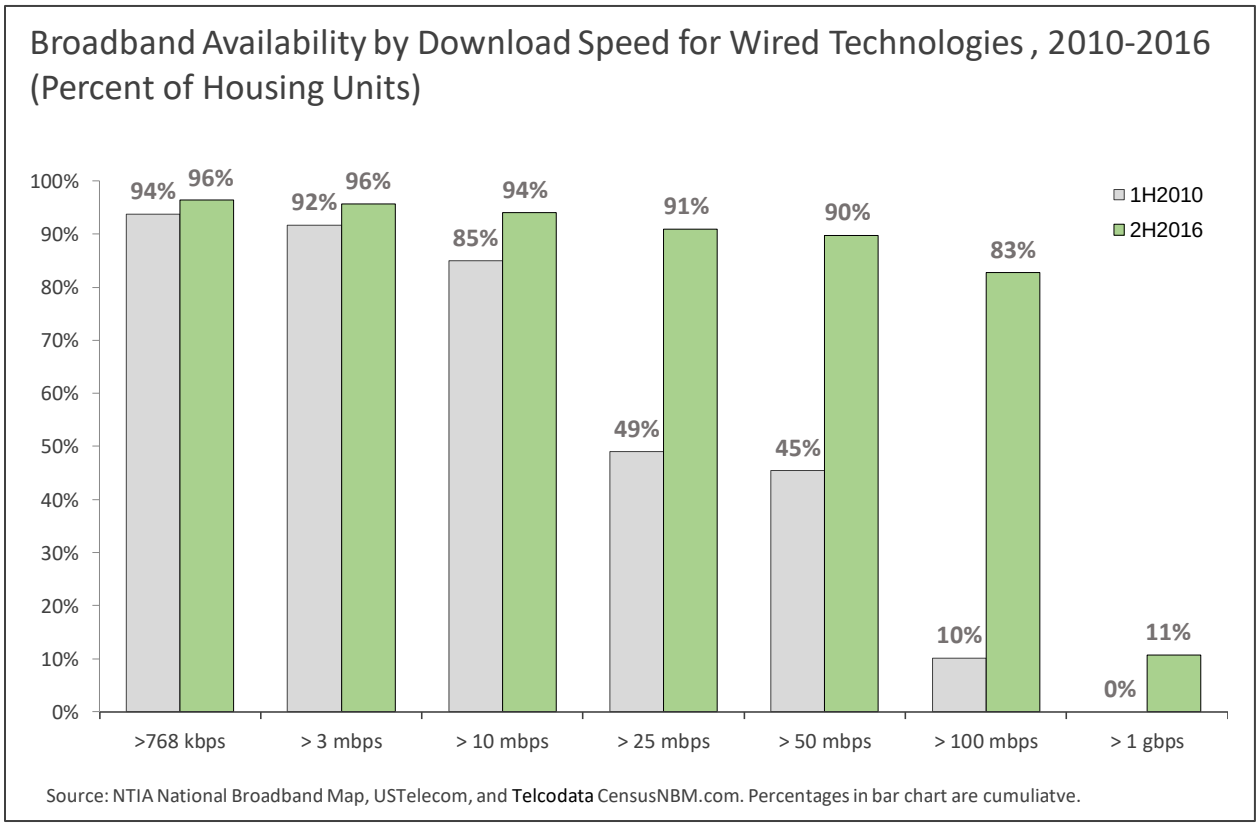
Chart 5



These data show that as of year-end 2016, fixed broadband at any speed was available to 98 percent of Americans and wired broadband was available to 96 percent of Americans. The FCC currently defines advanced services over fixed broadband based on a speed threshold of 25 mbps DL and 3 mbps UL. Approximately 92 percent of Americans had fixed broadband available and 90 percent had wired broadband available at the FCC's current speed threshold.

Broadband availability has been growing across all speed categories over time. Chart 6 compares availability of wired broadband from 2010 to 2016. Availability of broadband at 10 mbps DL grew from 85 percent to 94 percent. Availability of broadband at 25 mbps DL grew from 49 percent in 2010 to 91 percent at year-end 2016 while broadband at 50 mbps DL grew from 45 percent in 2010 to 90 percent at year-end 2016. Availability of broadband at 100 mbps DL grew from 10 percent in 2010 to 83 percent at year-end 2016. Gigabit consumer broadband, which did not exist in 2010, was available to 11 percent of households at year-end 2016.

Chart 6



Please note the following regarding the analysis shown in Chart 6: Corresponding data for fixed broadband are not readily available for 2010; and historical 2010 data were only available for download speeds. Therefore, the analysis in Chart 6 is limited to wired broadband. Nonetheless, it is likely that the broader fixed broadband category would show similar historical trends; and the discussions following Charts 4 and 5 comparing broadband availability at year-end 2016 and mid-2016 indicate that availability is currently growing for both fixed and wired options. Additionally, in order to make accurate comparisons to 2010, the analysis in Chart 6 contains only download speeds for 2016. As a result, the availability figures in Chart 6 are higher than for the corresponding download-upload combinations in Chart 4. Finally, since the 25 mbps DL /3 mbps UL and 50 mbps DL / 5 mbps UL are so similar, throughout the remainder of this research brief, USTelecom will not report the 50 mbps DL and 5 mbps UL figures.

An analysis of mobile broadband availability tells a similar story of competitive investment and growth. Data challenges make direct comparisons from 2010 to the present difficult. With 4G LTE technology, mobile carriers first began to report service at 10 mbps or greater DL. According to National Broadband Map (NMB), as of mid-2010, mobile broadband at 10 mbps DL or greater was available to less than one percent of Americans; by mid-2014 it was available to 98 percent. The FCC, which was responsible for the broadband deployment data collection as of year-end 2014, measures mobile wireless broadband speeds differently than the NBM; so, direct speed-based comparisons across the NBM and FCC data are not feasible. However, the FCC does report mobile broadband availability by technology. By year-end 2015, mobile broadband over LTE – a good proxy for 10 mbps or greater service – was available to 99.5 percent of Americans. By year-end 2016, LTE was available to 99.6 percent of Americans. In other words, mobile broadband at 10 mbps DL or greater grew from near zero to 98 percent availability in four years and approached 100 percent availability within six years. As of 2016, nearly all Americans had multiple choices for 4G mobile broadband, as shown above in Chart 1 above.

Broadband Availability in Rural and Non-Rural Areas

Broadband deployment across the diverse and expansive geography of the United States presents many challenges. In rural areas, costs are high and population densities low, so the cost per user can be extremely high. The economics of providing broadband at affordable and nationally comparable rates in many rural areas is difficult and in some cases prohibitive for wired providers who must deploy facilities all the way to end user locations. As a result, broadband is not surprisingly more widely available in non-rural areas than in rural areas and, due to the timing of upgrade cycles, typically at higher speeds. The analysis of rural broadband availability that follows updates USTelecom's previous analysis of mid-2016 data released in August 2017.

Rural Broadband Availability Overall

Broadband availability varies between rural and non-rural areas, but also within rural areas. In the calculations that follow, USTelecom reports availability as a percentage of housing units. Approximately 79 percent of housing units are non-rural and 21 percent are rural according to the 2010 Census.

As of year-end 2016, wired broadband at any speed was available to 99 percent of Americans in non-rural areas and 86 percent of Americans in rural areas at year-end 2016. See Chart 7. Wired broadband at 10 mbps DL and 1 mbps UL was available to 99 percent of Americans in non-rural areas and 75 percent in rural areas at year-end 2016, up from 98 percent and 72 percent, respectively, at mid-2016. Wired broadband at 25 mbps DL and 3 mbps UL was available to 98 percent of Americans in non-rural areas and 62 percent of Americans in rural areas at year-end 2016, up from 97 percent and 59 percent, respectively, at mid-2016. Wired broadband at 100 mbps DL and 10 mbps UL was available to 83 percent of Americans in non-rural areas and 39 percent of Americans in rural areas at year-end 2016, up from 79 percent and 34 percent, respectively, at mid-2016.

Chart 7

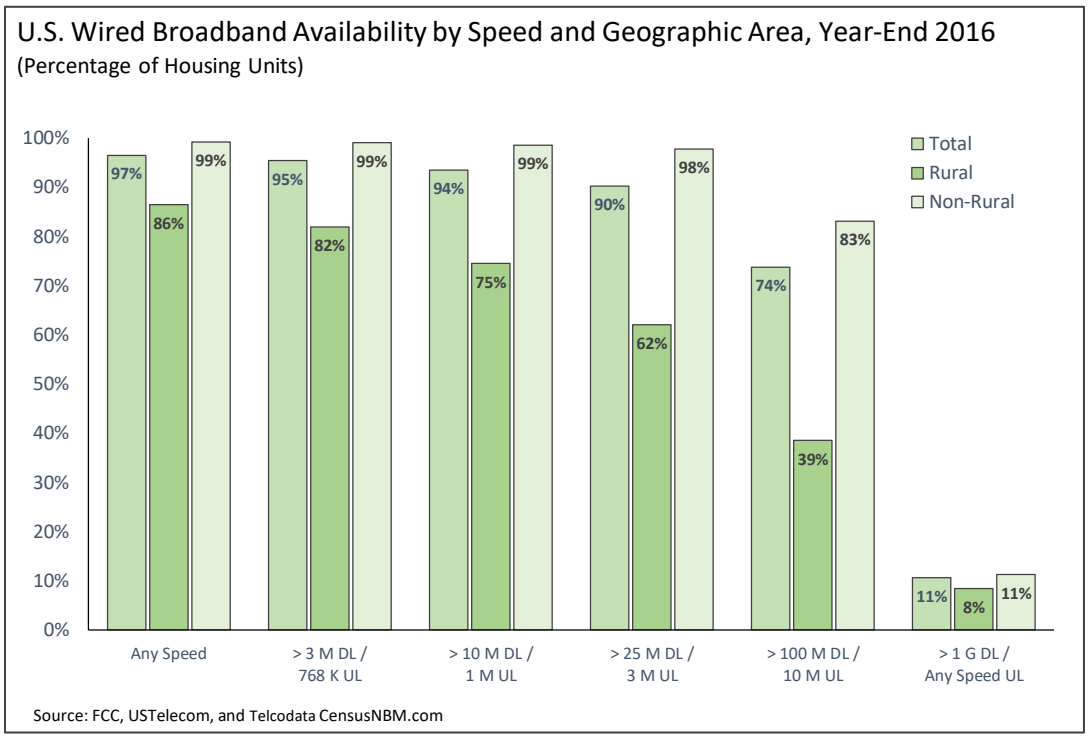
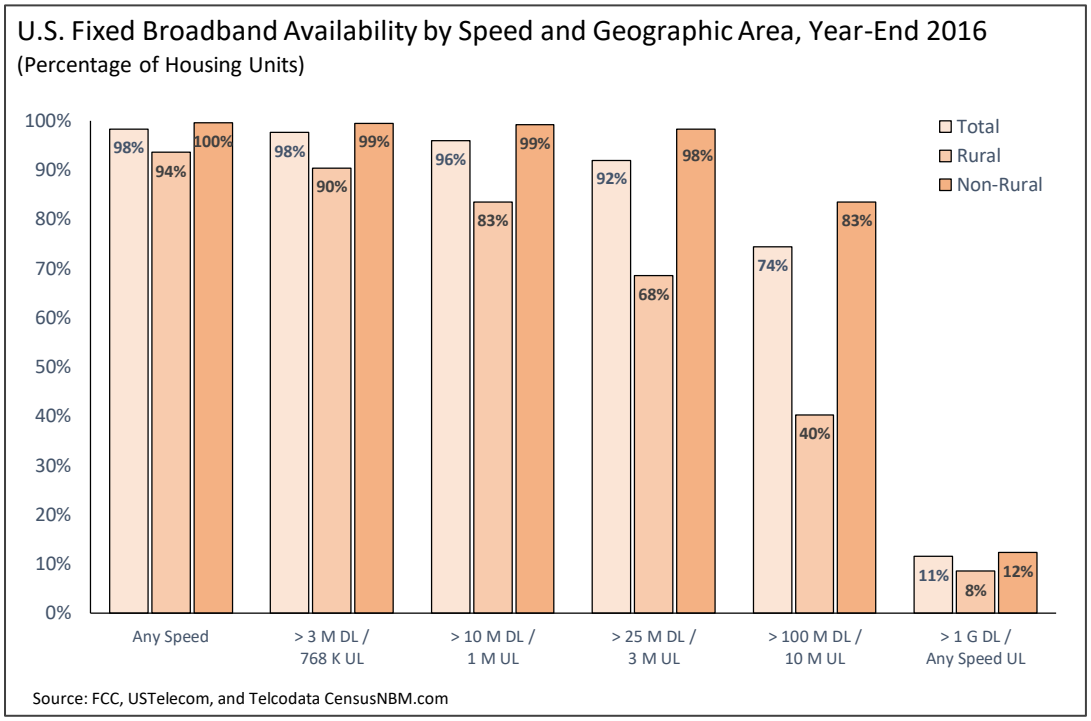


Chart 8



When including fixed wireless in the analysis, there is slightly greater availability in rural areas than there is when analyzing wired broadband alone. Fixed broadband at any speed was available to nearly 100 percent of Americans in non-rural areas and 94 percent of Americans in rural areas.

See Chart 8. Fixed broadband at 10 mbps DL and 1 mbps UL was available to 99 percent of Americans in non-rural areas and 83 percent in rural areas at year-end 2016, versus 99 percent and 80 percent, respectively, at mid-2016. Fixed broadband at 25 mbps DL and 3 mbps UL was available to 98 percent of Americans in non-rural areas and 68 percent of Americans in rural areas at year-end 2016, up from 97 percent and 64 percent, respectively, at mid-2016. Fixed broadband at 100 mbps DL and 10 mbps UL was available to 83 percent of Americans in non-rural areas and 40 percent of Americans in rural areas at year-end 2016, up from 77 percent and 35 percent, respectively, at mid-2016.

USTelecom does not provide a separate analysis for rural and non-rural deployment of mobile wireless broadband or satellite broadband. As shown in Chart 1 above, as of year-end 2016, 4G LTE mobile wireless broadband was available to 99.6 percent of Americans, and the vast majority of Americans, including those in rural areas, had 4G mobile broadband available to them from multiple competitive providers.

Competitive Availability: Rural and Non-Rural Components

At year-end 2016, wired broadband at any speed was available to 86 percent of Americans from two or more providers, with 11 percent having one option and three percent having no wired broadband option. See Chart 2. The 86 percent with two or more wired broadband options consisted of 75 percent in non-rural areas and 11 percent in rural areas. The 11 percent with one option consisted of nearly four percent in non-rural areas and seven percent in rural areas. The three percent that did not have a wired broadband provider consisted of less than one percent in non-rural areas and slighter greater than two percent in rural areas. See Chart 9.

At any point in time, competitive availability appears lower at higher speeds since they reflect more recent upgrade cycles. See Chart 10. This result is expected; and it reflects a dynamic, competitive marketplace. While core wired infrastructure is competitively available to 86 percent of Americans, networks are at different stages of upgrading to higher-speeds. As of year-end 2016, 67 percent of Americans could get 10 mbps DL and 1 mbps UL from at least two providers, while 50 percent could get 25 mbps DL and 3 mbps UL from at least two providers. As Chart 3 demonstrates, deployment at higher speeds by multiple providers is growing rapidly as competition drives upgrades.

Please note that Chart 9 shows the percentages with one decimal place because otherwise rounding would yield different figures than discussed above. Chart 10 uses the rounded figures because the individual charts are too small to accommodate decimals.

Chart 9

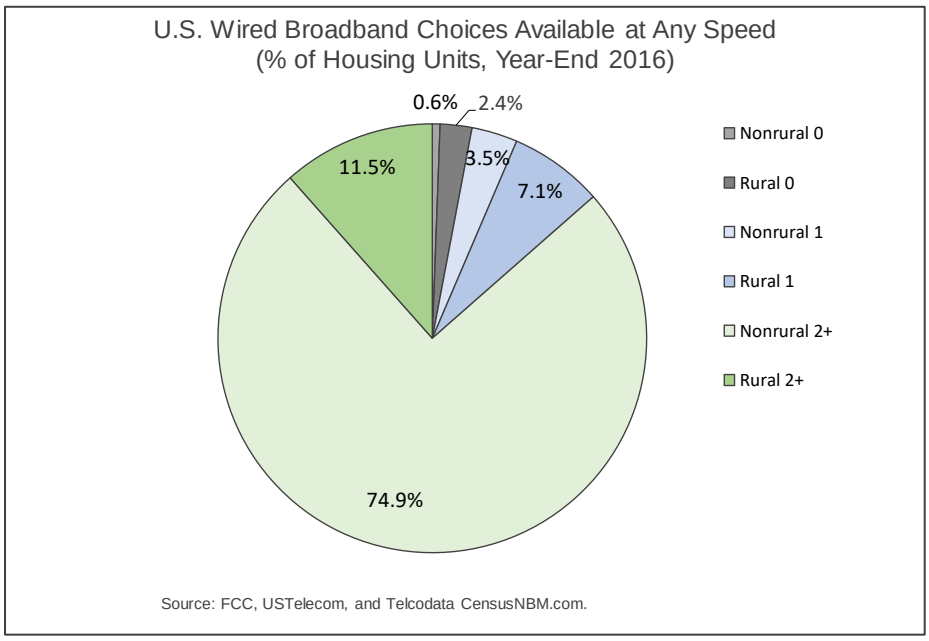
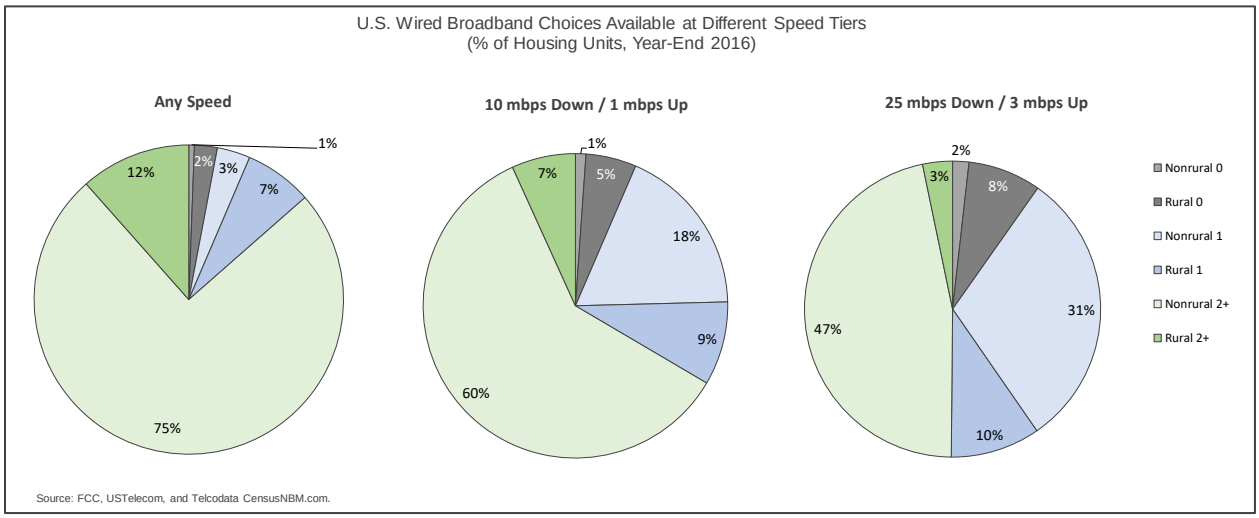


Chart 10



As of year-end 2016, fixed broadband – including wired and fixed wireless – at any speed was available to 90 percent of Americans from two or more providers, with eight percent having one option and two percent having no fixed broadband option. See Chart 1. The 90 percent with two or more fixed broadband options consisted of 76 percent in non-rural areas and 14 percent in rural areas. The eight percent with one fixed broadband option consisted of five percent in non-rural areas and three percent in rural areas. The two percent that did not have a fixed broadband provider consisted of less than one percent in non-rural areas and just under one and a half percent in rural areas. See Chart 11.

As with wired broadband, competitive availability estimates for fixed broadband are lower at higher speeds due to competitive dynamics and upgrade cycles. See Chart 12. Including fixed

wireless yields slightly higher estimates than wired broadband, especially at the 10 mbps DL and 1 mbps UL speed tier, where an additional 9 percent of Americans – 6 percent in non-rural areas and three percent in rural areas – had two or more fixed broadband offerings available as of year-end 2016.

Chart 11

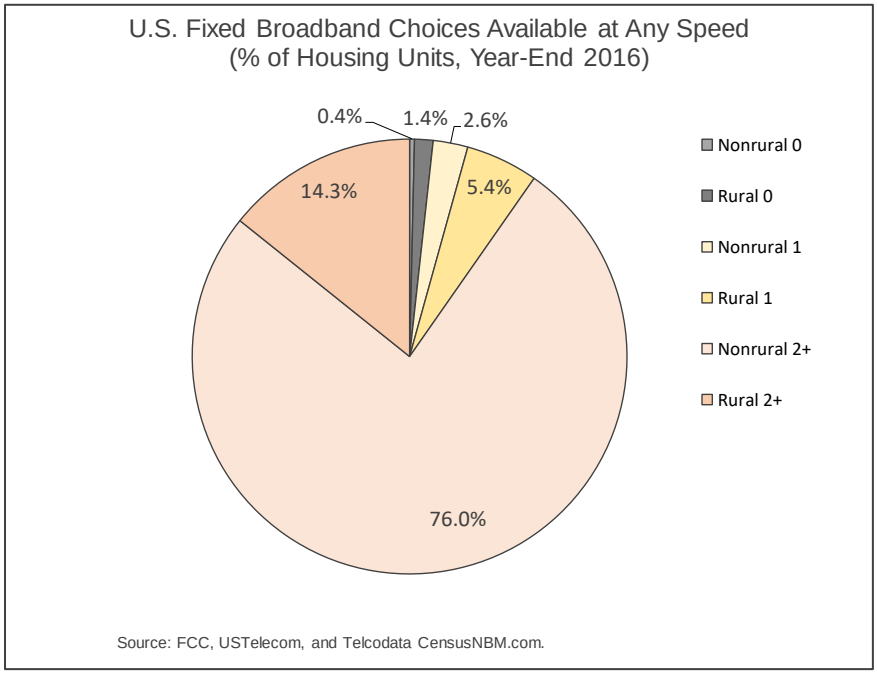
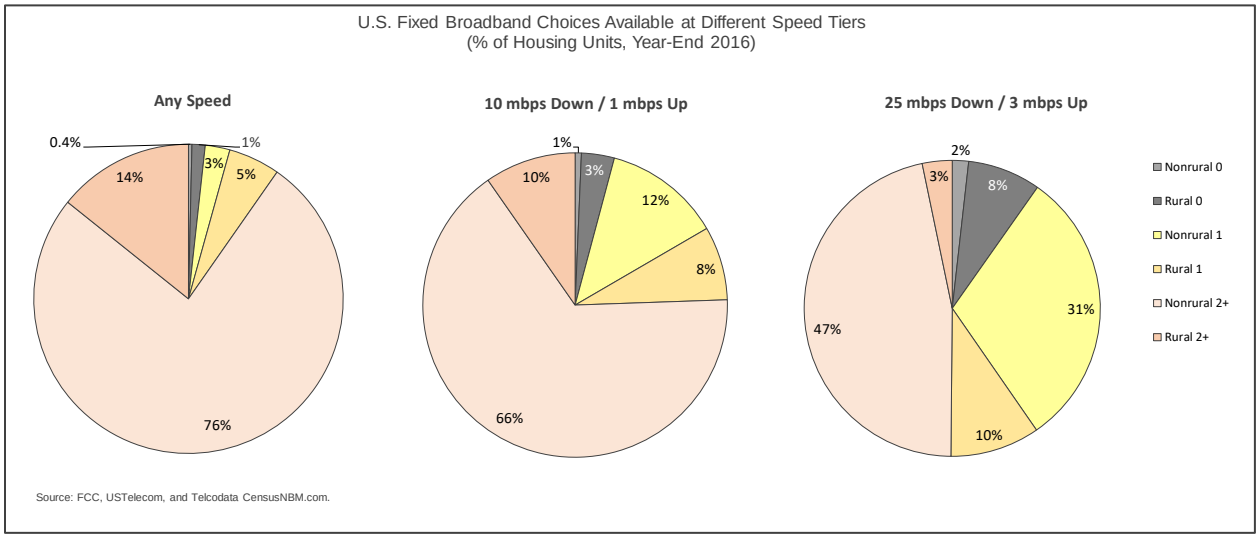


Chart 12



"The" Rural Broadband Gap?

Rural broadband is not monolithic. The data show that there is variation across rural areas in terms of deployment, speeds, and competition. While there are gaps in rural broadband, there is no single "rural broadband gap." Rather, gaps exist in specific rural areas either where broadband

is not available due to challenging economics or areas where there is only one provider and either demand, industry technology trends, or subsidies are not driving sufficient upgrades.

Nearly 55 percent of rural areas, where 11 percent of Americans reside, had two or more wired networks deployed, as of year-end 2016. Almost 34 percent of rural areas, where 7 percent of Americans reside, had just one wired provider. Combined with those areas that had two or more providers, almost 89 percent of rural Americans had at least one wired provider available to them. Of these, 75 percent could get services at 10 mbps DL and 1 mbps UL; 62 percent could get service at 25 mbps DL and 3 mbps UL; and 39 percent could get service at 100 mbps DL and 10 mbps UL. See Chart 6. Including fixed wireless and relaxing the upload requirement, these figures rise to 85 percent for 10 mbps DL; 71 percent for 25 mbps DL; and 51 percent for 100 mbps DL. See Appendix B.

The remainder may be unserved, depending on technology assumptions. Almost 14 percent of rural areas where three percent of Americans reside did not have a wired broadband option as of year-end 2016. This falls to less than 7 percent of rural areas, or less than 2 percent of all Americans, if fixed wireless is included in the analysis. The unserved portion falls to about two percent of rural areas and 0.4 percent of all Americans if 4G mobile wireless is included in the analysis, conservatively assuming nearly all uncovered areas for 4G mobile wireless are in rural America. Satellite eliminates the gap for all but the most extremely remote areas of the country if it is included in the analysis. The FCC has noted that latency – delays in data transmission arising from the distances between users and satellites – may affect perceived quality of real time interactive applications. However, satellite providers have recently deployed next generation satellites offering services that meet the FCC's current speed thresholds, and they may be able to accommodate real-time two-way communications. At minimum, in the very highest cost areas, satellite may be the most economical option for fixed broadband.

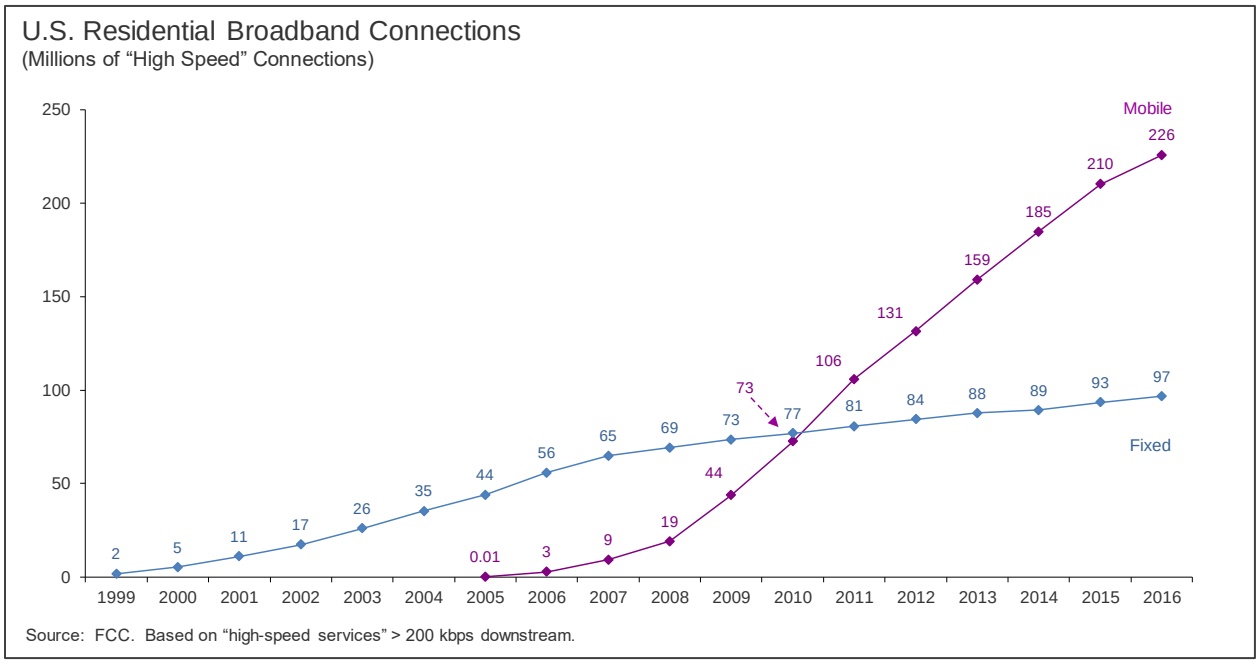
USTelecom believes that every American should have the opportunity to connect to the internet through sufficiently robust broadband service. For some areas, this requires government support. The FCC's Connect America Fund provides a good starting point. Further progress will require additional funding. Policies must be targeted, flexible, and efficient. Policies should target support to specific areas where the economics do not support deployment or upgrades; and governments must not fund wasteful, duplicative overbuilding of existing facilities. Policies must also be sufficiently flexible to allow for the most cost effective solutions rather than adhering to rigid technology or speed requirements. Finally, it is essential that funding be dedicated and direct, using a mechanism like the Connect America Fund, for the most economically and administratively efficient distribution of funds.

Mobile-Fixed Broadband Substitution

It is early in the evolution of wireless broadband to draw hard conclusions about substitution between fixed and mobile broadband services. Mobile broadband adoption is growing faster than fixed broadband adoption. See Chart 13. Fourth generation wireless services offer speeds on par with many wired broadband services, and fifth generation (5G) wireless promises significantly greater speeds. Americans are consuming more high-bandwidth services, especially video, on mobile devices and the major wireless providers are investing in fixed wireless services as a

potential fixed line alternative. There is also evidence that at least some consumers are choosing mobile broadband only, and that a portion of those consumer have a choice of fixed broadband provider. This cohort may grow significantly with the deployment of 5G wireless in the coming years, including both mobile and fixed wireless services. It will be critical for government to monitor such developments and to adjust policy should the trend toward substitution of wireless for wireline broadband gain momentum. As with voice telephony, broadband wireless-only users have started out slowly. Yet, the portion of U.S. households who rely on wireless-only telephone service has grown from 3 percent in 2003 to 53 percent as of 2016.

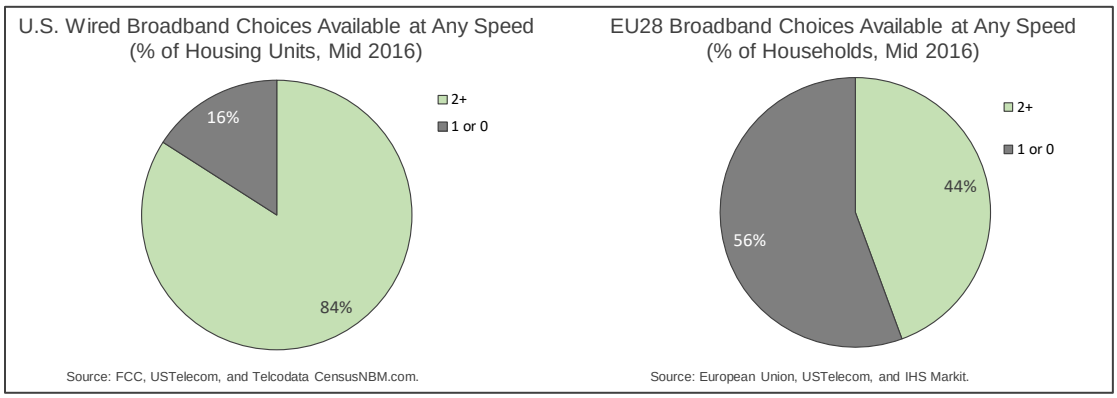
Chart 13



U.S. and European Broadband Availability

According to European Union data, U.S. consumers enjoy greater competitive choice among facilities-based wired broadband providers than their counterparts in Europe. As detailed above, as of year-end 2016, wired broadband from two or more providers was available to 86 percent of Americans. Data for Europe are available for mid-2016 only. Therefore, Chart 14 compares U.S. and European competitive availability for the same period. As of mid-2016, wired broadband from two or more providers was available to 84 percent of housing units in the U.S. By contrast, as of mid-2016, wired broadband from two or more providers was available to an estimated 44 percent of households in the EU's 28 member states (EU28), assuming that telecom providers cover most of Union and the cable footprint largely overlaps these providers.

Chart 14



Conclusion

As of year-end 2016, 97 percent of Americans had at least one wired broadband infrastructure available to them – 98 percent, if fixed wireless is included in the analysis. Moreover, there are competing wired broadband infrastructures in 86 percent of the country – 90 percent, if fixed wireless is included in the analysis. Nearly all Americans could get broadband service via mobile wireless and satellite.

While the FCC 477 data are not perfect, they are the best available and the risk of overstatement is minimal at broad geographic levels of aggregation. These broadband availability data highlight that U.S. broadband providers continue to deploy and upgrade networks rapidly, bringing the vast majority of consumers across the nation ever-faster service and choice in a reasonable and timely fashion. There is no paucity of competition, and there is no systemic market failure when it comes to deploying broadband in the U.S.

The presence of facilities-based competition is spurring ongoing investment in network upgrades across the nation, and as a result, both fixed and mobile broadband speeds are growing. Statistical market snapshots that arbitrarily understate the extent of broadband availability and competition are analytically deficient and can generate bad policy decisions. With respect to rural areas, there is not a monolithic broadband gap, but a range of areas that do not have sufficient broadband available to them. Policies must be targeted, addressing specific problem areas, and must be flexible to allow for economically efficient solutions. Moreover, to ensure both economic and administrative efficiency, governments must distribute any public funds for rural broadband deployment directly to providers through mechanisms such as the FCC's Connect America Fund.

Methodology

Data and Analysis

USTelecom worked with its consultant, Telecodata, to produce this research. Telcodata's broadband research service, CensusNBM (CensusNBM.com), compiled the data for this analysis by combining the Federal Communications Commission's (FCC) broadband availability and US Census housing unit data that is filed at the granular census block detail level and then consistently aggregated by Telcodata analysts to produce statistics for all 50 states plus DC. CensusNBM uses the 2010 Census, the last period that the Bureau produced a full tabulation of housing units, households, and population. For mapping and compatibility purposes, CensusNBM computed the broadband availability and Census information at the census block level in order to produce consistent broadband availability ratios. Census housing units and households track very closely, but housing units is a broader measure: it includes occupied homes, vacant homes and vacation homes; the household measure would include only occupied housing units.

The FCC has reported broadband availability data semi-annually using data collected using its Form 477 since year-end 2014. The most current FCC data available – and the data in this analysis – are for year-end 2016. The FCC reports broadband availability at the census block level by provider and by technology type, with maximum download/upload speeds.

The FCC reports the following fixed technology categories based on its Form 477 data collection:

- Asymmetric xDSL
- ADSL2
- VDSL
- Symmetric xDSL
- Copper
- Fiber
- Cable DOCSIS 3.1
- Cable DOCSIS 3.0
- Cable DOCSIS 1 - 1.1 - 2.0
- Cable Other
- Terrestrial Fixed Wireless
- Satellite

To enable certain analyses at higher levels than possible with the FCC-reported technology categories, CensusNBM created several broader groupings using. For example, CensusNBM created categories for all Cable technologies and all DSL technologies. It also created categories for Any Wired Technology except Cable – a category intended in include all wireline telecommunications provers; Any Wired Technology, which includes wireline telecommunications and cable providers; and Any Fixed Technology except Satellite, which combined Any Wired Technology and Terrestrial Fixed Wireless categories.

The following list represents the hierarchy of fixed broadband groupings and sub-groupings (see Appendices):

- Any Fixed Technology except Satellite
  - Any Wired Technology
    - Any Wired Technology except Cable
      - DSL
        - > Asymmetric xDSL
        - > ADSL2
        - > VDSL
        - > Symmetric xDSL
      - Copper
      - Fiber
    - Cable
      - DOCSIS 3.1
      - DOCSIS 3.0
      - DOCSIS 1 - 1.1 - 2.0
      - Cable Other
  - Terrestrial Fixed Wireless
- Satellite

The process for creating the broader categories eliminates duplication when appropriate, such as instances where a single provider reported multiple technologies in the same area, or where multiple types of providers in a broader category reported facilities in the same area. For example, since the FCC's Form 477 requires ISPs to record each broadband technology in a census block and its associated download/upload speeds, there can be duplicate records for a single provider. Therefore, when calculating the number of housing units with "Any Wired Technology except Cable" as a category, CensusNMB counts the number of housing units in census blocks where a single ISP reports both DSL and Fiber just one time – not once for fiber and once for DSL. Similarly, when calculating the number of housing units with "Any Wired Technology" as a category, CensusNBM counts the number of housing units in census blocks where both wireline telecommunications and cable operators report facilities just one time.

History

The National Telecommunications and Information Administration (NTIA) collected broadband availability data semi-annually for the "national broadband map" from mid-2010 to mid-2014. Those data are similar to, but not the same as, the broadband availability data the FCC collects using its Form 477. As a result, it is not possible to produce precise consistent time series between the NTIA data and the FCC data; but it is possible to create some rough comparisons over time using high-level data.

As part of the national broadband map, NTIA produced several reports detailing results by discrete technology and speed categories. Thus far, the FCC has released a great deal of raw data, and has used selected data in its Section 706 broadband deployment reports, but has not provided reports similar to those NTIA previously provided. USTelecom worked with

CensusNBM to develop several reports similar to, though not identical, to the NTIA technology and speed reports. See Appendixes.

With the FCC data, CensusNBM has flexibility to create speed tiers, technology aggregates, and other reports. It does not have as much flexibility with the NTIA data. Below is a discussion of some of the relevant differences between the NTIA and the FCC data.

- The NTIA only provided speed data in ranges, such as "1.5 mbps to 3.0 mbps." Certain speed thresholds that have become standards, like upload speeds "greater than 1.0 mbps" are not possible to ascertain with the NTIA data. In contrast, the current FCC 477 data specifies unique maximum advertised speeds, such as "1.0 Mbps." With such data points, as opposed to pre-defined ranges, it is possible for CensusNBM to create its own ranges or thresholds.
- The FCC 477 report identifies residential and business census blocks and further differentiates residential maximum advertised speeds from business/government maximum contracted speeds. Since the NTIA filings did not distinguish residential from business advertised speeds any comparison over time between the NTIA and FCC are not precisely compatible. Since the NTIA data also include business broadband deployment, earlier data will show relatively higher broadband availability results than the FCC 477 at comparable maximum advertised speeds.
- The NTIA data has only seven categories of fixed technologies, while the FCC data has 11.
- Unlike NTIA, the FCC data treats mobile wireless broadband differently than fixed broadband, so it is now not possible to report mobile data in the same manner as fixed broadband.

Geography

These data are national (50 states plus DC) with breakouts for rural and non-rural areas based on Census classification of census blocks. In terms of housing units, approximately 79 percent are in non-rural areas and 21 percent are in rural areas.

Appendix A – Year-End 2016 Broadband Availability by Housing Units, Download and Upload

US Broadaband Availability by Technology and Speed, Year-End 2016, Selected Download and Upload Speeds (Percentage of Housing Units)

All Areas

Technology	Total HU Any Speed	Total HU > 768 K DL / 200 K UL	Total HU > 3 M DL / 768 K UL	Total HU > 10 M DL / 1 M UL	Total HU > 25 M DL / 3 M UL	Total HU > 50 M DL / 5 M UL	Total HU > 100 M DL / 10 M UL	Total HU >1 gbps DL
Any Fixed Technology Except Satellite	98.3%	98.2%	97.6%	95.9%	92.0%	90.4%	74.4%	11.5%
Any Wired Technology	96.5%	96.3%	95.4%	93.5%	90.2%	89.4%	73.7%	10.7%
Any Wired Technology Except Cable	92.3%	91.8%	85.2%	70.9%	51.1%	42.3%	23.6%	7.3%
DSL	86.9%	86.4%	77.7%	57.2%	31.3%	23.2%	4.6%	0.1%
Asymmetric xDSL	64.9%	63.9%	50.8%	14.9%	3.8%	1.6%	0.2%	0.1%
ADSL2	34.2%	33.6%	28.5%	20.0%	1.8%	0.1%	0.0%	0.0%
VDSL	35.7%	35.7%	33.3%	31.6%	27.5%	21.5%	4.3%	0.0%
Symmetric xDSL	0.8%	0.8%	0.3%	0.3%	0.1%	0.1%	0.1%	0.0%
Copper	2.2%	2.2%	2.2%	2.1%	0.5%	0.3%	0.3%	0.0%
Fiber	26.4%	26.4%	26.0%	25.6%	24.7%	21.3%	19.6%	7.3%
Cable	88.0%	87.9%	87.9%	87.8%	87.2%	86.7%	70.0%	3.5%
DOCSIS 3.1	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
DOCSIS 3.0	86.9%	86.9%	86.9%	86.9%	86.5%	86.2%	69.6%	3.2%
DOCSIS 1 - 1.1 - 2.0	1.8%	1.8%	1.7%	1.6%	1.2%	0.4%	0.3%	0.0%
Cable Other	1.1%	1.1%	1.1%	1.1%	1.0%	0.8%	0.6%	0.2%
Terrestrial Fixed Wireless	37.5%	37.1%	34.9%	30.9%	19.5%	11.8%	6.0%	0.9%
Satellite	100.0%	100.0%	100.0%	100.0%	56.8%	0.0%	0.0%	0.0%

Rural Areas

Technology	Rural HU Any Speed	Rural HU > 768 K DL / 200 K UL	Rural HU > 3 M DL / 768 K UL	Rural HU > 10 M DL / 1 M UL	Rural HU > 25 M DL / 3 M UL	Rural HU > 50 M DL / 5 M UL	Rural HU > 100 M DL / 10 M UL	Rural HU >1 gbps DL
Any Fixed Technology Except Satellite	93.5%	93.1%	90.4%	83.5%	68.5%	63.3%	40.2%	8.5%
Any Wired Technology	86.5%	85.5%	81.9%	74.5%	62.0%	59.9%	38.5%	8.4%
Any Wired Technology Except Cable	79.1%	77.5%	69.1%	52.0%	25.2%	22.2%	12.2%	6.3%
DSL	74.2%	72.5%	63.2%	44.0%	14.3%	11.6%	2.3%	0.0%
Asymmetric xDSL	48.4%	46.4%	36.5%	12.7%	4.3%	3.8%	0.4%	0.0%
ADSL2	43.3%	41.5%	35.9%	25.3%	0.9%	0.2%	0.0%	0.0%
VDSL	17.4%	17.4%	15.7%	14.4%	9.4%	7.6%	1.7%	0.0%
Symmetric xDSL	0.9%	0.9%	0.7%	0.5%	0.3%	0.2%	0.2%	0.0%
Copper	1.1%	1.1%	1.1%	0.9%	0.4%	0.4%	0.4%	0.0%
Fiber	14.5%	14.5%	14.3%	14.2%	13.1%	12.2%	10.6%	6.2%
Cable	53.3%	53.1%	53.0%	52.7%	51.1%	50.1%	31.0%	2.3%
DOCSIS 3.1	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
DOCSIS 3.0	51.3%	51.3%	51.3%	51.1%	50.1%	49.4%	30.5%	2.2%
DOCSIS 1 - 1.1 - 2.0	2.0%	2.0%	1.8%	1.6%	0.8%	0.7%	0.4%	0.0%
Cable Other	1.3%	1.3%	1.2%	1.2%	1.0%	0.8%	0.6%	0.2%
Terrestrial Fixed Wireless	41.3%	40.9%	35.3%	28.1%	15.1%	7.4%	3.6%	0.0%
Satellite	100.0%	100.0%	100.0%	100.0%	43.8%	0.0%	0.0%	0.0%

Nonrural Areas

Technology	Nonrural HU Any Speed	Nonrural HU > 768 K DL / 200 K UL	Nonrural HU > 3 M DL / 768 K UL	Nonrural HU > 10 M DL / 1 M UL	Nonrural HU > 25 M DL / 3 M UL	Nonrural HU > 50 M DL / 5 M UL	Nonrural HU > 100 M DL / 10 M UL	Nonrural HU >1 gbps DL
Any Fixed Technology Except Satellite	99.6%	99.6%	99.5%	99.2%	98.2%	97.6%	83.5%	12.3%
Any Wired Technology	99.2%	99.2%	99.0%	98.6%	97.8%	97.3%	83.1%	11.2%
Any Wired Technology Except Cable	95.9%	95.6%	89.5%	75.9%	58.0%	47.7%	26.6%	7.6%
DSL	90.3%	90.1%	81.6%	60.7%	35.9%	26.2%	5.2%	0.1%
Asymmetric xDSL	69.2%	68.6%	54.7%	15.5%	3.7%	1.0%	0.1%	0.1%
ADSL2	31.7%	31.5%	26.5%	18.6%	2.0%	0.0%	0.0%	0.0%
VDSL	40.6%	40.6%	37.9%	36.2%	32.3%	25.2%	5.1%	0.0%
Symmetric xDSL	0.7%	0.7%	0.2%	0.2%	0.1%	0.0%	0.0%	0.0%
Copper	2.6%	2.6%	2.5%	2.5%	0.5%	0.3%	0.2%	0.1%
Fiber	29.6%	29.6%	29.1%	28.7%	27.7%	23.7%	22.0%	7.6%
Cable	97.3%	97.2%	97.2%	97.2%	96.8%	96.5%	80.4%	3.9%
DOCSIS 3.1	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
DOCSIS 3.0	96.4%	96.4%	96.4%	96.4%	96.2%	96.0%	80.0%	3.4%
DOCSIS 1 - 1.1 - 2.0	1.7%	1.7%	1.6%	1.6%	1.3%	0.3%	0.2%	0.0%
Cable Other	1.1%	1.1%	1.1%	1.1%	1.0%	0.8%	0.6%	0.2%
Terrestrial Fixed Wireless	36.4%	36.1%	34.8%	31.6%	20.7%	13.0%	6.6%	1.2%
Satellite	100.0%	100.0%	100.0%	100.0%	60.3%	0.0%	0.0%	0.0%

Source: FCC, USTelecom, and Telcodata CensusNBM.com

Appendix B – Year-End 2016 Broadband Availability by Housing Units, Download Only

US Broadaband Availability by Technology and Speed, Year-End 2016, Download Speeds Only (Percentage of Housing Units)

All Areas

Technology	Total HU Any Speed	Total HU >768 kbps DL	Total HU >1.5 mbps DL	Total HU >3 mbps DL	Total HU >6 mbps DL	Total HU >10 mbps DL	Total HU >25 mbps DL	Total HU >50 mbps DL	Total HU >100 mbps DL	Total HU >1 gbps DL
Any Fixed Technology Except Satellite	98.3%	98.3%	97.9%	97.7%	97.1%	96.2%	92.6%	90.7%	83.2%	11.5%
Any Wired Technology	96.5%	96.5%	96.0%	95.7%	95.1%	94.0%	91.0%	89.8%	82.7%	10.7%
Any Wired Technology Except Cable	92.3%	92.3%	87.0%	85.6%	82.4%	72.2%	54.6%	43.0%	24.3%	7.3%
DSL	86.9%	86.9%	80.9%	78.3%	72.3%	58.8%	35.3%	23.9%	5.2%	0.1%
Asymmetric xDSL	64.9%	64.5%	54.7%	51.6%	44.8%	15.2%	4.5%	1.7%	0.8%	0.1%
ADSL2	34.2%	34.1%	29.7%	28.9%	26.7%	21.7%	6.9%	0.1%	0.0%	0.0%
VDSL	35.7%	35.7%	33.3%	33.3%	33.3%	31.7%	29.0%	22.2%	4.3%	0.0%
Symmetric xDSL	0.8%	0.8%	0.7%	0.3%	0.3%	0.3%	0.1%	0.1%	0.1%	0.0%
Copper	2.2%	2.2%	2.2%	2.2%	2.2%	2.1%	0.5%	0.3%	0.3%	0.0%
Fiber	26.4%	26.4%	26.0%	26.0%	25.9%	25.6%	24.7%	21.4%	19.8%	7.3%
Cable	88.0%	88.0%	88.0%	88.0%	87.9%	87.8%	87.4%	87.0%	79.9%	3.5%
DOCSIS 3.1	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
DOCSIS 3.0	86.9%	86.9%	86.9%	86.9%	86.9%	86.9%	86.6%	86.4%	79.5%	3.2%
DOCSIS 1 - 1.1 - 2.0	1.8%	1.8%	1.7%	1.7%	1.6%	1.6%	1.2%	0.4%	0.3%	0.0%
Cable Other	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.0%	0.9%	0.7%	0.2%
Terrestrial Fixed Wireless	37.5%	37.1%	35.3%	35.1%	33.2%	30.9%	19.5%	11.8%	6.1%	0.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	56.8%	0.0%	0.0%	0.0%

Rural Areas

Technology	Any Speed	>768 kbps DL	>1.5 mbps DL	>3 mbps DL	>6 mbps DL	>10 mbps DL	>25 mbps DL	>50 mbps DL	>100 mbps DL	>1 gbps DL
Any Fixed Technology Except Satellite	93.5%	93.4%	91.9%	91.1%	88.6%	85.0%	70.9%	64.1%	50.8%	8.5%
Any Wired Technology	86.5%	86.4%	84.2%	82.9%	80.7%	76.6%	64.7%	60.8%	49.2%	8.4%
Any Wired Technology Except Cable	79.1%	79.0%	73.0%	70.6%	65.8%	56.0%	30.9%	22.7%	14.0%	6.3%
DSL	74.2%	74.1%	67.7%	64.9%	59.2%	48.4%	20.5%	12.0%	4.0%	0.0%
Asymmetric xDSL	48.4%	48.0%	41.3%	38.0%	31.9%	13.3%	5.3%	3.9%	2.1%	0.0%
ADSL2	43.3%	43.2%	37.9%	37.0%	35.0%	29.9%	7.7%	0.2%	0.0%	0.0%
VDSL	17.4%	17.4%	16.0%	15.9%	15.8%	14.6%	11.1%	7.9%	1.7%	0.0%
Symmetric xDSL	0.9%	0.9%	0.8%	0.7%	0.5%	0.5%	0.3%	0.2%	0.2%	0.0%
Copper	1.1%	1.1%	1.1%	1.1%	1.0%	0.9%	0.4%	0.4%	0.4%	0.0%
Fiber	14.5%	14.5%	14.3%	14.3%	14.3%	14.2%	13.2%	12.4%	11.0%	6.2%
Cable	53.3%	53.3%	53.3%	53.2%	52.9%	52.7%	51.6%	50.8%	42.0%	2.3%
DOCSIS 3.1	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
DOCSIS 3.0	51.3%	51.3%	51.3%	51.3%	51.2%	51.1%	50.6%	49.9%	41.5%	2.2%
DOCSIS 1 - 1.1 - 2.0	2.0%	2.0%	2.0%	2.0%	1.7%	1.6%	0.8%	0.7%	0.4%	0.0%
Cable Other	1.3%	1.3%	1.3%	1.2%	1.2%	1.2%	1.0%	0.9%	0.7%	0.2%
Terrestrial Fixed Wireless	41.3%	40.9%	36.3%	35.9%	31.5%	28.2%	15.1%	7.4%	3.7%	0.0%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	43.8%	0.0%	0.0%	0.0%

Nonrural Areas

Technology	Any Speed	>768 kbps DL	>1.5 mbps DL	>3 mbps DL	>6 mbps DL	>10 mbps DL	>25 mbps DL	>50 mbps DL	>100 mbps DL	>1 gbps DL
Any Fixed Technology Except Satellite	99.6%	99.6%	99.5%	99.5%	99.4%	99.2%	98.4%	97.8%	91.8%	12.3%
Any Wired Technology	99.2%	99.2%	99.1%	99.1%	99.0%	98.6%	97.9%	97.5%	91.6%	11.2%
Any Wired Technology Except Cable	95.9%	95.8%	90.7%	89.7%	86.8%	76.5%	60.8%	48.4%	27.0%	7.6%
DSL	90.3%	90.3%	84.4%	81.9%	75.8%	61.6%	39.3%	27.0%	5.6%	0.1%
Asymmetric xDSL	69.2%	68.8%	58.3%	55.2%	48.3%	15.7%	4.3%	1.1%	0.5%	0.1%
ADSL2	31.7%	31.7%	27.6%	26.7%	24.5%	19.6%	6.6%	0.1%	0.0%	0.0%
VDSL	40.6%	40.6%	38.0%	38.0%	37.9%	36.2%	33.7%	26.0%	5.1%	0.0%
Symmetric xDSL	0.7%	0.7%	0.7%	0.2%	0.2%	0.2%	0.1%	0.0%	0.0%	0.0%
Copper	2.6%	2.6%	2.5%	2.5%	2.5%	2.5%	0.5%	0.3%	0.2%	0.1%
Fiber	29.6%	29.6%	29.1%	29.1%	29.0%	28.7%	27.8%	23.8%	22.1%	7.6%
Cable	97.3%	97.3%	97.2%	97.2%	97.2%	97.2%	96.9%	96.7%	90.0%	3.9%
DOCSIS 3.1	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
DOCSIS 3.0	96.4%	96.4%	96.4%	96.4%	96.4%	96.4%	96.2%	96.1%	89.6%	3.4%
DOCSIS 1 - 1.1 - 2.0	1.7%	1.7%	1.7%	1.7%	1.6%	1.6%	1.3%	0.3%	0.2%	0.0%
Cable Other	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.0%	1.0%	0.7%	0.2%
Terrestrial Fixed Wireless	36.4%	36.1%	35.0%	34.9%	33.7%	31.7%	20.7%	13.0%	6.8%	1.2%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	60.3%	0.0%	0.0%	0.0%

Source: FCC, USTelecom, and Telcodata CensusNBM.com

Appendix C – Year-End 2016 Broadband Availability by Population, Download and Upload

US Broadaband Availability by Technology and Speed, Year-End 2016, Selected Download and Upload Speeds (Percentage of Population)

All Areas

Technology	Total Pop Any Speed	Total Pop > 768 K DL / 200 K UL	Total Pop > 3 M DL / 768 K UL	Total Pop > 10 M DL / 1 M UL	Total Pop > 25 M DL / 3 M UL	Total Pop > 50 M DL / 5 M UL	Total Pop > 100 M DL / 10 M UL	Total Pop >1 gbps DL
Any Fixed Technology Except Satellite	98.5%	98.4%	97.8%	96.3%	92.6%	91.1%	75.6%	11.3%
Any Wired Technology	96.8%	96.5%	95.7%	93.9%	90.9%	90.1%	75.0%	10.5%
Any Wired Technology Except Cable	92.6%	92.1%	85.5%	73.7%	52.3%	43.0%	23.8%	7.2%
DSL	87.0%	86.5%	77.7%	57.1%	32.2%	23.5%	4.5%	0.1%
Asymmetric xDSL	65.3%	64.4%	51.7%	14.8%	4.1%	1.6%	0.2%	0.1%
ADSL2	33.2%	32.7%	27.9%	19.2%	1.9%	0.1%	0.0%	0.0%
VDSL	36.4%	36.4%	34.0%	32.2%	28.1%	21.9%	4.3%	0.0%
Symmetric xDSL	0.8%	0.8%	0.3%	0.2%	0.1%	0.1%	0.1%	0.0%
Copper	2.1%	2.1%	2.1%	2.0%	0.4%	0.2%	0.2%	0.0%
Fiber	27.0%	27.0%	26.6%	26.2%	25.3%	21.7%	20.0%	7.2%
Cable	88.8%	88.8%	88.8%	88.7%	88.1%	87.7%	71.5%	3.5%
DOCSIS 3.1	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
DOCSIS 3.0	87.8%	87.8%	87.8%	87.8%	87.4%	87.1%	71.1%	3.1%
DOCSIS 1 - 1.1 - 2.0	1.5%	1.5%	1.5%	1.4%	1.0%	0.3%	0.2%	0.0%
Cable Other	1.1%	1.1%	1.1%	1.1%	1.0%	0.8%	0.6%	0.2%
Terrestrial Fixed Wireless	37.8%	37.5%	35.7%	31.6%	19.9%	12.1%	5.9%	0.9%
Satellite	100.0%	100.0%	100.0%	100.0%	57.3%	0.0%	0.0%	0.0%

Rural Areas

Technology	Rural Pop Any Speed	Rural Pop > 768 K DL / 200 K UL	Rural Pop > 3 M DL / 768 K UL	Rural Pop > 10 M DL / 1 M UL	Rural Pop > 25 M DL / 3 M UL	Rural Pop > 50 M DL / 5 M UL	Rural Pop > 100 M DL / 10 M UL	Rural Pop >1 gbps DL
Any Fixed Technology Except Satellite	94.1%	93.7%	91.2%	84.5%	69.8%	64.6%	41.5%	8.5%
Any Wired Technology	86.9%	86.0%	82.4%	75.0%	63.0%	61.0%	39.7%	8.5%
Any Wired Technology Except Cable	79.5%	77.8%	69.2%	51.9%	25.4%	22.4%	12.2%	6.2%
DSL	74.6%	72.8%	63.3%	43.8%	14.4%	11.7%	2.2%	0.0%
Asymmetric xDSL	48.9%	46.9%	38.2%	12.7%	4.3%	3.8%	0.4%	0.0%
ADSL2	43.0%	41.2%	36.4%	24.7%	0.9%	0.2%	0.0%	0.0%
VDSL	17.7%	17.7%	16.1%	14.4%	9.5%	7.7%	1.7%	0.0%
Symmetric xDSL	0.9%	0.8%	0.6%	0.5%	0.2%	0.2%	0.2%	0.0%
Copper	1.0%	1.0%	1.0%	0.9%	0.4%	0.4%	0.4%	0.0%
Fiber	14.6%	14.6%	14.4%	14.2%	13.1%	12.2%	10.6%	6.1%
Cable	54.6%	54.6%	54.4%	54.0%	52.5%	51.6%	32.5%	2.5%
DOCSIS 3.1	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
DOCSIS 3.0	52.6%	52.6%	52.6%	52.5%	51.5%	50.8%	32.0%	2.3%
DOCSIS 1 - 1.1 - 2.0	2.0%	2.0%	1.9%	1.5%	0.8%	0.7%	0.4%	0.0%
Cable Other	1.3%	1.3%	1.3%	1.2%	1.0%	0.8%	0.6%	0.2%
Terrestrial Fixed Wireless	42.4%	42.0%	37.3%	29.4%	15.9%	7.9%	3.7%	0.0%
Satellite	100.0%	100.0%	100.0%	100.0%	43.5%	0.0%	0.0%	0.0%

Nonrural Areas

Technology	Nonrural Pop Any Speed	Nonrural Pop > 768 K DL / 200 K UL	Nonrural Pop > 3 M DL / 768 K UL	Nonrural Pop > 10 M DL / 1 M UL	Nonrural Pop > 25 M DL / 3 M UL	Nonrural Pop > 50 M DL / 5 M UL	Nonrural Pop > 100 M DL / 10 M UL	Nonrural Pop >1 gbps DL
Any Fixed Technology Except Satellite	99.5%	99.5%	99.4%	99.1%	98.0%	97.4%	83.7%	12.0%
Any Wired Technology	99.1%	99.1%	98.9%	98.4%	97.5%	97.1%	83.4%	11.0%
Any Wired Technology Except Cable	95.7%	95.5%	89.3%	78.9%	58.8%	47.9%	26.6%	7.5%
DSL	90.0%	89.7%	81.1%	60.3%	36.5%	26.3%	5.0%	0.1%
Asymmetric xDSL	69.2%	68.5%	55.0%	15.3%	4.1%	1.0%	0.1%	0.1%
ADSL2	30.9%	30.6%	25.9%	17.9%	2.2%	0.0%	0.0%	0.0%
VDSL	40.9%	40.9%	38.3%	36.5%	32.5%	25.3%	4.9%	0.0%
Symmetric xDSL	0.8%	0.8%	0.2%	0.2%	0.1%	0.0%	0.0%	0.0%
Copper	2.3%	2.3%	2.3%	2.3%	0.4%	0.2%	0.2%	0.0%
Fiber	29.9%	29.9%	29.5%	29.1%	28.2%	23.9%	22.2%	7.4%
Cable	97.0%	97.0%	97.0%	96.9%	96.6%	96.3%	80.8%	3.7%
DOCSIS 3.1	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
DOCSIS 3.0	96.2%	96.2%	96.2%	96.2%	96.0%	95.8%	80.4%	3.3%
DOCSIS 1 - 1.1 - 2.0	1.4%	1.4%	1.4%	1.4%	1.1%	0.3%	0.2%	0.0%
Cable Other	1.1%	1.1%	1.1%	1.1%	1.0%	0.9%	0.6%	0.2%
Terrestrial Fixed Wireless	36.7%	36.5%	35.3%	32.1%	20.9%	13.1%	6.4%	1.1%
Satellite	100.0%	100.0%	100.0%	100.0%	60.6%	0.0%	0.0%	0.0%

Source: FCC, USTelecom, and Telcodata CensusNBM.com

Appendix D – Year-End 2016 Broadband Availability by Population, Download Only

US Broadaband Availability by Technology and Speed, Year-End 2016, Download Speeds Only (Percentage of Population)

All Areas

Technology	Total Pop Any Speed	Total Pop >768 kbps DL	Total Pop >1.5 mbps DL	Total Pop >3 mbps DL	Total Pop >6 mbps DL	Total Pop >10 mbps DL	Total Pop >25 mbps DL	Total Pop >50 mbps DL	Total Pop >100 mbps DL	Total Pop >1 gbps DL
Any Fixed Technology Except Satellite	98.5%	98.4%	98.1%	98.0%	97.4%	96.6%	93.2%	91.4%	84.3%	11.3%
Any Wired Technology	96.8%	96.7%	96.2%	95.9%	95.4%	94.3%	91.5%	90.4%	83.8%	10.5%
Any Wired Technology Except Cable	92.6%	92.6%	87.2%	85.9%	82.7%	72.5%	69.6%	43.6%	24.5%	7.2%
DSL	87.0%	87.0%	80.9%	78.3%	72.2%	58.6%	36.0%	24.1%	5.1%	0.1%
Asymmetric xDSL	65.3%	64.9%	54.9%	51.7%	44.8%	15.1%	4.8%	1.6%	0.8%	0.1%
ADSL2	33.2%	33.2%	28.8%	27.9%	25.8%	20.9%	6.6%	0.1%	0.0%	0.0%
VDSL	36.4%	36.4%	34.0%	34.0%	34.0%	32.3%	29.6%	22.5%	4.3%	0.0%
Symmetric xDSL	0.8%	0.8%	0.7%	0.3%	0.2%	0.2%	0.1%	0.1%	0.1%	0.0%
Copper	2.1%	2.1%	2.1%	2.1%	2.0%	2.0%	0.4%	0.2%	0.2%	0.0%
Fiber	27.0%	27.0%	26.6%	26.6%	26.5%	26.2%	25.3%	21.7%	20.1%	7.2%
Cable	88.8%	88.8%	88.8%	88.8%	88.7%	88.7%	88.2%	87.9%	81.3%	3.5%
DOCSIS 3.1	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
DOCSIS 3.0	87.8%	87.8%	87.8%	87.8%	87.8%	87.8%	87.5%	87.3%	80.8%	3.1%
DOCSIS 1 - 1.1 - 2.0	1.5%	1.5%	1.5%	1.5%	1.4%	1.4%	1.0%	0.4%	0.2%	0.0%
Cable Other	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.0%	1.0%	0.7%	0.2%
Terrestrial Fixed Wireless	37.8%	37.5%	35.8%	35.7%	33.9%	31.6%	19.9%	12.1%	6.1%	0.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	57.3%	0.0%	0.0%	0.0%

Rural Areas

Technology	Any Speed	>768 kbps DL	>1.5 mbps DL	>3 mbps DL	>6 mbps DL	>10 mbps DL	>25 mbps DL	>50 mbps DL	>100 mbps DL	>1 gbps DL
Any Fixed Technology Except Satellite	94.1%	94.0%	92.5%	91.9%	89.4%	85.9%	72.0%	65.4%	52.0%	8.5%
Any Wired Technology	86.9%	86.8%	84.5%	83.3%	81.1%	77.1%	65.6%	61.8%	50.3%	8.5%
Any Wired Technology Except Cable	79.5%	79.3%	73.1%	70.6%	65.8%	55.8%	30.9%	22.9%	14.1%	6.2%
DSL	74.6%	74.4%	67.8%	64.9%	59.1%	48.1%	20.3%	12.1%	4.0%	0.0%
Asymmetric xDSL	48.9%	48.5%	41.5%	38.2%	32.1%	13.3%	5.4%	3.9%	2.1%	0.0%
ADSL2	43.0%	42.8%	37.4%	36.4%	34.4%	29.3%	7.4%	0.2%	0.0%	0.0%
VDSL	17.7%	17.7%	16.1%	16.1%	15.9%	14.6%	11.2%	8.0%	1.7%	0.0%
Symmetric xDSL	0.9%	0.8%	0.7%	0.6%	0.5%	0.5%	0.2%	0.2%	0.2%	0.0%
Copper	1.0%	1.0%	1.0%	1.0%	1.0%	0.9%	0.4%	0.4%	0.4%	0.0%
Fiber	14.6%	14.6%	14.4%	14.4%	14.3%	14.2%	13.2%	12.4%	11.0%	6.1%
Cable	54.6%	54.6%	54.6%	54.5%	54.2%	54.1%	53.0%	52.2%	43.4%	2.5%
DOCSIS 3.1	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
DOCSIS 3.0	52.6%	52.6%	52.6%	52.6%	52.5%	52.5%	52.0%	51.3%	42.8%	2.3%
DOCSIS 1 - 1.1 - 2.0	2.0%	2.0%	1.9%	1.9%	1.6%	1.5%	0.8%	0.7%	0.4%	0.0%
Cable Other	1.3%	1.3%	1.3%	1.3%	1.3%	1.2%	1.1%	1.0%	0.7%	0.2%
Terrestrial Fixed Wireless	42.4%	42.0%	37.8%	37.3%	32.9%	29.5%	15.9%	7.9%	3.9%	0.0%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	43.5%	0.0%	0.0%	0.0%

Nonrural Areas

Technology	Any Speed	>768 kbps DL	>1.5 mbps DL	>3 mbps DL	>6 mbps DL	>10 mbps DL	>25 mbps DL	>50 mbps DL	>100 mbps DL	>1 gbps DL
Any Fixed Technology Except Satellite	99.5%	99.5%	99.4%	99.4%	99.3%	99.1%	98.2%	97.6%	92.0%	12.0%
Any Wired Technology	99.1%	99.1%	99.0%	98.9%	98.8%	98.4%	97.7%	97.3%	91.8%	11.0%
Any Wired Technology Except Cable	95.7%	95.7%	90.6%	89.5%	86.7%	76.5%	78.9%	48.6%	27.0%	7.5%
DSL	90.0%	89.9%	84.0%	81.4%	75.3%	61.1%	39.7%	27.0%	5.4%	0.1%
Asymmetric xDSL	69.2%	68.8%	58.0%	55.0%	47.9%	15.5%	4.6%	1.0%	0.5%	0.1%
ADSL2	30.9%	30.9%	26.7%	25.9%	23.7%	18.9%	6.5%	0.1%	0.0%	0.0%
VDSL	40.9%	40.9%	38.3%	38.3%	38.3%	36.5%	33.9%	25.9%	4.9%	0.0%
Symmetric xDSL	0.8%	0.8%	0.7%	0.2%	0.2%	0.2%	0.1%	0.0%	0.0%	0.0%
Copper	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%	0.4%	0.2%	0.2%	0.0%
Fiber	29.9%	29.9%	29.5%	29.5%	29.4%	29.1%	28.2%	23.9%	22.3%	7.4%
Cable	97.0%	97.0%	97.0%	97.0%	97.0%	96.9%	96.7%	96.5%	90.3%	3.7%
DOCSIS 3.1	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
DOCSIS 3.0	96.2%	96.2%	96.2%	96.2%	96.2%	96.2%	96.0%	95.9%	89.9%	3.3%
DOCSIS 1 - 1.1 - 2.0	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%	1.1%	0.3%	0.2%	0.0%
Cable Other	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.0%	1.0%	0.7%	0.2%
Terrestrial Fixed Wireless	36.7%	36.5%	35.4%	35.3%	34.1%	32.1%	20.9%	13.1%	6.6%	1.1%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	60.6%	0.0%	0.0%	0.0%

Source: FCC, USTelecom, and Telcodata CensusNBM.com