



FTTH Worldwide Technology Update & Market Forecast

EXECUTIVE SUMMARY

Despite ongoing setbacks and delays in many territories, 2007 marked another landmark year in the long-term transition to fiber-to-the-home (FTTH) networks. Among other highlights this year:

- The now-unarguable success of Verizon's initial FTTH rollout, and a stronger commitment to FTTH than hitherto from the other major U.S. ILEC, AT&T.
- Strong commitments to FTTH from France Telecom, Telefónica, and several smaller incumbents in Europe, starting the firing gun in Western Europe after a generally slow start on the old continent.
- Confirmed major rollouts in Korea and Singapore, and continuing strong growth in China.
- Growing interest and rollouts in Eastern Europe, the Middle East, and other "new" regions.

The transition to FTTH is now well underway in many countries, including Denmark, France, Hong Kong, Japan, Korea, Sweden, Taiwan, and the U.S. Over the next five years, we expect most other developed countries to join that list, and fiber will also have a significant impact in relatively less developed telecom markets, including India, Russia, and the Middle East.

But if the endgame of an all-fiber fixed access network is no longer in serious doubt, the speed of the transition and the ultimate winners remain open questions. One issue sure to affect the speed of rollouts is how rapidly the cost of components will decline as the market ramps up in volume. Yet although the market for components is becoming globalized, the construction of FTTH networks will continue to be strongly influenced by a wide range of local factors, including the local regulatory environment, growth in demand for high-bandwidth services, greenfield housing development, and local cost structures. For that matter, even the manufacture of optoelectronics will be regional or national to some degree, and for some time to come.

Winners and losers are also in doubt. On the telco side, our five-year scenario points to a market that is increasingly dominated by incumbent telco investment, but there is plenty of room for other types of operators, including utilities, municipalities, CLECs, real-estate developers and others to have a significant impact, too. On the vendor side, it is already clear that the winners and losers will not necessarily be the same as those that dominated the DSL market, but again the picture is complicated, in particular by a likely upswing in M&A activity as FTTH deployment grows and smaller vendors are snapped up by the majors.

FTTH Worldwide Technology Update & Market Forecast delves into these and other questions about the FTTH market, providing a comprehensive global view of the transition to FTTH. The report in particular examines key developments in the underlying technology, as well as vendor positioning in this important emerging market segment.

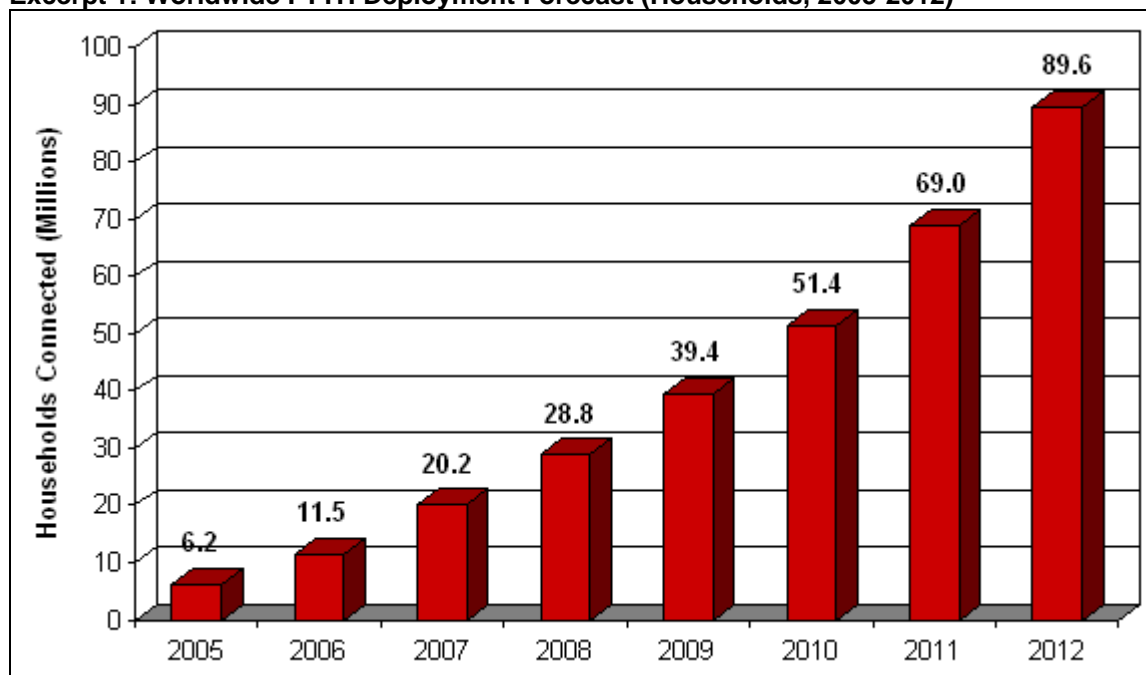
Among other things, the report:

- Reviews the advantages and disadvantages of major FTTH technologies, specifically Ethernet passive optical networking (GEAPON), Gigabit passive optical networking (GPON), and active Ethernet
- Assesses likely future technology developments in FTTH networking
- Provides an overview of important FTTH projects and developments over the past 12 months in all geographies, including North America, Asia/Pacific, and Europe, as well as key national markets within those regions
- Includes a forecast for houses connected from 2007-2012, breaking down market growth by region, type of technology, and type of network builder
- Reviews the optical network terminal (ONT) and optical line terminal (OLT) product strategies of more than 30 vendors, evaluating their strengths and weaknesses, and analyzing the key differentiators in their offerings

Heavy Reading's FTTH market forecast consists of a high-level global forecast, plus regional and country forecasts for major regions and countries. It also segments the market by type of provider, type of property, and type of technology deployed. The forecast is based on the following major assumptions:

- **Mass FTTH:** Our underlying assumption is that following a period of experimentation and development, FTTH will begin to follow a typical S-curve growth in penetration, reaching 80 percent or more of households over a 15-20 year period in all developed nations.
- **Bandwidth demand trends:** we assume that high-end households in most countries will opt for the new bandwidth "gold standard" of 100 Mbit/s by 2008-2009 wherever it is made available at competitive prices, boosting competitive buildout from 2009 on. Continuing rapid increases in the size of computer hard disks, digital memory, DVDs, cameras and all consumer electronic equipment, together with unanticipated high-bandwidth applications development will put continuing pressure on bandwidth needs.
- **Costs of equipment and construction:** These will continue to fall steadily, but because costs remain dominated by civil/labor construction costs, the percentage decline will be modest, and the overall high cost per household (in the range of \$500-\$2,500, depending on circumstances) will continue to hold back mass rollout in some countries and prevent a truly rapid transition to FTTH. Skill and labor shortages will also be a factor here.
- **Competitive pressures:** These pressures will continue to increase as a result of the saturation of orthodox telephony markets, both wireline and wireless. In order to create a long-term platform for high-bandwidth services, and be first with a fiber into the home, providers will modify short-term return-on-investment approaches where these currently dominate planning and move to longer-term views.
- **Political and regulatory issues:** political pressure to move to fiber will gradually increase everywhere as nations seek to create the best possible environment for businesses – with a knock-on impact on household FTTH. Regulation, however, may continue to vary widely – see further discussion in segmentation report below.

Excerpt 1: Worldwide FTTH Deployment Forecast (Households, 2005-2012)



Source: Heavy Reading

In addition to high-level forecasts, **FTTH Worldwide Technology Update & Market Forecast** provides granular forecasts and analysis based on a range of parameters, including:

- Deployments by technology types
- Deployments by carrier types
- Deployments by geographic regions and key national markets
- Deployments by customer type (MDU/SDU)

FTTH Worldwide Technology Update & Market Forecast also provides detailed insight into the market positioning of key technology suppliers in the FTTH sector, focusing on product strategies and differentiators, customers and geographic focus, and overall strengths and weaknesses for each supplier.

Excerpt 2: Vendor Differentiation Strategies

DIFFERENTIATOR	COMMENTS
MSAP approach, with copper/fiber support from the same cabinet	Many vendors (e.g. ECI) support this approach, but others (e.g. Alcatel-Lucent and Ericsson) reject it on price-performance grounds.
Support for services such as VOIP, POTS, RF TV, and IPTV	Implied in the GPON standard, but some vendors (e.g. ECI and UTStarcom) highlight their record in deploying IPTV services, for example. VOIP support varies; not all variants are always supported. POTS may not be supported.
QOS and related features	Related to services support; GPON has some QOS features built in, but support e.g. for Layer 3 functionality is not consistent across different vendors.
Capacity	Vendors take different positions on the capacity users require. Some cite low capacity as a virtue in early deployments; others (e.g. Huawei) are going for big systems. The number of variants (large and small) also varies by vendor.

DIFFERENTIATOR	COMMENTS
Density	Related to capacity; a move in 2006-2007 to four-port cards will be followed with eight-port cards in 2008 – one of several mechanisms for improving density. Implies lower cost per port.
Management systems	Main selling point for some vendors, e.g. PacketFront. Most management systems contain a lot of proprietary software, and the degree and depth of management is variable. Others emphasize the use of the same management system across all wireline access technologies – though this is now the norm.
Range of ONTs	Often cited as a differentiator, but most vendors now have a wide range to meet most basic requirements.
Operational and deployment experience	Typically cited by those with a significant installed base, e.g. Tellabs (BPON) and Calix.
Support for network design and engineering	Many vendors offer various kinds of professional services to assist e.g. with splitter siting, rollout schedules, and so on.
End-to-end proposal	Including not only OLTs and ONTs, but also in-house equipment, fiber, network construction etc. Some e.g. Ericsson have in-house expertise in construction.
Technology neutrality	Many vendors support both one of the PON standards and active Ethernet – though degree of commitment varies. A few, such as Huawei and NSN, support both GPON and GEPON.
Ability to customize offers	E.g. by using own ASICs – both Calix and ECI cited this as a differentiator
Power consumption	In light of environmental legislation, becoming more important, and cited by some, e.g. ZTE, as a strength

Source: Heavy Reading

Report Scope & Structure

FTTH Worldwide Technology Update & Market Forecast is structured as follows:

Section I is an introduction to the report, with complete report key findings.

Section II defines the various types of FTTH and describes the major technologies, along with their advantages and disadvantages. It also examines key standards developments and emerging technologies in this sector.

Section III looks at the major regional markets of Europe, North America, and Asia/Pacific, detailing who is building and delivering FTTH and where.

Section IV sets out a global forecast for the number of FTTH households from 2007 to 2012, subdividing the market by major regions, technologies, provider types, and dwelling types.

Section V reviews 19 major vendors in the sector, describing their strategies, deployments, and plans, and evaluating their relative strengths and weaknesses.

FTTH Worldwide Technology Update & Market Forecast is essential reading for a wide range of industry participants, including the following:

- **FTTH technology suppliers:** How will demand for FTTH progress in coming months and years? Which regions are going to see the most FTTH buildout activity, and which network operators will be leading the way? Which technology choices are deployers most likely to make? Are your products and marketing messages in line with customer plans and expectations? Are there significant gaps in your product line coverage that need to be addressed to meet future demand for FTTH solutions?
- **Other equipment suppliers:** How will demand for your products be affected by FTTH deployment plans? Which technologies are emerging as the most likely winners for tomorrow's access networks? Is your company in position to take advantage of those anticipated changes?
- **Network operators:** How do your plans for FTTH deployment compare with those of your competitors? Does your access strategy deliver the best cost-control option for your network, or are there other alternatives that will deliver greater efficiency? How do your projected costs for FTTH deployment match up with the rest of the industry? What is the competitive threat posed by FTTH from other operators?
- **Investors:** Which technologies are emerging as the winning solutions for FTTH, and which companies are the leading providers of those solutions? How will FTTH affect profitability for the telecom service sector in the coming months and years?

FTTH Worldwide Technology Update & Market Forecast is published in PDF format.