

FTTH Expands Fast Around the World

Take a tour and see what competitive forces drive FTTH in different countries.

By Bob Whitman ■ *Corning*

Fiber to the home may not yet be a recognized consumer term in the United States. But FTTH is obviously the technology of the future. Examples of deployments are now common in every region of the world. The US has about 300,000 home fiber subscribers, and the number is growing fast. But other countries with much smaller populations, such as Japan with almost 3 million FTTH subscribers and Sweden with 500,000, are well ahead in the race for broadband leadership.

Asian carriers have capitalized on the marketing value of FTTH. Korean builders have been using fiber technology as a selling tool in consumer real estate marketing for some time now. In Japan new FTTH subscribers are outstripping new DSL subscribers.

Even US carriers have started using optical fiber in their marketing programs, coining terms such as fiber to the node (FTTN), which is simply fiber-fed remote terminals that allow carriers to provision DSL broadband services, and fiber to the curb (FTTC), which again takes fiber deeper into the access network but not all the way to the home.

While these technologies do offer higher transmission speeds than typical DSL service, they still are hampered by twisted pair copper in the access loop. These architectures have been more accurately classified by the techies as “copper from the node” (CFTN) and “copper from the curb” (CFTC).

Worldwide Growth

FTTH has various levels of regional adoption around the world, making it hard to forecast country-by-country or worldwide subscribers. Figure 1 is a fairly conservative forecast that could easily be surpassed by the adoption of FTTH by

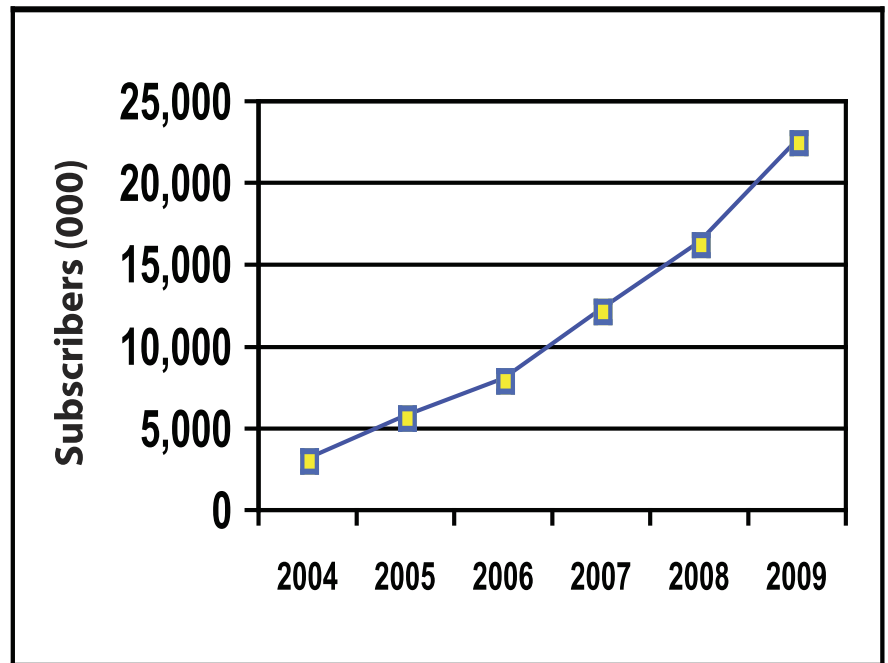


Figure 1. Worldwide FTTH subscribers. Sources: Corning, In-Stat, Point Topic, Gartner.

a few additional large carriers. Outside of Japan, Sweden and the US the other primary pockets of FTTH activity are in Australia, Italy, Korea, the Netherlands, Scandinavia, Hong Kong, Taiwan, and regions of the Middle East. They all have a diverse set of circumstances that have led to choosing FTTH.

Not all variables involved in making broadband technology decisions will apply to the US market. However, examining these variables and lessons learned will enable the US government to develop sound public policy, US carriers to understand the consumer and operational value, and technology companies a peek in the box at which technologies to bet on.

Closed or Open Access?

The most important factor in technology choice is to understand which entity is driving deployment, private in-

dustry or the government. While FTTH has been deployed commercially or in trials in nearly every developed region of the world, sustained deployment has occurred in only a few regions and countries.

Two conclusions can be drawn from analyzing these regions of sustained deployment. Either a competitive market exists where carriers are fighting for subscribers or governments (national and local) have stepped in to provide a subsidy or other concession to promote deployment. Facilities-based competition in private industry or government sponsored deployment determines whether the network will be closed or open access, with some exceptions.

Competitive Markets

In the US, FTTH has largely taken off as a result of the pressure telecom carriers face from CATV operators that cur-

rently offer a robust set of converged services. Commentators have taken to call this a “fear-driven” policy. US incumbent telecom operators are working hard with a variety of technologies to offer a competitive video service. While FTTH has a higher first installed cost due to inability to leverage installed plant, it is increasingly becoming the technology of choice to allow carriers the bandwidth and flexibility to add video and any other future application to effectively compete with CATV operators.

In addition to bandwidth, motivation for carriers to deploy FTTH are lower operating expenses (up to 50 lower), preferred regulatory treatment, converged services platform, and the reduction of customer churn.

In addition to incumbent telecom carriers, three main market segments in the deployment of FTTH dominated in the US. Municipalities and municipal utilities have been deploying FTTH as a means to stimulate economic development in their areas; rural incumbent carriers have built FTTH as a means to generate additional revenue. Because rural areas in general have had either poor access to CATV or poor quality, home developers and builders have adopted FTTH to increase the value of their property for quicker or higher valued sales of homes.

While these segments will continue to deploy the vast majority of FTTH deployment in the short term, the large incumbent telecom carriers will build most FTTH. Both Japan and the US have large incumbent carriers that are fighting for customers. In the case of Japan, the incumbent carrier NTT (East and West) is competing with several alternative carriers (USEN, Tokyo Electric Power Company, PowerCom, K-Opticom, IP Revolution, Softbank and KDDI) that are independently deploying FTTH infrastructure. This facilities-based competition has led to sustained FTTH deployment where network capability, consumer demand and service marketability are primary reasons for carrier choice of FTTH.

Non-facilities-based competition has had an impact on broadband growth but

hasn't proven to drive carriers to adopt FTTH. NTT faces both facilities-based and non-facilities-based competition, where alternative carriers are leasing NTT copper loops and offering DSL as well as FTTH. This competitive pressure has led to NTT requests for regulatory relief similar to that of US incumbent carriers for FTTH networks.

Subsidized Markets

The regions of the world that have sustained FTTH deployment where competition isn't the driving force typically have some sort of government subsidy to encourage deployment. Scandinavian countries, particularly Sweden, have been deploying FTTH for several years, primarily in open access municipal networks, where all carriers have access to the network to provide services.

Interestingly, the incumbent carriers tend to use the open access in lieu of their installed copper network, claiming the new fiber networks are cheaper than building for themselves. Proactive regional and local governments have been driving forces for many of the current and planned FTTH deployments. The Swedish Urban Network Association (SSNf) is a good example of the mindset behind subsidized broadband networks where broadband is considered a utility such as water, roads and power. SSNf is a non-profit group of 300 municipalities, telecom operators, energy companies and others whose mission is to:

- Give cities an open infrastructure for everyone.
- Stimulate the market by offering new operator capacity at below self-cost.
- Reduce digging in the streets.
- Create and own a network for each city.

This model of municipal network has spotty FTTH growth throughout Europe and Canada but is picking up speed (although still at a slower rate compared to Japan and the US). Local governments in the Netherlands, Denmark, and many small communities in France are choosing to deploy open access FTTH networks in the hope of bringing economic development, consumer

choice and future growth of their cities. Only FTTH brings enough capacity to meet future needs of businesses and consumers while allowing multiple carriers and applications providers the most capable and flexible platform to provide their services.

Canada: One of the world leaders in broadband penetration, currently listed as fourth best despite its low population density compared to other penetration leaders such as Japan, Korea, Hong Kong and the Netherlands. Hundreds of local government broadband initiatives are underway, driven by a national imperative expressed in 2004: “We foresee a Canada where the benefits of 21st century economy are being reaped from coast to coast to coast – on our farms, in our fishing, forest and mining industries and in our rural communities where modern communications are helping to surmount the barriers of distance.”

These local initiatives are often funded by government grants and other subsidies meant to connect schools, hospitals and municipal facilities. The backbone for that is then leveraged to serve consumers. The Broadband for Rural and Northern Development Pilot Program (BRAND) was started in 2002 and has since funded 58 rural broadband projects for 884 communities with approximately \$105 million (Canadian).

The incumbent carrier, Bell Canada, has decided to move forward with FTTH, targeting greenfield and select rehabilitation sites. Bell Canada cites the need for higher bandwidth and lower operating costs. The plan calls for no additional copper deployments in greenfield and rehabilitation in 2006. This would be followed by overbuilds with FTTH starting in 2010.

Australia: Early adoption of FTTH by numerous home developers and municipalities, in patterns similar to the US, encouraged incumbent telephone operator Telstra to evaluate and deploy FTTH technology. Telstra, like many carriers worldwide, recognized consumer demand for converged services and has committed to deploy only optical fiber in the terrestrial network for rehabilitation. It plans then to systematically

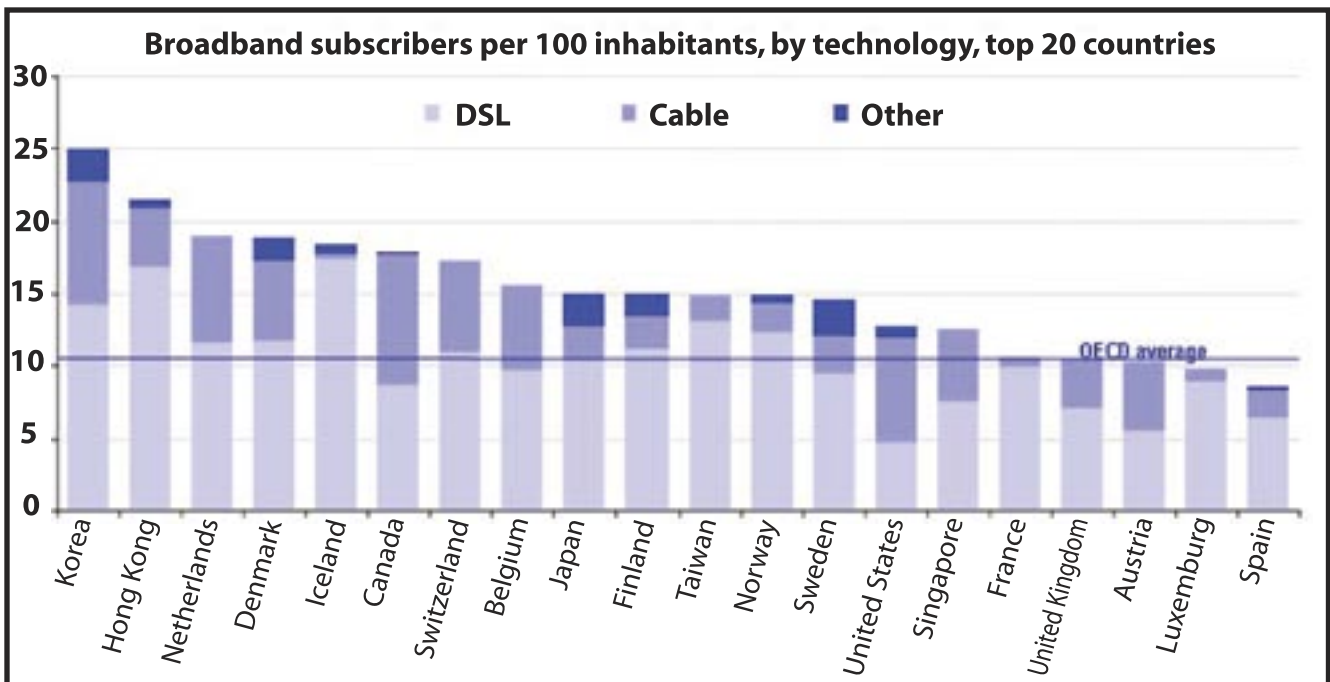


Figure 2 Broadband Penetration by Country. Sources: OECD, December 2004; Corning.

eliminate the copper network. Telstra estimates the cost for complete conversion of its network to PON at about \$35 billion.

The Australian Federal government has committed \$37 million to help provide broadband in regional Australia to limit the digital divide, bringing total federal funding for the Higher Bandwidth Incentive Scheme (HiBIS) to about \$118 million. The HiBIS program was established in 2003 to provide access to affordable broadband services for Australians living in regional Australia. Under the program, financial incentives are provided to broadband service providers to offer services in areas that cannot get broadband access at urban prices. Under HiBIS a registered service provider receives an incentive payment for each eligible customer that it signs up to an approved broadband service.

Korea: Characterized by high population density, short loop lengths and a society that embraces the Internet and bandwidth, Korea is poised to continue to lead the world in broadband penetration. Korea has been expanding data rates and service offerings and is now experimenting with next generation WDM PON networks.

But while FTTH is often mentioned

as part of the Korean next generation network plan (BcN), very little FTTH (several thousand subscribers) has been deployed to date. Network evolution and new service offerings by Korea Telecom (KT) and Hanaro with video on demand (and soon, IPTV) may drive more FTTH deployment.

In July KT announced adoption of GPON technology trials but plans VDSL deployment and “near FTTH” where fiber is run to a pole and CAT5 wire is run to the home or apartment. Like Japan, Korean providers are attempting to win in the marketplace by “selling on data rate.” Consumers are buying speed whether or not they use it.

Little Incentive

While nearly all carriers agree that FTTH is the long-term network solution, some have been reluctant to deploy the technology where competition or short term subsidy is not available. As an example, many developed nations such as Germany, UK, Italy (except for alternative carrier FastWeb) and France have national incumbent carriers that have only experienced marginal competition and have little incentive through subsidy or regulation.

Thus, while broadband growth has

been strong, primarily through DSL, FTTH adoption by these carriers does not appear to be imminent in the next few years. The lack of competition and lower perceived interest in high definition interactive video will allow carriers to extend the life of copper networks through lower capital cost network upgrades. It should be noted that carriers in these regions are better positioned to extend the life of the copper network relative to US networks due to the inverse relationship between DSL bandwidth and loop length. The US norm is for much longer loop lengths than in Europe.

Public Policy- Friend or Foe?

Regulatory structure can be both an enabler and a barrier to deployment. Broadband public policy must fit the market dynamics that exist in order to promote the proliferation of advanced broadband. A common thread among leading broadband nations is a national broadband policy. Governments that provide a vision with achievable goals and clearly articulated targets that define success have been far more effective in their deployments. National initiatives in Ireland, Canada, Korea, Netherlands, France, Japan, Australia, China

and other nations have at least one thing in common: The idea that broadband is now a necessity to keep pace in this global economy.

Commitment to building for the future requires resolve and an environment, both politically and economically, that rewards investment. Figure 2 represents the leading countries in broadband penetration, many of which have articulated national broadband policies. The US continues to move further down the list from fourth in 2001 to number 14 at the end of 2004.

Some analysts suggest that while the US may appear behind in consumer broadband there is no evidence that the US is at a disadvantage because businesses (and the resulting workforce) have ready access to broadband. These comments are short sighted in that limited consumer broadband will have long term effects that may not show up in specific country GDP in the short term.

Limited broadband access will have long term effects on US competitiveness as other nations embrace broadband as part of the social culture and view broadband access as a necessary utility such as roads, electricity and water. Children brought up in a broadband environment with media rich applications and instant access to worldwide information will be better prepared and more effective as they enter the workforce compared to their counterparts with limited access as they compete in the global marketplace.

US government officials and policy makers also downplay the broadband penetration metrics, stating that it is not a fair comparison because most nations leading the statistics are smaller and more densely populated making it easier for mass deployment. At first pass this seems like a logical conclusion but when you consider countries such as Canada, Sweden and Iceland with much lower overall population densities (but in the case of Sweden, more urbanization) then the US these arguments do not hold water.

The US is hampered by antiquated policy that was written for voice services before broadband networks were in mass deployment. The policy does not work

for networks that now provide converged services of voice, video and data. Recent activity by the FCC, and Supreme Court rulings, has been encouraging. The FCC seems determined to provide a level playing field of competition for broadband providers by separating legacy voice services from new broadband networks. Likewise, the recent Supreme

Court ruling in Brand X, upholding the fact that cable modem networks are information services and are not required to be shared, set the framework for the FCC to follow suit on telco networks.

While these activities support competition by the largest US carriers there is still debate on whether municipalities could or should provide telecom service-



Increasing revenues from your properties. It's all about the right moves!

- Vacancy rates are a hard reality that many building owners must address on a monthly basis in a market where churn rates average 60% per year, occupancy rates are always on the mind of building owners.
- As a real estate owner, one of the biggest challenges facing your business is how to attract and retain residents.
- In an MDU environment where the chief source of income is rent, quickly deploying desirable amenities can be tough.

Introducing the Telkonet iWire System™ with intelligent Wire Technology, the astonishingly simple solution that uses your existing electrical wiring in your building to distribute Internet access for all your residents. Telkonet's revolutionary iWire system can help you increase the property values of your portfolio of assets, increase revenue and profitability, reduce churn and maintain occupancy. Find out more at www.telkonet.com/iWire.



(866) 375-6276
mdu@telkonet.com

es. Currently twelve states have legislation that limits municipal telecom. Municipalities claim the need to build next generation broadband where the private sector will not, particularly in more rural areas. But telecom carriers and CATV operators claim municipalities have an unfair competitive advantage by leveraging long term municipal bonds as well as being the local regulatory body.

This debate will likely be clarified in the near future as Congress readdresses broadband either through a rewrite of the Telecommunications Act of 1996 or through entirely new federal broadband legislation.

FTTH Business Case

Despite the inherent increased capability of fiber over copper the choice to deploy FTTH requires a sound business case. Carriers around the world have found that greenfield FTTH makes absolute sense and have readily adopted fiber technology due to higher capability at installed cost parity.

The cost for FTTH in an over-build situation has dropped from about \$4,000 per subscriber in 2001 to less than \$1,500 per subscriber in 2005 in the US. The falling first installed cost has been an enabler for some carriers but the increased revenue opportunity and lower operating costs are the real drivers. US carrier comments and business case modeling indicate savings of more than \$100 per line per year can be achieved by decommissioning the copper loop once FTTH is deployed.

This kind of cost savings will be critical to the competitiveness of US carriers faced with increasingly capable competition. The ability for carriers to offer converged services has proven to reduce customer churn. US CATV operators in particular have recorded a reduction in customer churn by more than 50 percent in areas where they have deployed voice services.

In addition to reduced churn, carriers have found that some US broadband subscribers will pay more for higher broadband speeds. Nearly all broadband carriers are now offering tiered data services to capture additional revenue from

users who value greater speeds.

Critical to the business case for broadband deployment and a critical factor in technology choice is the ability to offer quality video services. FTTH offers the ability to provide video services with conventional RF technology as well as emerging IPTV technology while DSL networks will be limited to standard quality IP-only video technology. (IPTV is the protocol used to deliver video over a local or proprietary network and does not mean video via the Internet, although high quality video over the Internet is certainly becoming feasible.) The maturation of IPTV has enabled the use of less capable twisted pair networks to deliver one or two channels of standard quality video at 6 Mbps each, which can be compressed to 2 or 3 Mbps.

Telecom carriers around the globe are upgrading their copper networks to increase the number of channels or develop the capability to provide high definition video. That requires 20 Mbps in MPEG2 format and 10 Mbps in MPEG4. Compression techniques work well for static, prerecorded material but they don't work well in live, dynamic applications such as sporting events.

Carrier deployment of IPTV or video in general has kicked up a storm of activity in US regulatory policy. Carriers are vying for various degrees of regulatory relief from local franchises while CATV operators are hoping to maintain the status quo and force telecom operators to negotiate every community franchise in order to provide service.

The lure of IPTV is the interactivity it creates such as:

- A wider range of programming on demand. More movies and TV shows available when the user wants them.
- Multiple pictures on the user's screen.
- Camera angles. The ability to choose any desired angle at sporting events.
- Instant messaging with friends while watching a common program.
- Interactive on-screen program guides to arrange programs by genre, regardless of the channel.

While IPTV will enable some level

of standard quality video offerings over DSL networks, the adoption of high definition TV and other interactive media rich services will be a driving factor in deciding to proceed with FTTH technology.

Conclusion

The US still faces some challenges in widespread FTTH deployment but the lessons learned from other leading nations can be adopted to speed the acceptance of fiber. While improving technology is an important factor, equally important are the regulatory climate, culture, and goals and objectives of regional governments. FTTH must prove to have a viable business case even if government will support the technology. Sound economics that allow for a reasonable payback period, reduced operating costs and bandwidth capability to support emerging revenue generating applications will drive FTTH growth.

FTTH has become the preferred technology for greenfield builds and is quickly being adopted in network rehabilitation. Countries leading the broadband revolution have national broadband policies in place and are upgrading their current copper networks or building FTTH to continually provide their citizens with the bandwidth capacity they demand.

Governments should tailor their policies for the specific market. In general, competitive markets require relief from regulations and in non-competitive markets governments should provide a framework that rewards investment.

FTTH will flourish where carriers believe they need a network that must continually grow to meet the needs of customers and that new services will be developed that cannot be supported by legacy networks. Fiber's nearly unlimited bandwidth and lower cost of operation will position fiber as the broadband choice of the future. **BBP**

About the Author

Bob Whitman is Manager, Global Broadband Market Development at Corning, Inc. He can be reached at WhitmanRJ@Corning.com.

1971

For Over 34 Years . . .

2005

Toner
cable equipment, inc.

800-523-5947
Tel: 215-675-2053
Fax: 215-675-7543
info@tonercable.com

Toner has earned our customers trust through old fashioned reliability. We combine superior customer service with the latest technical expertise and innovative products . . .

We are your single source supplier, whether you are looking for an entire broadband R F system, or just an "F" connector, we can fulfill your needs.

**Just a few of Thousands of Cable TV
Products We Stock . . .**



- **Headend Electronics** • **Pre-Packaged Headends**
- **Satellite Receiving** • **Fiber Optics**
- **Coaxial Distribution** • **Test Equipment**

One Reliable Source

Visit us on the web www.tonercable.com