

Consumer Usage Patterns and Attitudes of U.S. FTTH and Broadband Consumers

Prepared for the Fiber-to-the-Home Council North America
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About the Fiber-to-the-Home Council

Now in its ninth year, the Fiber-to-the-Home (FTTH) Council is a non-profit association consisting of companies and organizations that deliver video, Internet and/or voice services over high-bandwidth, next-generation, direct fiber optic connections - as well as those involved in planning and building FTTH networks. The Council works to create a cohesive group to share knowledge and build industry consensus on key issues surrounding fiber to the home. Its mission is to educate the public and government officials about FTTH solutions and to promote and accelerate deployment of fiber to the home and the resulting quality of life enhancements such networks make possible. The Council organizes North America's largest annual FTTH event, the [FTTH Conference & Expo](#), to be held September 12 - 16, 2010 in Las Vegas. More information about the Council can be found at www.ftthcouncil.org.

About RVA LLC

RVA LLC is a full service marketing research firm located in Tulsa, Oklahoma. Since 2002 RVA has conducted market research on the FTTH market and is considered the primary research authority on North American FTTH.

NOTE: A full set of 75 charts and slides related to this report is available for download to FTTH Members by [clicking here](#).

I. Executive Summary and Key Findings

With nearly five years of FTTH deployment across the U.S., advanced broadband has become clearly differentiated from other types of broadband. Based on RVA surveys, FTTH has both perceived and actual (empirically tested) statistically significant advantages over its alternatives. This is true even with the caveat that early users have not yet

generally demanded or utilized FTTH to its full potential – i.e. 100 Mbps symmetrical service (or higher).

Awareness Of FTTH

Many in the general public are still not aware of fiber to the home, but awareness of FTTH among these consumers is quickly increasing. General public awareness of FTTH is currently 41%, up from 28% in 2009.

Most consumers, even those who had not heard of FTTH prior to the survey, seem to understand the unique benefits of FTTH when explained briefly. Nearly half say they would switch to FTTH at price and service plans listed, which is fairly consistent with actual take-rates experienced by providers of FTTH services.

Also, based on the study, the presence of a FTTH connection in a home has a significant positive influence on home sales. Internet from a direct fiber connection is rated more important than a list of several other amenities when shopping for a new home.

Use of FTTH

The actual use of FTTH is also increasing. Just over 6% of all broadband users in the United States now use FTTH. A wide variety of potentially high bandwidth applications are currently accessed over fiber, led by shopping from home, gaming, and uploading large files. Advanced applications, such as two-way video conferencing, are also increasing in use.

Satisfaction with FTTH

Among FTTH users, satisfaction is much higher than consumer satisfaction with other types of broadband.

For data or Internet services, a total of 71% are very satisfied with FTTH, compared to 53% for cable modem and 52% for DSL. Satisfaction with HD TV performance, another

important benchmark, is also highest for FTTH. A total of 73% are very satisfied with FTTH HD services overall, 61% for satellite TV HD, and 45% for Cable TV HD.

Perceptual differences for some specific attributes, such as consistency of Internet speed and HD picture quality, show an even larger difference.

When FTTH users were asked an open-end question as to what they liked most about FTTH, Internet speed, video picture clarity, and consistency of results are clearly the three primary benefits of FTTH in the mind of the consumer.

Performance

Based on empirical measurements of performance, FTTH performs better than other types of broadband – and this performance gap is widening over time.

Based on consumer self-performed tests taken at home, FTTH currently has a median download speed of 16.6 and an upload speed of 4.5 Mbps. Based on speed tests conducted via RVA surveys since 2007, download speeds have increased 219% in three years, while upload speeds have increased 350%.

Compared to tests from consumers with other types of broadband, FTTH download speeds are currently 1.5 times faster than cable modem download speeds, and 5.7 times faster than the median DSL download speeds. In terms of upload speeds, FTTH is 3.2 times faster than cable modem, and 5.7 times faster than DSL.

FTTH service is also more stable and reliable than other forms of broadband, based on the reported number of reboots required monthly.

FTTH Societal Impact

FTTH is already making a difference in the way humans experience life and society. At a base level, one of the key objectives of broadband policy has always been to increase competition and reduce prices for consumers. FTTH is meeting these objectives. FTTH users report a 4% decrease in price for a similar package of services after moving to

FTTH from other broadband services. A total of 42% say competitors have offered lower prices since they migrated to FTTH.

But the societal impact from FTTH goes much further. FTTH is changing the way Americans live, work and play. FTTH users report working (on average) one additional day from home because of FTTH. According to the respondents, this is based on the Internet speed and reliability that FTTH enables. More work from home has wide-ranging implications for both economic efficiencies and environmental sustainability, particularly with regard to the impact of telecommuting on energy consumption, CO2 emissions, and transportation infrastructure. (The findings in this survey offer further evidence to support the conclusions of an FTTH Council commissioned study that was conducted by PricewaterhouseCoopers [PwC] in 2008, which predicted that upgrading America's telecommunications networks to end-to-end fiber will deliver substantial environmental benefits that will outweigh the costs of deployment in as little as six years. PwC predicted that FTTH will be a significant factor in reduction of carbon emissions and the greening of the North American economy within the next few years.) FTTH teleworkers themselves report saving both time and money, as well as being more productive.

A total of 13% of FTTH users report operating a home-based business, of which 75% are reportedly more efficient or wouldn't be possible without FTTH. Based on survey input regarding revenues received from home-based business, increased efficiencies from FTTH may already add as much as \$9.9 Billion to the US home-based business economy. A more thorough and complete review of RVA 2010 broadband studies follows.

II. Survey Methodology

In April/May 2010, RVA LLC conducted two surveys of broadband subscribers for the purpose of comparing consumer usage patterns and attitudes among and between fiber to the home (FTTH) subscribers and those who receive their broadband access services over

other technologies. The first survey included detailed interviews with more than 1,000 FTTH subscribers who were drawn from a national online panel of more than 50,000 consumers. Consumers were asked questions about the type of Internet used, and those who noted that they have direct fiber connections were given a much longer follow-up survey that included a detailed series of perceptual questions. These FTTH respondents were also asked to test and report their current Internet speeds (via www.speakeasy.net/speedtest).

A second survey was conducted among an online panel – exclusive of FTTH and dial-up users. This comparative sample, representing interviews with more than 600 DSL and cable modem, as well as other non-FTTH, broadband users, were asked questions similar to those in the fiber study.

Similar studies have been conducted by RVA among FTTH users for four years and other broadband users for two years, providing data and timelines for review and comparison of longer term trends.

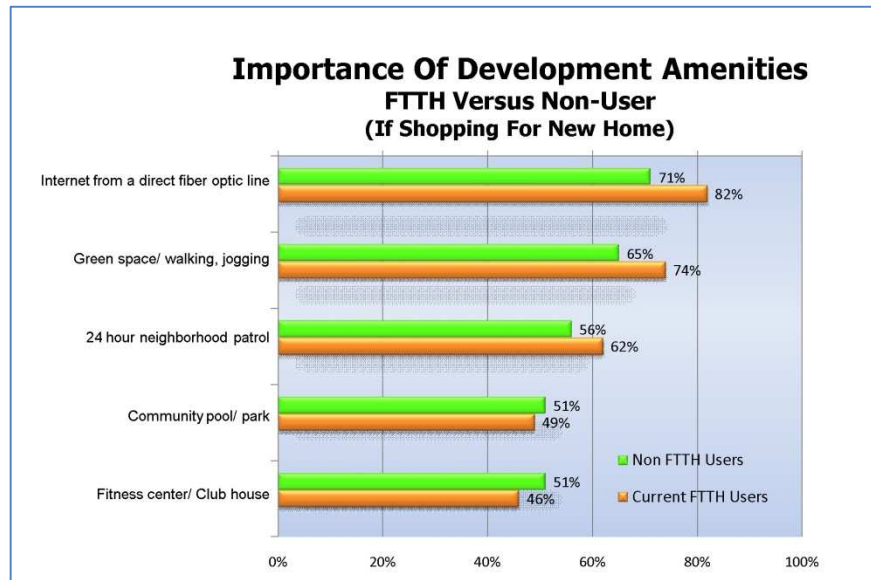
III. Review of Key Findings

A. FTTH Awareness and Interest

Broadband respondents that do not have FTTH were asked if they were aware of Fiber-to-the Home. A total of 41% said that they were aware of FTTH, up significantly from 28% in 2009.

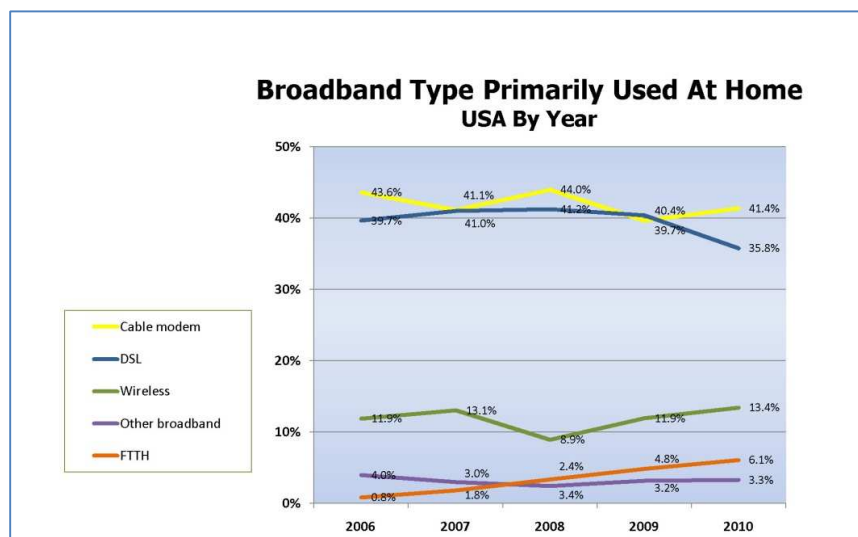
As in 2009, When the concept of FTTH was explained, a total of 46% said they would likely switch to this service if available at the price points expressed. A total of 6% said they would likely take 100Mbps symmetrical service for \$145 monthly, 16% 20 Mbps symmetrical service for \$60 a month, and 24% 10 Mbps symmetrical service for \$40.

At another point in the survey, respondents were given a list of five real estate development amenities and asked to rate their perception of the importance of those amenities in a housing development if purchasing a new home today. Fiber optic service from a direct fiber connection was rated as the most important amenity among all those tested. A total of 71% of non FTTH users and 82% of current FTTH users said that very high speed Internet from a fiber optic line would be an important factor in purchasing a new home. Internet from a direct fiber optic line beat other amenities such as green spaces, security patrols, community parks and fitness centers.



B. Broadband Use

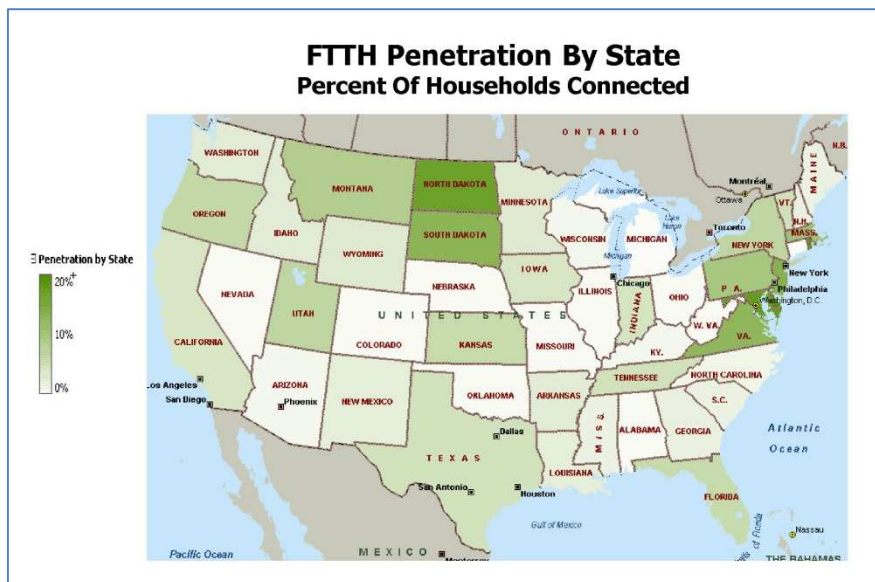
Currently 41% of broadband users use cable modem compared to 36% DSL. (Cable modem use does not have as much a lead in this study as some sources report. This is likely because some sources only report data from the largest telecom and cable providers, ignoring thousands of small incumbent telephone companies in the United States. By contrast, the data from this study is



based on a very large direct consumer sample and includes customers of telephone companies of all sizes.) Wireless from an outside tower at home is currently used by 13% of all broadband users, while FTTH currently represents about 6% of such. Other types of broadband such as satellite represents 3% of users.

No clear patterns emerge reviewing the trends of the last five years, except an upward migration for FTTH. There may be a slight upward movement for wireless and a recent downward trend for DSL.

Broadband users say they have greatly increased Internet use in the past year while only slightly increasing television use.



The top ten states for FTTH penetration are currently Delaware, Rhode Island, Maryland, North Dakota, New Jersey, South Dakota, Virginia and Massachusetts. Several of these northeastern states are influenced by

Verizon's FTTH build while the Dakotas are an example of the influence of small independent telcos.

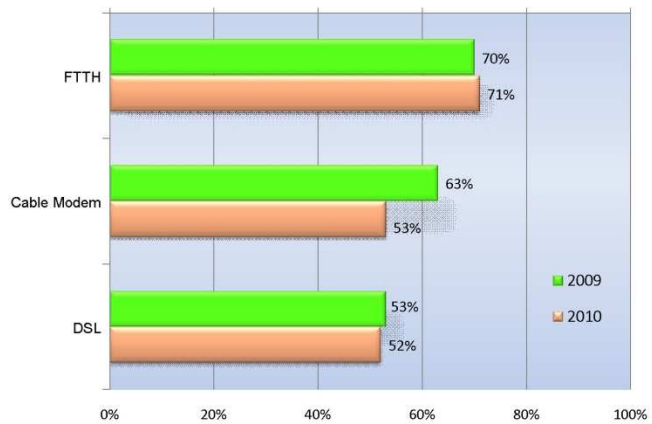
C. Perceptions of Broadband

Based on the study, satisfaction among FTTH users is higher than for cable modem and DSL users on all Internet issues tested.

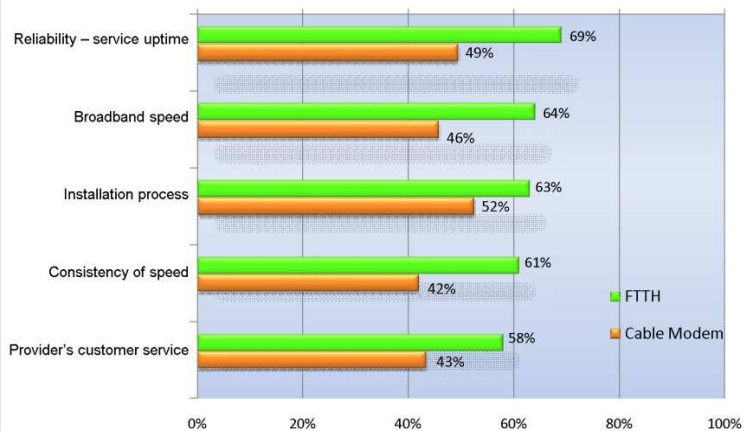
Compared with 2009, satisfaction with Internet overall is stable for FTTH and DSL but down for cable modem users. Satisfaction is also higher for FTTH Users for HD television as compared to cable and satellite users.

Reviewing satisfaction by specific Internet aspects, differences are even more pronounced. As an example, 64% of FTTH users are very satisfied with their broadband speed compared to 46% of cable modem users and 43% of DSL users. Similarly, a total of 69% of FTTH users are very satisfied with their Internet service uptime compared to 49% of cable modem users and 49% of DSL users.

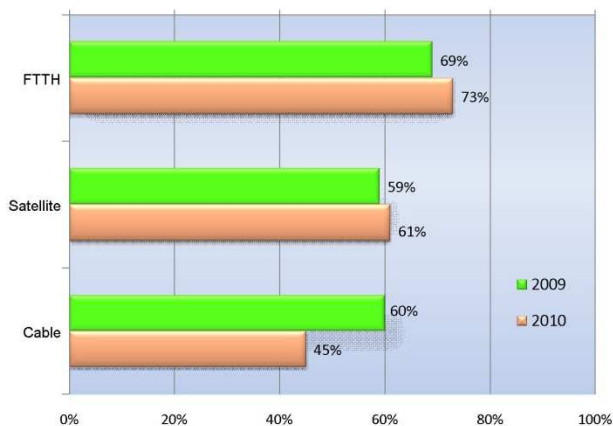
Very Satisfied With Internet Services Overall By Year



Very Satisfied With Specific Internet Aspects FTTH Versus Cable Modem



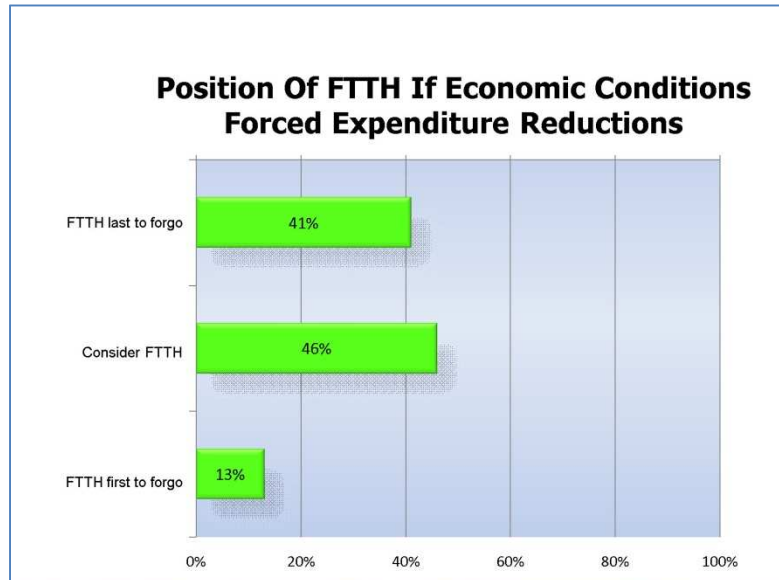
Very Satisfied With HD Television Overall By Year



Satisfaction from FTTH users is also higher for all television issues tested. For example, 76% of FTTH users reported they were very satisfied with the quality of HD picture they receive compared to 59% of satellite TV users and 48% of cable TV users.

FTTH satisfaction is currently very slightly higher among those residing in multi tenant buildings than those in single family residences.

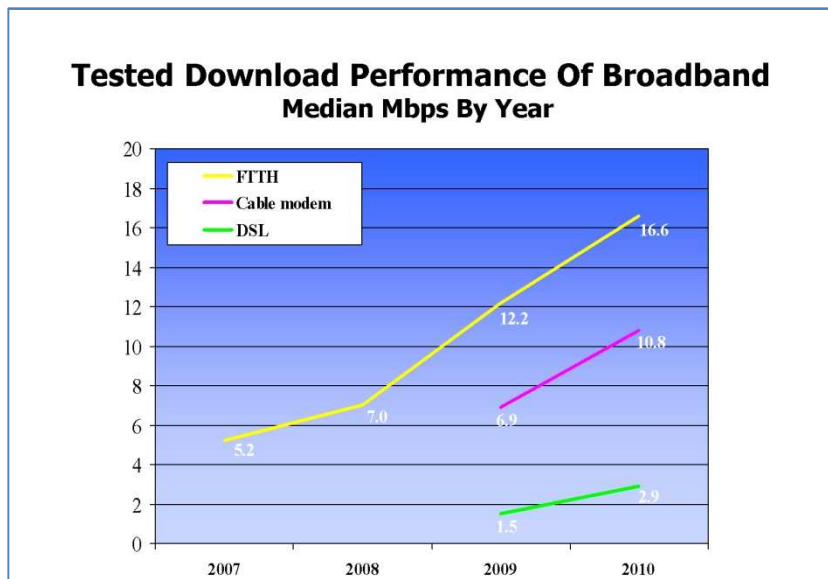
When asked what would happen if economic conditions forced them to make expenditure reductions, many more respondents say FTTH would be one of the last things they give up as compared the first.



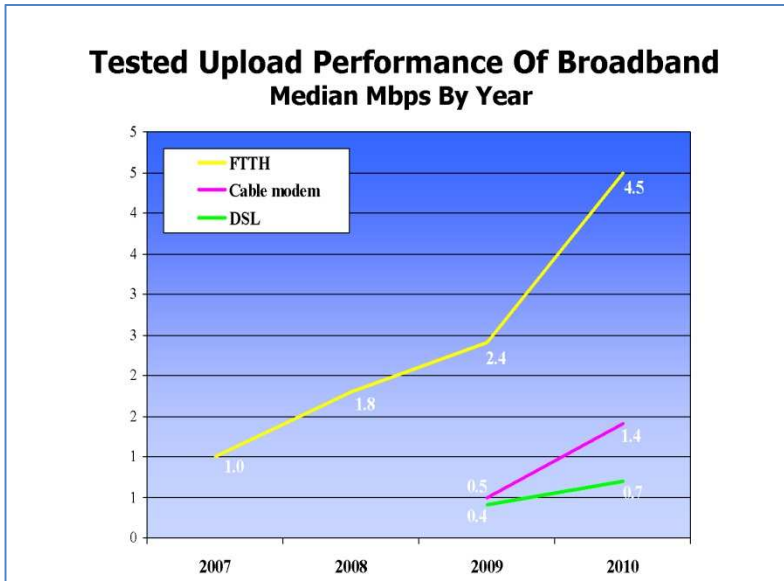
When asked an open question as to the most important advantage of FTTH, three basic factors were mentioned most frequently: speed, picture clarity, and reliability/consistency.

D. Performance of Broadband

During the survey, respondents were asked to perform a real-time test and record their download and upload Internet speeds by visiting www.speakeasy.net. They were then



asked to connect to the server city listed closest to their own location. The survey also verified that respondents took the survey at their home.

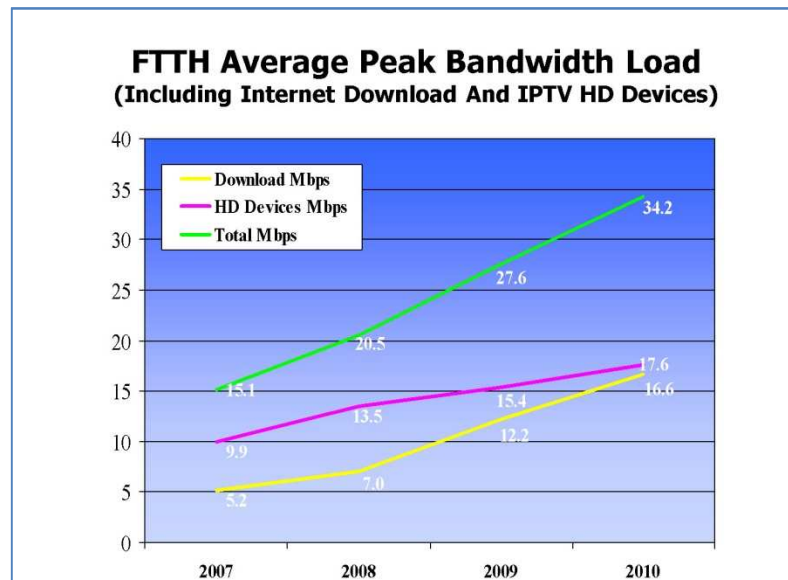


Based on this methodology, the current median FTTH speeds are now 16.6 Mbps down and 4.5 Mbps up. (It should be noted that Internet speeds are governed by the capacity of the local system as well as the service package chosen by the consumer. Finally, speed can also be limited, in some degree, by the Internet itself. In other

words, the actual capacity of most FTTH systems is far beyond any tested speeds.) FTTH download speeds have increased 219% since 2007, while upload speeds have increased 350%.

Cable modem median tested download speeds are second to FTTH while DSL is far behind. As might be expected upload speeds are even more differentiated from FTTH. Fiber is currently 1.5 times faster than Cable modem for downloads and 3.2 times faster for uploads. FTTH is currently 5.7 times faster than DSL for downloads and 6.4 times for uploads.

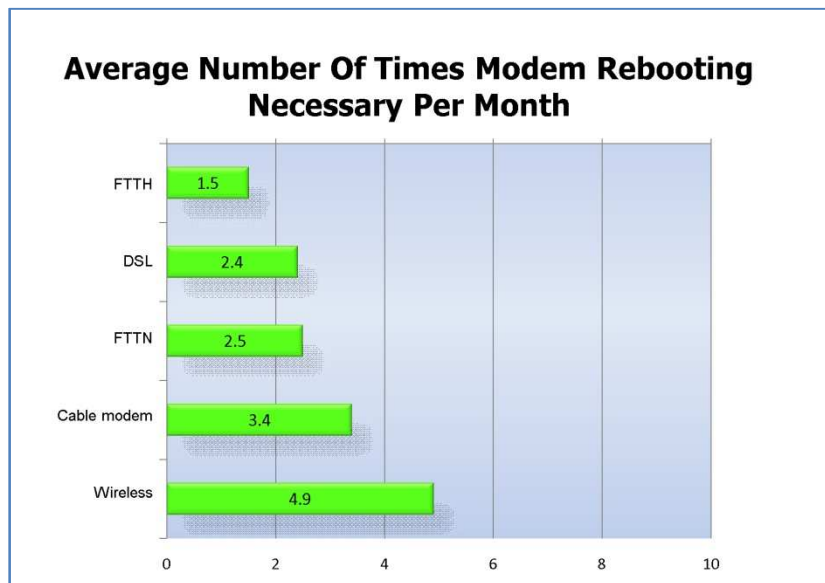
The number of HD devices in FTTH enabled homes was also monitored because those devices can consume a great deal of bandwidth when content is sent via IP (IPTV). The average number of HD capable devices (televisions and recorders) is now 2.2 per FTTH household.



The bandwidth required via IPTV to support these devices if they are all being used simultaneously and are tuned to unique channels has grown to 17.6 Mbps. (This assumes a high signal compression down to about 8 Mbps per unique signal. Some compression systems would require even more bandwidth. And, of course picture quality is further degraded by excessive compression.)

When the average Internet access download speed is added to the average bandwidth required for HDTV in an IPTV environment, the 2010 average peak load per FTTH home reaches 34.2 Mbps. In other words, an average FTTH household consumes 34 Mbps at prime time periods when different family members are simultaneously watching different television programs and Internet content.

In the 2010 study, users were asked to report the estimated number of times they have to reboot their modem every month. FTTH users report the greatest stability, with 1.5 reboots per month. Cable modem and wireless users report the most reboots required, at 3.4 and 4.9 per month respectively.



FTTH users with television service report receiving 200 channels of television compared to 180 for satellite users and 112 for cable TV users.

Based on the study, a total of 5% of other broadband users believe caps or limits have been placed on their usage, compared to 1% of cable modem and FTTH users.

FTTH users report that they pay an average of \$138.04 per month for the services they receive over fiber. This compares to \$143.61 for the same types of services from previous providers, representing a reduction of 4%.

Respondents were also asked if other suppliers within their area had offered lower prices since FTTH was introduced. A total of 42% of the respondents indicated that other suppliers have offered lower prices to them since FTTH was introduced in the area.

E. Use of FTTH

About three quarters of FTTH users migrated to FTTH from other types of broadband. Only 4% had had no previous Internet service and only 16% had had dial up Internet service previously.

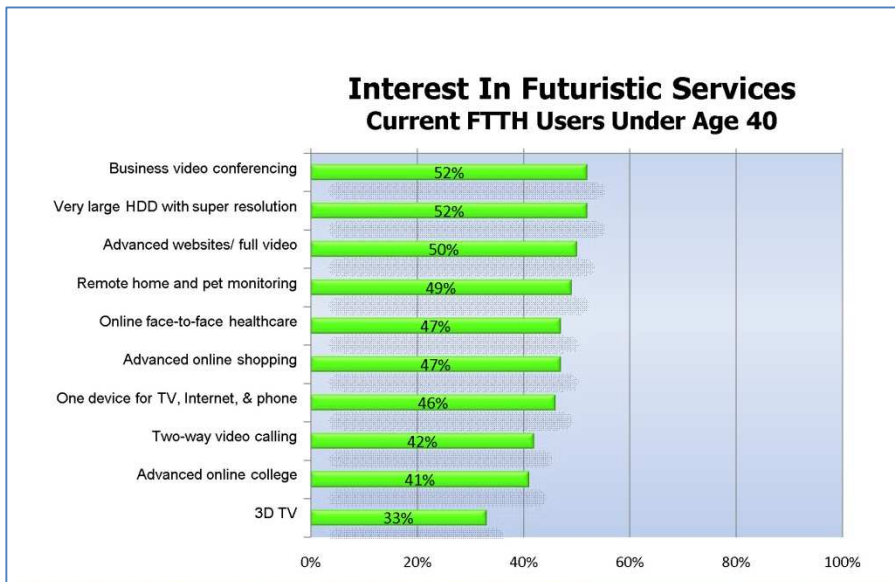
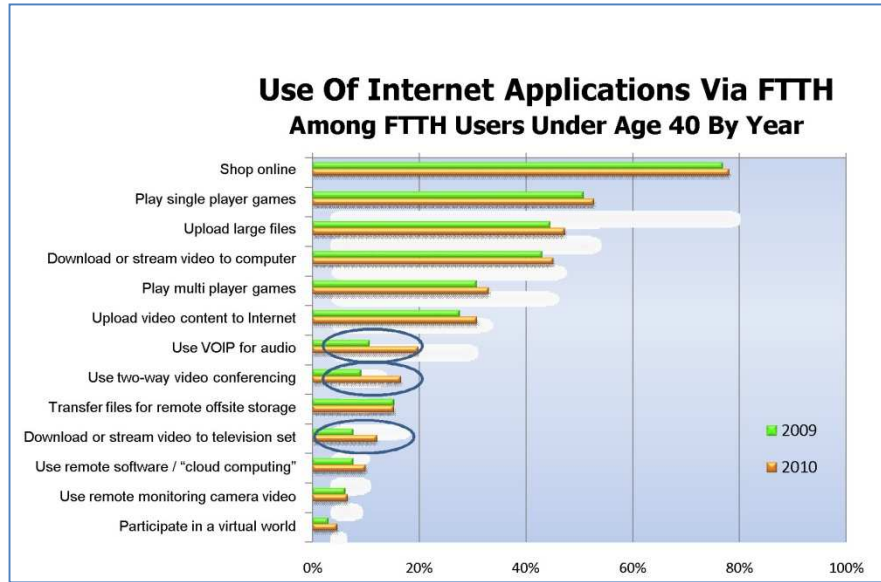
On average, FTTH users are aware of 1.5 other broadband alternatives available to them – cable modem, DSL, Dial-up, and wireless

In terms of services subscribed to via fiber, all FTTH users in the study get their Internet access over fiber (since this was a defining question to qualify for the study.) A total of 82% also utilize television over fiber and 80% use local telephone. So, over three quarters of these FTTH subscribers are “triple play” subscribers. A total of 21% have cellular telephone packaged with their FTTH plan.

Only 6% of the FTTH users live in relatively new homes. A total of 11% of the FTTH subscribers are multi dwelling unit (MDU) subscribers, up from 9% in 2009.

Three quarters of FTTH builds are in suburban and moderately dense zip codes in terms of population per square mile. On the ends of the spectrum, 3% of builds are in areas with over 5,000 households per square mile and 3% are in areas with only 10 households or less per square mile. A total of 29% of FTTH users report a lot of ½ acre or more and 2% report living on 6 or more acres.

The most common internet applications used over fiber include shopping online, game playing, uploading large files, and downloading or streaming video. Applications that grew significantly since 2009 include VOIP for audio, using two way video conferencing, and downloading or streaming video directly to a TV set. Video conference users primarily use the service for personal reasons as opposed to business, education or healthcare.



Awareness of both local programming and community intranet is up for FTTH subscribers in 2010. About half of FTTH subscribers are aware of local programming and one quarter are aware of community intranet.

When asked about a series of potential applications over fiber, younger users are most interested in futuristic services such as business video conferencing, extremely large HDD televisions with super resolution, advanced websites with full video, and remote home and pet monitoring. Older users are particularly interested in online face to face healthcare.

F. FTTH Marketing

One goal of the interview survey is to gather information about the way current FTTH customers came to purchase their service, and what types of marketing and advertising techniques may have influenced their decisions. Most FTTH consumers recall a variety of methods of first hearing about FTTH, such as TV advertising, direct mail, newspaper advertising, peer recommendations, door to door salespeople, websites, and new stories. Recall of TV advertising is up most since 2009.

When asked what marketing methods actually most influenced their decision to purchase FTTH service, TV advertising is mentioned first, followed by direct mail, newspaper advertising, and word-of-mouth from peers.

Among customers of typically more rural, non-Verizon FTTH providers, peer recommendations and direct mail plays a more prominent role in decisions to subscribe, while television advertising plays a lesser role. Anecdotal evidence from other FTTH providers across North America indicates their strong reliance on word-of-mouth to promote their services among potential customers. This is a likely finding because most of these FTTH services are deployed in much smaller, more community-oriented settings than Verizon, which is undertaking its FTTH build-out on a massive, nationwide scale in the face of strong competition from existing cable and DSL services.

G. Societal Impact OF FTTH

Telecommuting

On average, FTTH users say they work one additional day from home per month because of FTTH. This is consistent with most previous years but less than the 1.8 days reported in 2009. As may be expected, the increase in work from home is not uniform among subscribers. In the study, a total of 12% said they worked significantly more from home (8.3 more days).

Survey respondents were also asked if FTTH added more flexibility to their work schedule, such as allowing more flexible hours to avoid rush hour traffic. A total of 24% of the respondents indicated that the use of FTTH does add to such flexibility.

The study confirmed that certain occupations are most likely to work from home.

Consultants, sales and marketing personnel, IT personnel and management/owners said they were the most likely occupations for work from home.

Perceived personal benefits of working from home include saving commute time, more time with family and pets, setting an independent schedule, and saving money in various ways. Some respondents also say they are more productive or efficient working at home. When asked to describe the primary advantage of FTTH in helping them work from home, most perceive speed to be most significant, followed by stability and reliability.

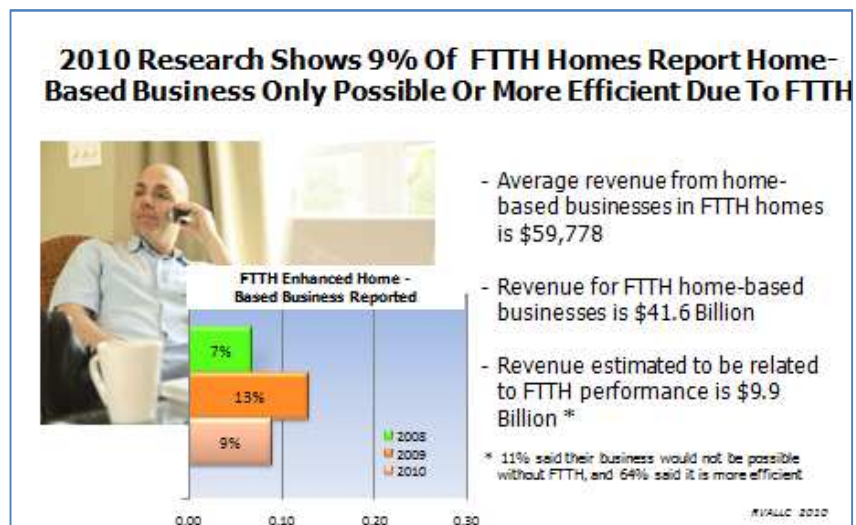
Among those working from home, a total of 24% said they utilize a virtual private network to communicate with their office server, up from 20% in 2009.

Home Businesses

In 2010, 12% report

operating a home based business. Of these 11% say the business would not be possible without FTTH, and 64% say it would not be as efficient without FTTH. FTTH users with home based businesses report an average revenue of nearly \$60,000 annually. Projecting to all users, all FTTH users have home based business income of about \$41.6 billion. About \$9.9 billion is estimated to be directly related to the efficiencies FTTH provides.

Based on this study, FTTH is indeed different than other types of broadband and is indeed making a difference in the society in which we live.



RVA, along with the FTTH Council, plans to continue to conduct both consumer and provider surveys in order to continue to track the deployment and impact of fiber to the home in North America. Other studies from RVA and other sources are available on the FTTH Council website www.ftthcouncil.org.