KEY FINDINGS

**Catalysts for incumbent** telcos to roll out fiber networks include revenue loss, competition, user demand, and the high cost base of existing networks

**Deployment of fiber** cannot be justified by short-term financial ratios, but rather by longer-term concerns about the shape of user demand and competitive pressures

**Savings on opex are** a key objective in all-fiber networks, and were particularly important for Verizon

**Strong government** involvement and funding was not, contrary to popular opinion, a key motivator; however, regulatory action can make a significant difference to the business case

**Europe is likely to lag** the rest of the world in the transition to very high-bandwidth NGNs

JANUARY 2006

## EXECUTIVE SUMMARY

# The Business Case for Incumbent Telco Fiber Networks

No European incumbent telco has yet made a firm commitment to full-scale rollout of fiber to the home (FTTH). But elsewhere – especially in Asia – some incumbents are taking a much more positive view.

This White Paper reviews the plans and objectives of three telcos that are blazing a trail for FTTH:

- KT (Korea Telecom)
- NTT
- Verizon

Among them, these three major incumbents anticipate connecting more than 20 million homes with fiber by 2008 and 50 million homes by 2010. And the three are already offering services that include HDTV and Internet access at up to 100 Mbit/s.

In our research, we identified eight basic catalysts for deploying FTTH and found that there is usually a requirement for at least two "green lights" to make the case for moving forward. However, justifications varied from one incumbent to another, often because of variations in local conditions.

In Europe, lights are mostly still on amber. However, pressure is building, and the lights are likely to turn green for at least one telco over the next 12-18 months.

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# I. Introduction and Executive Summary

No European incumbent telco has yet made a firm commitment to full-scale rollout of fiber to the home (FTTH). Most believe that there is no business case yet, and do not anticipate mass-migration to all-fiber networks before 2008 at the earliest. But elsewhere – especially in Asia – some incumbents are taking a much more positive view.

This White Paper reviews the plans and objectives of three telcos that are blazing a trail for FTTH: KT (Korea Telecom), NTT, and Verizon. Among them, these three incumbents anticipate connecting over 20 million homes with fiber by 2008 and 50 million homes by 2010. And they are already offering services that include HDTV and Internet access at up to 100 Mbit/s.

In our research, we identified eight basic catalysts for deploying FTTH, shown in **Figure 1.1**, and found that there is usually a requirement for at least two "green lights" to make the case for moving forward. However, justifications varied from one incumbent to another, often because of variations in local conditions. Figure 1.1 also compares the three companies studied to the situation in Europe, showing that the lights have not yet turned green for European incumbents.

**Figure 1.1: Catalysts for Incumbent FTTH/FTTP Projects**

| CATALYST | DESCRIPTION | NTT | KT | VERIZON | EUROPE |
|---|---|---|---|---|---|
| Revenue Attrition | Search for wider revenue sources | 4 | 4 | 4 | 4 |
| User Demand for High Bandwidth | More downstream/upstream speed for gaming, P2P, photo/video uploading, etc. | **5** | **5** | 3 | 3 |
| Applications & Devices | HDTV, high-quality videophone, 3DTV, 3D gaming, grid computing, multi-play packages | 4 | 4 | 5 | 3 |
| Competition | From cable MSOs, utilities, municipal fiber projects, IP-centric telcos, ISPs, etc. | **5** | 4 | **5** | 3 |
| Address High Cost Base | Fiber access with IP NGN equals much lower cost base | 3 | 2 | **5** | 2 |
| Future-Proofing | No further network upgrades; higher entry barriers for third parties; copper obsolescence | 3 | 3 | 4 | 2 |
| Regulatory Relief | No mandatory unbundling or open access | 2 | 3 | 4 | 1 |
| Political Will | Make our country competitive; be first with high-bandwidth services | 3 | **5** | 2 | 3 |

*Source: Heavy Reading; 1= not a catalyst; 5 = major catalyst*

For NTT, which has pioneered incumbent deployment of fiber and has already connected about 2.5 million homes, the main justifications for the move are intense local competition and strong evidence of demand for more bandwidth among consumers. For Verizon, the desire and need to control costs was as important as the need to compete more effectively with cable MSOs; regulatory relief from unbundling was also important. And for KT, the decisive factors have been the early saturation of the broadband market, along with strong government incentives and initiatives.

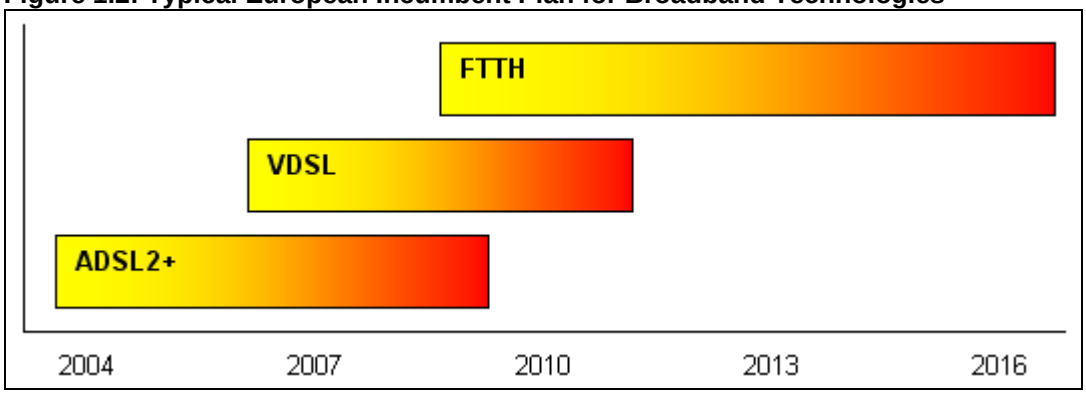
In all three cases, however, the incumbents had a long-term vision in which they continued to play a central role in the development of communications technology in their nation or region – and in the final analysis, this probably mattered most of all. Deployment of FTTH is not (and probably cannot be) justified by short-term financial measures, but the three incumbents in our

study clearly believe it can be justified in their long-term plans to survive and prosper in the face of rapid changes in consumer demand and market conditions.

For the time being, meanwhile, European incumbents are biding their time – the conventional wisdom among them being that the time is not yet right for FTTH. Although most accept the principle that ***eventually*** fiber will reach most homes and businesses, timing is everything. And it is telling in this regard that very few incumbents have even set a timetable for rolling out fiber.

**Figure 1.2** offers a rough consensus view of thinking on the issue today: The typical European incumbent telco does not currently anticipate large-scale deployment of FTTH before 2008 at the earliest. Most envisage a staged transition from ADSL to (in most cases) VDSL, with FTTH following a few years later.

**Figure 1.2: Typical European Incumbent Plan for Broadband Technologies**

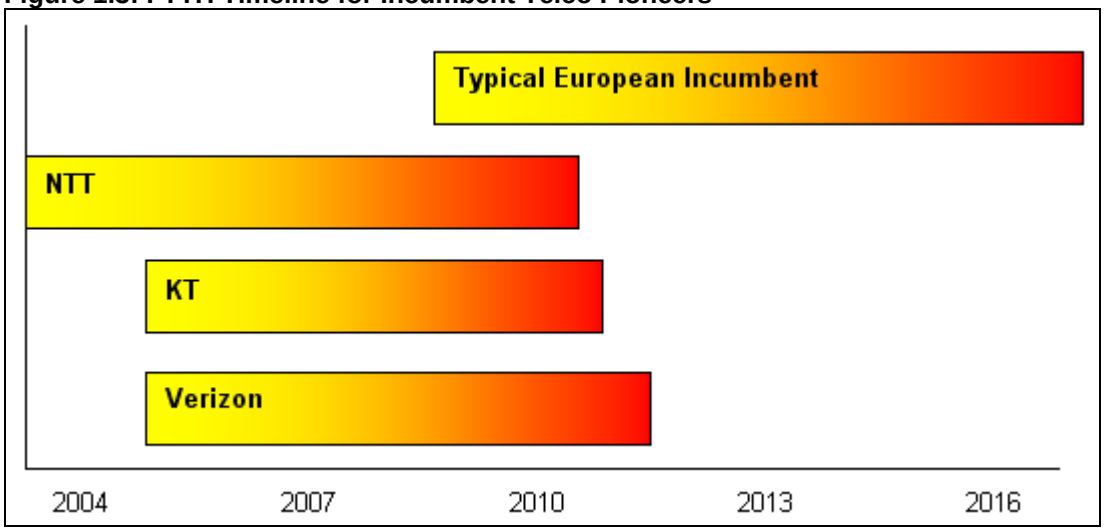



*Source: Heavy Reading*

The root cause of this reluctance can be summed up in one word: cost. Most incumbents overspent during the boom of the late 1990s, and since every action has an equal and opposite reaction, most have been wearing financial hairshirts through the first few years of the 21st century. As a result, financial markets are again happy, debt is down, and cash is flowing in. In principle, that cash could be used to finance a big new investment in the access network. But very few incumbents have made any concrete commitment yet.

However, as **Figure 1.3** shows, the fact that European incumbents don't yet believe the time is right for investing in FTTH is not stopping major carriers in other regions from pushing ahead. Incumbents in China, South Korea, Japan, and the U.S. are already moving strongly towards FTTH, although their motives and justifications for doing so vary widely.

**Figure 1.3: FTTH Timeline for Incumbent Telco Pioneers**




*Source: Heavy Reading*

**Figure 1.4: Selected Incumbent FTTH Rollouts Outside Europe (Households)**

| INCUMBENT | 2004 | 2006 | 2008 | 2010 |
|---|---|---|---|---|
| KT | N/A | 3M | 6M | 10M |
| NTT | 750,000 | 4M | 12M | 30M |
| Verizon* | N/A | 2M | 4M | 6M |
| Chunghwa Telecom (Taiwan) | 100,000 | 1M | 2.8M | 4.2M |

*Source: Heavy Reading estimates, based on government and telco estimates*
**Based on Verizon estimates of homes passed and assumed penetration rate of 30 percent.*

Developments elsewhere are now starting to have an impact in Europe, where there are signs of increasing impatience among politicians, mostly at the local and municipal level, about the slow speed of development. It's very important to note here that **any** rollout of FTTH is a long process, likely to take up to ten years to reach maturity. In Japan, the first country to adopt fiber, household penetration five years after initial deployment will reach around 20 percent. Hence, European incumbents that choose to deploy fiber in 2008-2009 are unlikely to achieve mass-market penetration before 2015 or thereabouts. Meanwhile, developments in applications and service bandwidth requirements, driven by Moore's Law, are likely to accelerate well beyond the capabilities of DSL and other copper-based technologies.

For European incumbents, therefore, a crunch may be approaching. Despite their generally settled conviction that the time is not yet right for fiber, it's likely that pressures – both political and market-based – will intensify markedly in the next one to two years, leading to a more rapid timetable for change than is currently envisaged. Where incumbents hold out for too long, we predict a strong trend towards municipal fiber deployment.

The purpose of this paper is to understand why certain major telcos outside Europe have made a strong commitment to FTTH. How did they make the case for fiber? What were the catalysts? Where customers are now connected to the network, what has been the result? And what, if anything, does this mean for European incumbents?

To these ends, we explore the experiences and views of three major global incumbents: Verizon in the U.S.; NTT in Japan; and KT in South Korea. In the final section, we consider the implications of these case studies and suggest the practical steps incumbents need to take in making the case for fiber.