



Towards the light

As the European fibre-to-the-home industry prepares for its annual gathering under the auspices of the FTTH Council Europe, whose 2010 conference will take place in Lisbon from February 24-25, Stuart Thomson assesses the current state of fibre in Europe.

The economic climate may not seem to be suited to an industry that requires large upfront capital expenditure and offers in return only the uncertain prospect of a very long-term payback. But despite the financial crisis, the mood of the European fibre-to-the-home industry, now preparing for its annual gathering – to be held this February in Lisbon – remains relatively buoyant.

In fact, the economic slowdown appears to have had a mixed impact on European fibre deployments, with operators in some markets continuing to forge ahead while those in others have made little headway. Informa

Telecoms & Media, publisher of *Digital TV Europe*, estimates that there will be some 52 million fibre-to-the-home and fibre-to-the-building subscribers in the EMEA region, up from 30 million in 2012 and eight million today. Unlike some analyst groups, Informa believes there is already a significantly larger number of FTTH and FTTB subscribers in eastern Europe than in western Europe – about five million compared with 2.5 million – as a result of the need to replace out-of-date (or non-existent) infrastructure, the lower cost of public works, fewer planning restrictions and regulations, and a higher concentration of

people in MDUs. Informa counted some 2.5 million homes connected in Russia alone as of the end of the third quarter of last year, compared with 630,000 homes in Sweden, the leading western European country. In eastern Europe, in the absence of alternative infrastructure, fibre has filled the gap, allowing operators to leapfrog DSL. Despite economic difficulties affecting the region, therefore, progress continues to be made.

Looking at western Europe, Karel Helsen, president of industry body the FTTH Council Europe, says that the economic downturn may have a positive impact in some ways, with

governments looking to next-generation networks as a way to (literally) dig their way out of the crisis. But while some infrastructure projects may have benefited from government stimulus packages, this has been countered by factors including troubles afflicting the property market, which has not only limited opportunities for installing fibre in Greenfield housing developments but has directly hit infrastructure providers whose balance sheets include property assets.

Long lead times

However, a factor that may reduce the sensitivity of FTTH deployments to the economic cycle is the relatively long lead times between plans being made and networks actually being laid in the ground. "Those decisions are long-term decisions," says Robin Mersh, COO of the Broadband Forum, which promotes interoperability of broadband technologies.

Mersh says that the economic recession may have a more immediate impact on the take-up of broadband generally by consumers. While he does not believe that the number of additions has dropped off dramatically, he points out that broadband take-up in advanced markets is in some cases already at saturation point and consumers seeking higher speed tend to upgrade to offers from their existing service provider rather than change provider.

Mersh also points out that broadband is particularly pervasive in densely populated cities – exactly the locations likely to be targeted by FTTH deployments. "It's not written in stone that customers need 100Mbps and it has to be delivered by fibre," says Mersh. "You can potentially deliver triple-play services over ADSL2plus or, if you need more, VDSL2."

Technology vendors continue to report growth, with significant regional variations. According to Thomas Kallstenius, marketing director at Alcatel Lucent, Portugal, and to a lesser extent neighbouring Spain, have experienced strong growth in fibre this year, as have Saudi Arabia and the UAE in the Middle East (at least until its recent financial crisis). In eastern Europe, says Kallstenius, Russia has seen investment in fibre-to-the-building networks, with operators making use of CAT 5 or

copper within apartment buildings to connect end consumers. On the other hand, he believes that Greece and parts of central and eastern Europe have been harder hit by the crisis and plans have been put on hold. "It's a mixed picture but the economic situation has had less of an impact than anticipated," he says. Where private finance has withered, stimulus packages have to some extent taken up the slack, meaning that schemes backed by municipalities with public policy objectives in mind have come to the fore, he says.

The view that activity in Europe continues to be driven at a local level, often sponsored by municipalities rather than by incumbent telcos, meets with agreement from other vendors in the space. Carsten Storbeck, director of product marketing at ADC Krone, agrees that utilities and "tier two and three" carriers have been behind most recent activity, which are generally "small in size and scale".

The preponderance of local operators in western European fibre to date could to some extent reflect the relative robustness of DSL-based technologies in providing acceptably high bandwidth to densely-populated cities, with a higher threshold of bandwidth required than elsewhere to necessitate the upgrade to fibre – a situation that does not apply further East. Storbeck believes that most short-term growth in Europe will come from France, the Nordic countries and also possibly Portugal.

Cutting across regional variations, human geography and economic factors combine to influence the pattern of fibre deployment. Peter Linder, head of network strategy at infra-

structure provider Ericsson, argues that the potential market can broadly be divided into four segments. The first is Greenfield sites (new housing developments and business parks), where fibre deployment is seen as a sine qua non, but where development been hit by the decline of the housing market.

The second segment (comprising, according to Linder, about half a billion homes globally), comprises 'brown field' areas where there is intensive infrastructure competition, with cable and multiple DSL providers present. In these areas competition is driving investment in next-generation networks – whether DOCSIS 3.0, VDSL2 or fibre, with the latter being adopted in densely populated areas with high concentrations of MDUs.

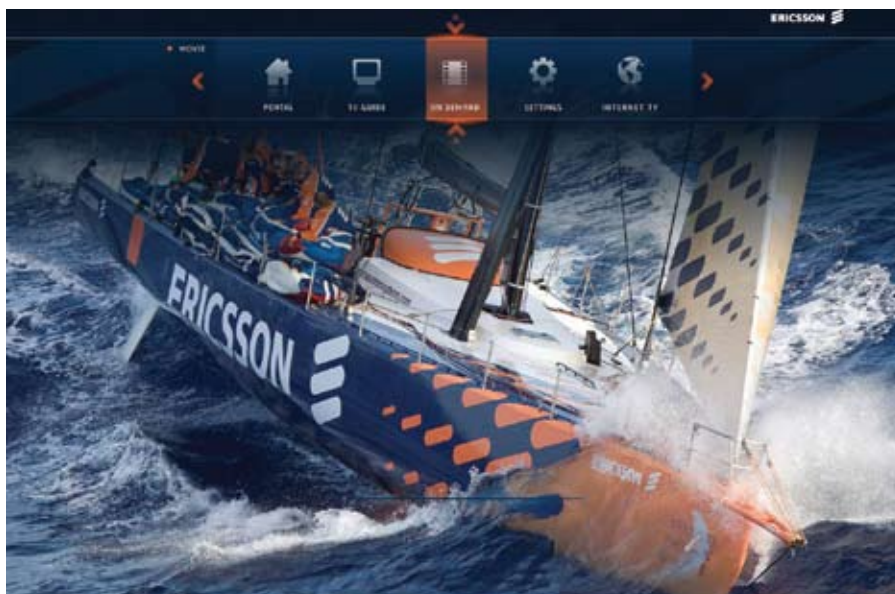
The third of Linder's quartet of segments comprises less populated 'grey' areas (similar in overall extent to the brown zones), typically served by a single provider (where investment in next-generation networks is driven primarily by government-sponsored initiatives).

Finally, there are 'white' areas where the business case for fixed-line infrastructure is difficult to make, and which might be better served with wireless technology.

Within this colour-coded universe, Linder sees most activity taking place in the brown field areas, with government initiatives driving some activity in the 'grey' areas. In the brown field areas, telcos themselves, often responding to cable competition, are more likely to invest in VDSL2 or fibre upgrades.

The degree of competition in a market is clearly an important determinant of operators'

High-definition TV is one of the key applications that could drive demand for networks delivering higher bandwidth.



The choice: GPON versus point-to-point

The major FTTH technology choice in Europe is between Gigabit passive optical networks (GPON), where the fibre infrastructure is shared between households up to the street cabinet, with passive (unpowered) optical splitters used to allow a shared fibre to serve multiple homes, and point-to-point, where individual fibres are run between the central office and individual homes. The latter is sometimes associated with the so-called 'layer 2' technology of Active Ethernet, where optical Ethernet switches are used to distribute signals to the customer.

The majority of rollouts in Europe to date have been point-to-point, reflecting the fact that most have been rolled out in municipality or utility-backed initiatives. "Telcos like GPON because it's more like a telephony model of lots of users aggregated to a single point before it comes into one office," says Russ Sharer, vice-president of marketing at Occam Networks. "Electrical companies and municipalities are more IT-oriented and go down the Ethernet route. Point-to-point networks give much greater bandwidth overall [but] the downside is that, if you build 10,000 homes on the network, you get 10,000 fibres coming back to a single location and it gets very difficult to manage." He says that GPON remains about "15-20% cheaper than Ethernet today".

Dutch service provider OONO, a customer of Alcatel Lucent, despite being present in a market that is dominated by point-to-point FTTH,

chose GPON. "We chose GPON because it's easy to operate and deploy," says OONO's CEO Oscar Kuiper. "You can also transport analogue and digital TV on the same fibre. With GPON you can also have two service providers connected to one customers on one line."

Carsten Storbeck, director of product marketing at FTTH supplier ADC Krone, on the other hand, argues that "one individual fibre" to each home is the only truly future-proof solu-



Storbeck: point-to-point fibre is the only truly future-proof solution.

tion. Wolfgang Fischer, in charge of next-generation access at Cisco Systems, is also a partisan of point-to-point and Ethernet architectures. He points out that a number of Europe's incumbents, including TeliaSonera, Telekom Slovenije, Swisscom and KPN, have opted for point-to-point. "Because of scalability and upgradeability it's the most future-proof option," he says. Fischer argues that infrastructure competition can best be facilitated by point-to-point, which, because it provides a unique fibre to each customer, easily enables multiple operators to compete across the infrastructure.

strategies. "Incumbents are deploying FTTH in most cases when pushed by competition," says Wolfgang Fischer, in charge of next-generation access at Cisco Systems. This is being driven by cable, which thanks to DOCSIS 3.0, is able to beat telcos to the punch in offering very high-speed services. In some cases, he points out, cable is currently marketing faster top-line internet speeds than FTTH or fibre-to-the-building competitors. "We all know [cable] is a shared medium but to the end customers it looks appealing," he says.

The extent of regional variation within Europe means that it is impossible to identify a single model for the whole of the EU, according to the FTTH Council's Helsen. "The EC would like to maintain an open, competitive environment, but also a favourable investment climate – it's extremely difficult,"

he says. Helsen says local regulatory regimes have played a key role in determining the speed and extent of fibre-building activity in particular markets. An appropriate strategy at Commission level might therefore comprise a set of general guidelines that give maximum flexibility to local regulators.

The major cost of fibre networks is digging the streets to lay them. It makes sense for operators to share ducts and to use existing infrastructure – notably sewers – to minimise this, which can best be encouraged by local regulators. For Helsen, the ideal regulatory regime is one that has fostered multiple broadband providers, where regulators have encouraged operators to cooperate in building networks and have encouraged infrastructure-based competition. Currently, amongst European countries, France is most advanced

in developing a regulatory framework. The EC recently gave a green light to telecom regulator ARCEP's plans for the 'mutualisation' of access to in-building fibre to encourage the deployment of FTTH. ARCEP plans to oblige all operators rolling out fibre to provide access to alternative operators, allowing users to choose between access providers.

Business model

While a favourable regulatory environment is a crucial ingredient to stimulate investment, commercial operators are unlikely to take the plunge if they do not believe that demand for the service will make their money back.

The business case for fibre has been a topic of much debate. Many projections work on the assumption that demand for video-rich services will lead to an exponential increase in demand for capacity, and telecom operators have over the last few years bet heavily on walled-garden IPTV services as part of a triple-play bundle. But the failure, thus far, of operators to make much money from IPTV has raised a question over this kind of vertical service model. Cisco's Fischer says that studies have shown that "very often the driver from the customer's perspective is not fancy new services but raw speed – people see that everyday applications like teleworking and enterprise-type activities just work better."

Recently there has been much hype around 'over-the-top' video services. It is also possible that other applications including home security, e-medicine, teleworking and e-learning that have yet to be fully exploited could fill the gap to some extent. "Operators' plans for services are driven by video and how to deliver this, in particular high definition video, telepresence and video conferencing," says Mark Chaplain, vice-president EMEA at technology company Ixia. "There isn't anything else that places so much demand on infrastructure."

The FTTH Council Europe's Helsen makes the point that FTTH has a strong advantage here over technologies including DSL and DOCSIS. "The good thing about fibre networks is the possibility of symmetrical bandwidth," he says. While differentiation based on download speed is of limited attraction to a segment of the market, the desire to upload content including videos, photos and presentations will lead to demand for higher upstream speeds. "The only way you can pro-

vide this is with fibre networks," he contends.

Ericsson's Linder believes there will be a trend away from flat-rate access towards more variegated tariff models that are attractive to consumers as well as making more sense for service providers. "As we move along we will see completely different tariffing schemes coming into play, essentially to make it more attractive for the end user," he says.

This theme is taken up by Helsen, who suggests that a range of service tiers may be marketed across new networks. "You could break up offerings in multiple ways to create packages for different audiences. High-end super-users could pay a premium price for [higher speed], while someone else can still have a fibre connection with a lower speed," he says. Helsen emphasises that all this is easier where there is infrastructure competition. Competition based on wholesale access is more likely to lead to a number of identikit service providers competing on price, he says.

One area that has attracted comment of late is business-to-business services, which includes making available an 'intelligent' network to consumer-facing service providers.

"As the access network becomes powerful, with local caching especially of video and video-on-demand it makes sense."



Peter Linder, Ericsson

The perception that content can efficiently be cached at the edge of the network, for example, has given rise to the notion that last-mile operators could provide content delivery network (CDN) services to third-party service providers. Alcatel Lucent recently acquired CDN specialist Velocix with this in mind. "It's a complementary solution to core caching because certain things are better cached in the [access] network and certain things are better cached in the core," says Kallstenius.

Ericsson's Linder believes that the infrastructure provider delivering some kind of Quality of Service to third-party providers could make sense, and he also sees a space emerging for the access network CDN model. "As the access network becomes powerful,

with local caching especially of video and video-on-demand it makes sense," he says.

According to David Noguer Bau, a member of the service provider marketing team for metro and wireline services EMEA with Juniper Networks, which provides broadband router aggregation servers (BRAS) that enable service providers to aggregate information about individual subscribers, FTTH operators are asking for this functionality, which has traditionally been centralised, to be located within the access network, allowing the operator to cache content locally. For Bau, not only will this enable better delivery of walled-garden on-demand services, it will deliver value to third-party over-the-top providers, who will be willing to pay to use the access network CDN.

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The intermediate solution: VDSL2

Given the high cost of digging up the streets to lay fibre all the way to the end customer, a number of operators are continuing to move ahead with upgrades that fall short of taking fibre all the way to the customer's premises.

Thomas Kallstenius, marketing director at Alcatel Lucent, observes that VDSL2, which makes use of existing copper networks after taking fibre to street cabinet-based DSLAMs, has been adopted by incumbent telecom operators that face competition from cable. "You can do a lot with 60Mbps - the market window for VDSL2 is quite big," he says.

Robin Mersh, chief operating officer of the Broadband Forum, believes that VDSL2 could enjoy a significant window of opportunity, with new technologies such as 'vectoring' (or dynamic spectrum management, which can improve the performance of a copper pair by cancelling so-called 'cross-talk' or interference from neighbouring lines) helping to increase bandwidth and extend the copper loop length over which it can be delivered.

Others are more skeptical. Russ Sharer, vice-president of marketing at broadband access equipment provider Occam Networks, points out that with VDSL2, in many cases "the delta cost of going all the way [with fibre] is small". Carsten Storbeck, director of product marketing at ADC Krone, points out that only subscribers within a small radius of the

street cabinet can benefit. While Deutsche Telekom, BT and Belgacom have made a commitment to the technology, Wolfgang Fischer, in charge of next-generation access at Cisco Systems, sees other incumbents scaling back VDSL2 deployment plans and focusing instead on fibre. "Those who are faced with competition from FTTH players can't afford to stick to VDSL," he says. "It's a transitional technology that you can upgrade to some kind of fibre to the home or building, but VDSL2 will not make it in the long term."

Nevertheless, VDSL2 could enable operators to reach some customers quickly. NTL:Telewest, the business services arm of UK MSO Virgin Media, plans to use VDSL2 to extend reach and offer symmetrical services. (Virgin Media offers telephony via its own copper loop that runs in parallel to the HFC network used to deliver TV and residential broadband). "We see DOCSIS 3.0 and VDSL2 as complementary. VDSL2 is symmetrical," says Marcus Hill, head of SI channel for NTL:Telewest. "VDSL2 is a project we have under way. We focused on getting DOCSIS 3.0 out first [but] there is a need for higher upload speeds in some instances." According to Hill, NTL:Telewest will use any solution that meets the needs of customers. Operators that are flexible will be best positioned to capture business users.

But there is a further case for building fibre. In DSL networks, central office functionality has been decentralised to the level of the DSLAM. For Bau, one incentive to build fibre is that, in the case of FTTH networks, this requirement is eliminated. The service provider's point of presence and central office can be combined. "Central offices will be reduced down to one because distance is no longer important," he says. "This is a huge cost saving." Ultimately, the move will mean that operators can sell off buildings that will simply become surplus to requirements.

Open access

Dutch service provider OONO, a customer of Alcatel Lucent, has introduced an entirely new business model for fibre. OONO operates networks on behalf of their owners (typically municipalities or housing associations), with services being offered by third-party providers. OONO helps its customers build their networks and then transports the services of the third-party providers to the end users. According to Oscar Kuiper, CEO of OONO, the genesis of the model was a general resentment on the part of access network providers that the incumbent, as provider of the backbone network, was unwilling to allow them a choice of service providers. OONO has invested in a nationwide level two network that is open to all service providers, enabling them to reach the last mile access networks provided by municipalities and local housing groups.

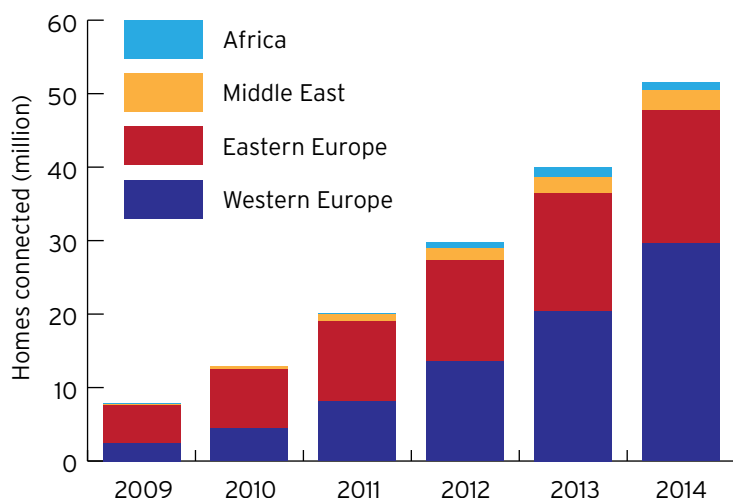
The question of how open networks should be has a regulatory as well as a business dimension, of course. Where fibre investments are supported by public finance, the requirement to adopt an 'open' model is pronounced. "It's clear that when you put public money in you have to open up the networks," says Cisco's Fischer. The EU is likely to look to open access also in cases where a single large player dominates the market. Incumbents including Swisscom are also forming partnerships with local municipalities and utilities to build out municipal fibre networks.

Yet commercial operators, including incumbents, will only be willing to invest in laying fibre if they can be sure they will be given a chance to make some money from it.

FTTH take-up could be driven by symmetrical applications including e-learning.



Projected EMEA FTTx subscribers 2009-14



Source: Informa Telecoms & Media's World Broadband Information Service

"People are struggling to figure out what the best model is," says Russ Sharer, vice-president of marketing at broadband access equipment provider Occam Networks. He points out that the most aggressive US operator,

Verizon, was given a degree of regulatory assurance that it would not have to share its new-built network with competitors.

For Alcatel Lucent's Kallstenius, the lessons provided by existing broadband markets apply

to fibre: infrastructure-based competition (where operators own their own networks and do not simply rent lines from others on a wholesale basis) works best. "It's better that everyone has their own fibre," he says. "We will see more duct sharing and so on but operators want to have their own infrastructure because it's not that costly."

But beyond the debate about whether or not the open or closed model makes best commercial sense, the question of how much actual demand there is for high-speed services remains open. "In Europe we have had a problem of not enough fibre but also low adoption [by consumers] compared with other countries," says Alcatel Lucent's Kallstenius. "We can't blame that on the regulator. Adoption has to be dealt with through marketing." For Kallstenius, the answer is to focus on local community-based marketing. He points to the success of operators including Lyse in Norway that have successfully marketed fibre on a municipality-by-municipality basis. In the current climate, getting fibre networks laid is quite an achievement. Selling the service to consumers is a challenge of a higher order. ●

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