CASE ASSOCIATES

New Generation Network Development in the Netherlands

Market definitions

Report prepared for

Koninklijke KPN N.V.

kpn

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Summary

Retail

- The chain of substitution for broadband packages is likely to break at around 30Mbit/s which would place cable and fibre in the same retail broadband market but not copper.

- Copper and off-air digital RTV services do not place a competitive constraint on cable RTV services. Hence copper RTV and cable RTV services are not in the same relevant product market. However, fibre will offer analogue RTV services and provide a direct constraint on cable RTV services, placing cable and fibre RTV services in the same retail market.

- FTTH will provide triple play bundles including analogue RTV services. This will present a more effective competitive constraint on cable RTV services and hence be more likely to be in the same relevant product market.

Wholesale

- A high-speed WBA market at speeds of 30Mbit/s and above can be defined which includes cable and fibre, but not copper-based broadband services.

- Based on direct constraints analysis there are separate wholesale physical access markets for copper and fibre because of significant upfront fixed and switching costs to access seekers (and KPN) from switching between copper and fibre. Also copper and fibre networks are not likely to coexist in the same geographical market.

Geographical

- Fibre will be deployed and replace copper; while cable will upgrade in areas where fibre has been deployed. It is therefore most likely that upgraded cable and fibre will be in the same regional/local markets without the presence of copper apart from a transitional period. Thus copper will not provide an effective competitive constraint on fibre and cable.

1 Introduction

1.1 ISSUES

This report has been commissioned by KPN to assist with market definitions associated with the development of New Generation Networks (NGNs) and in particular wholesale markets associated with the passive tier of Fibre-to-the-Home (FTTH) in the Netherlands.

The development of a NGN has just commenced in the Netherlands and is not likely to be fully established within the next regulatory period (2009 to 2011). It is at a highly critical and formative stage requiring considerable investment in the face of highly uncertain returns. The commercial attractiveness of this investment will depend on forecasts of costs, coverage, the likely demand, the risks, market factors, and the regulatory framework. The last factor will have a substantial impact on the willingness to invest and the type of NGN and its footprint.

At the same time the principles which trigger *ex ante* regulatory obligations, while well established, have an acknowledged fluidity when applied to emerging markets such as NGNs. In the application of *ex ante* regulation (and *ex post* competition law and merger clearance) NGNs raise uncertainties surrounding the delineation of the markets for copper, fibre, cable, and wireless networks.

In this report we examine the possible wholesale and access markets of the so-called passive tier of NGN networks. In line with accepted market definition principles this will necessitate consideration of downstream/retail markets for the services which copper, cable, fibre and wireless networks do and will prospectively supply to the Dutch consumer.

It is noteworthy that the ERG opinion on regulatory principles for NGA states that NGNs cannot be treated in isolation from cable and alternative networks, but then sets out its

regulatory principles ignoring the competitive constraints imposed by cable networks in the Netherlands (and other countries)[1]. This compartmentalisation of technologies as a basis for setting out of basic regulatory principles is misguided and incorrect, as the discussion below will clearly show.

1.2 OPTA'S PROVISIONAL DECISIONS

In anticipation of the revision of the NRF the Independent Post and Telecommunication Authority (OPTA) has published a number of Draft Decisions covering *ex ante* Wholesale Markets 11[2] and 12[3] (redesignated as Markets 4 and 5 under the new EC Recommendation of 2007[4]).

These draft decisions provisionally identify the following *ex ante* markets:

- Separate residential and business markets for fixed telephony.
- Two access markets – an unbundled access to copper (Main Distribution Frame (MDF); Sub-loop Distribution Frame (SDF) and fibre (Optical Distribution Frame (ODF)) access; and a separate market for physical access to cable.
- Two separate wholesale broadband access (WBA) markets – low-quality with a contention rate less that 1:20 and high-quality with a contention rate between 1:1 and 1:20[5].
- Two wholesale and retail leased line markets – low capacity (up to 20Mbit/s) and high capacity (more than 20Mbit/s).

[1] *ERG Opinion on Regulatory Principles of NGA*, ERG (07) 16rev2, p. 29.

[2] OPTA, *Marktanalyse Breedband – Ontbundelde toegang op wholesale-niveau – Ontwerpbesluit*, 29 Juli 2008.

[3] OPTA, *Marktanalyse Breedband, Wholesale – Breedbandtoegang, Onwerpbesluit*, 29 Juli 2008.

[4] *Commission Recommendation on the relevant product and service markets within the electronic communications sector susceptible to ex ante regulation*, Second edition, C(2007)5406 rev1, p. 9.

[5] The contention rate is the ratio between the maximum bandwidth needed if all users use the network at maximum speed and the actual available bandwidth.

- Separate regional cable markets delineated by the network footprint of the Netherlands four cable operators.

The draft decisions make a number of preliminary determinations:

- Multiplay (telephony, television, and broadband) packages do not yet constitute a separate *ex ante* product market.

- The retail telephony market is sufficiently competitive to abolish the regulation of KPN's tariffs.

- The broadcasting retail market is not competitive. KPN's Digitenne digital, internet television (IPTV) and satellite do not impose a sufficient competitive constraint on cable operators Ziggo and UPC.[6]

In the next regulatory period (2009 to 2011), OPTA provisionally proposes:

- No retail regulation on the telephony, broadcasting or broadband markets.

- WBA for the copper network.

- Access to the sub-loop distribution frame (SDF) and optical distribution frame (ODF) for the FTTC and FTTH networks respectively (but no WBA for FTTH).

- Resale of cable connections and analogue radio and television (RTV) signals imposed on Ziggo and UPC on wholesale and retail levels.

- Tariffs that incentivise investment and *"encourage the development of infrastructure competition"*[7] even if this is at the expense of short-term service competition. OPTA proposes access tariffs to the ODF which gives FTTH operators a reasonable profit, and wholesale resale tariffs for cable connections that do not dampen investment in cable upgrades.

[6] OPTA, *Marktanalyse omroep Ziggo B.V. – Ontwerpbesluit*, Voorontwerp, 5 Augustus 2008.

[7] OPTA, *Fixed Telephony, Broadband and Leased Line – Preliminary Draft Decisions*, *Content and Perspective, Executive Summary*, 15 July 2008, p.17.

1.3 STRUCTURE OF REPORT

This report is organised as follows:

- Section 2 provides the background to the technology of copper and FTTH networks.
- Section 3 defines the relevant product and geographic markets.
- Section 4 summarises our findings.

2 Background

This section sets out the essential features of the various technologies and the factors affecting market structure and competitive pressures potentially relevant to the development of NGNs, and in particular FTTH.

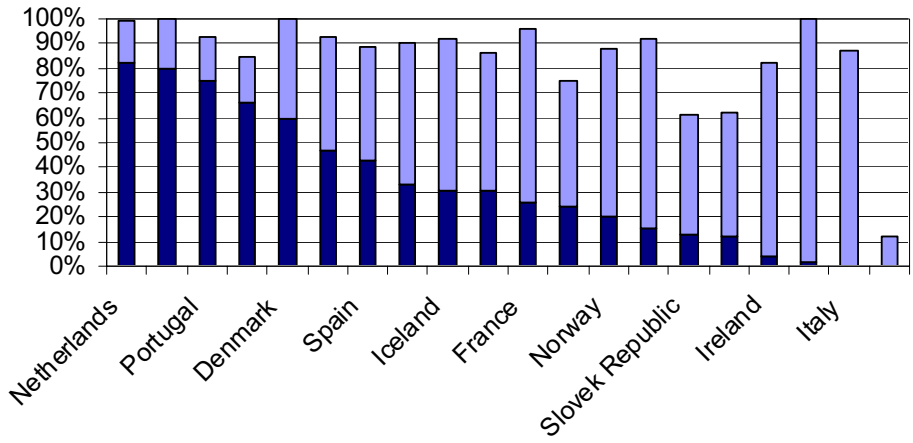
2.1 FIBRE NETWORKS

The present configuration of fixed networks in the Netherlands consists of an ubiquitous copper Public Switching Telephone Network (PSTN), owned and operated by KPN, third party operators which have their own network components and access to KPN's network, and regional vertically integrated cable networks which cover almost the entire country.

About 98% of the Dutch population are passed by a DSL broadband network, and 82% by both DSL and the cable networks (see Figure 2.1 below). Therefore, unlike in most EU Member States almost all Dutch consumers have a choice between DSL and cable broadband and telephony services.

As a result the Netherlands is in the almost unique position within the EU of having direct and vigorous platform competition (even ignoring wireless networks) offering competitive broadband, telephony and RTV packages to residential consumers.

Figure 2.1: Percentage of population covered by broadband networks



Source: OECD, Broadband Growth Report

The critical issue surrounding NGNs is the replacement of existing copper and coaxial cable, in full or part of the network, with optic fibre cable. Optic fibre networks have the attraction of providing virtually unlimited bandwidth and with this a range of new and enhanced services.

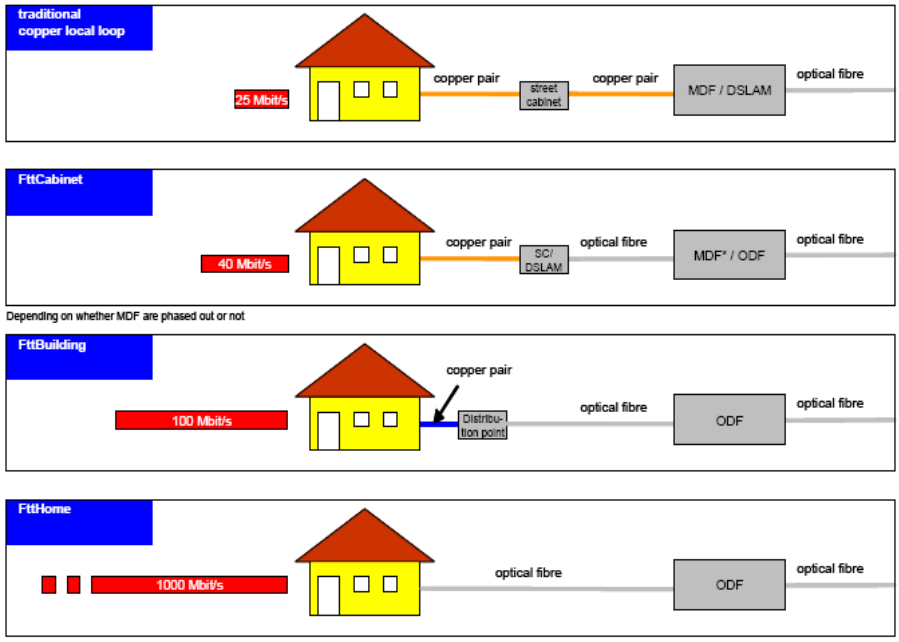
Optic fibre cable consists of many hair thin strands of glass. These use light rather than electrical impulses to transmit data. A pulse of light is generated by a laser at one side and translated into an electrical pulse at the other end. The translation works at enormous speed, currently up to 40Gigabit/second, which is far above the future requirement. This speed is possible because the transfer of light is independent of resistances and hence the distance travelled.

Network Architecture

As would be expected NGNs have a different network configuration which will have competitive and regulatory implications.

Traditionally the PSTN consists of three components – a long haul national and international network, a backhaul or backbone network for regional data distribution and a 'last mile' or local network which connects end-users to the local central switching locations (the central office). Historically all these segments used copper and analogue transmission but over the last decades the backbone and backhaul segments have been upgraded with optic fibre and digitalised. This has lead to the development of DSL broadband services to the home in the Netherlands. However, the local loop – or as it is sometimes called the 'last mile' – remains copper (see Figure 2.2 below) and this has placed constraints on the bandwidth, reliability and functionality of the services available to residential and business customers.

Figure 2.2: FTTx networks and sustainable rates



Source: ERG, Opinion on Regulatory Principles

At a simplistic level the impact of optic fibre deployment can be gauged by its closeness to the home. Figure 2.2 (above) depicts these with the sustainable speeds (defined below) that these different network configurations enable, together with the potential

access points. Among those most commonly discussed are FTT Home (FTTH) where the fibre connects to the end-user's premises, FTT Building (FTTB) where the fibre stops at the building; FTT Kerb (FTTK) where fibre stops at a curb near a building or group of buildings; and FTT Cabinet (FTTC) where fibre stops at a cabinet with telecommunication equipment that serves a neighbourhood.

Of these the two most relevant to the development of NGNs in the Netherlands are:

- **Fibre To The Cabinet (FTTC)** - This replaces copper with fibre to cabinets but retains copper from the cabinet to homes and businesses. FTTC increases speed but the use of copper in the last mile places limitations on bandwidth and hence services. FTTC networks are being deployed in Australia, Germany, Switzerland, Belgium, etc. and KPN plans to develop FTTC in non-urban areas.

- **Fibre To the Home (FTTH)** – These are all-fibre networks. Each home is connected to the cabinet by glass strands which allow very high speed broadband of more than 100 Mbit/s. FTTH is being deployed locally in urban areas in the Netherlands.

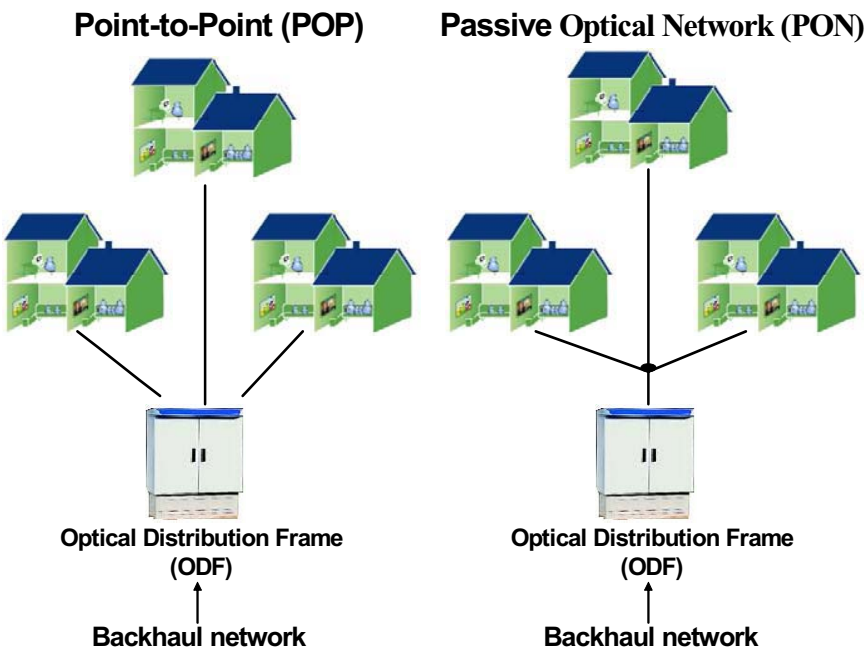
In addition there are two types of FTTH networks (see Figure 2.3 below) – the Ethernet Point-to-Point (POP) network and Passive Optical Network (PON):

- **Ethernet Point-to-Point (POP):** A POP network has one fibre dedicated to every end-user, which prevents sharing with other users in the local loop and allows individual upgrading to higher bandwidth. The same design is used for the current PSTN where the copper's capacity does not have to be shared in the last mile. From a regulatory perspective, POP network offers more regulatory opportunities like unbundled local loop unbundling (ULL) or Wholesale Broadband Access (WBA)[8]. The largest network provider in the Netherlands (Reggefiber) is building a POP network.

- **Passive Optical Network (PON):** The PON uses one fibre to connect multiple end-nodes, and therefore users have to share the available bandwidth. It allows adding new subscribers to the fibre, but makes individual upgrade to higher bandwidth difficult.

[8] OECD, *Developments in Fibre Technologies and Investment*, DSTI/ICCP/CISP(2007)4/Final, 3 April 2008, p. 28, ("OECD Fibre Report").

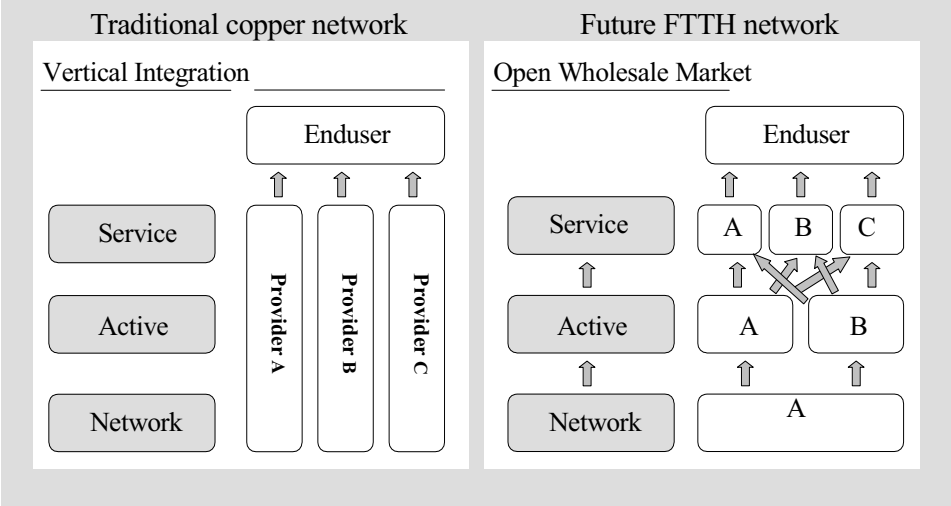
Figure 2.3: Different FTTH network topology



Source: Case Associates

A FTTH network has three layers - passive, active and service levels. The passive layer is the basic infrastructure (ducts and optic fibre), the active layer includes equipment for transporting data over the network and customer premise equipment, and the service level the services provided over the FTTH network. The difference between this structure and the copper PSTN is depicted in Figure 2.4 (below). This report is primarily concerned with market definitions related to the passive tier of a FTTH network.

Figure 2.4: A network comparison



Source: Case Associates based on KPN information

Bandwidth and Speed

From the consumers' perspective the main difference between copper, hybrid networks using copper or coaxial cable and fibre, and all-fibre networks is their bandwidth or speeds.

There are three elements to the speed of broadband connections –

1. the sustainable (downstream) speed;

2. whether the bandwidth is asymmetric or symmetric i.e. the speed is the less or the same upstream as downstream;

3. the contention rate.

Consider these in turn:

The bandwidth of a network is measured in megabits per second (Mbit/s) and is know as the sustainable rate. The sustainable rate varies considerably for different networks. The

speed of data transferred over copper is inversely proportional to the resistance of the copper line which decreases with distance. Thus speed of copper based xDSL and cable broadband depends on the distance of the exchange to the customer. To reach the maximum speed for VDSL technology the switch has to be around 450 metres from the end-user. The impact of this is appreciable. KPN has provided internal documents to us which show that the typical residential customer receives average download speeds of 12 Mbit/s (on ADSL2+) and 14Mbit/s (on VDSL2) on KPN's current network where the MDF is the last switch. These technologies are not available to 50% of the households because they are living too far from the switch. A roll-out to FTTC will make the maximum speed of 30Mbit/s available to 70% of all copper lines and the average speed will rise to 24Mbit/s. Even then the maximum speed will not be comparable to the one for fibre where the speed (of light) is unaffected by distance. FTTH in practice will offer over 100 Mbit/s symmetrical broadband to every customer.

Second, the speed of downstream and upstream traffic often differs. Most current broadband connections are asymmetric i.e. have faster download than upload speeds. This is the case for ADSL and cable broadband, and many new generation technologies. Some dedicated DSL products do offer symmetric speeds but these use dedicated leased lines. The transfer of light through fibre is symmetrical with similar up- and download speeds/bandwidths. Such symmetric connections are especially important for real time services like Voice over Internet Protocol (VoIP) and video telephony, which require as much data transferred by the personal computer as is received.

The third factor that affects the bandwidth available to the customer is the contention rate. The speed to the end user is often much lower than the maximum advertised speed and depends, apart from distance from the street cabinet, on the number of users sharing the line from the street cabinet. This is captured by the contention rate. A contention rate of 1:1 means that the line is for the exclusive use of a single customer. A contention rate of 1:10 means that the line, and hence available maximum bandwidth, is shared between up to 10 users, and so on. Clearly the fewer sharing the line the greater will be the speed. Copper currently has contention rates of 1:20 while FTTH will have a contention rate of 1:1.

There is a presumption that consumers will increasingly demand higher sustainable speeds. The OECD estimates that by 2011, households will have a standard download requirement of 50 Mbit/s and an upload requirement of around 10 Mbit/s[9]. High

[9] OECD Fibre Report, p. 13.

sustainable rates are especially important for television services like high definition television (HDTV). Optic fibre allows internet service providers (ISPs) to offer multiple channels, while offering two or three HD channels simultaneously requires guaranteed bandwidth which is beyond the ADSL capabilities[10].

Whether or not this is the case, the fact remains that the economic and commercial case for FTTx investment relies on assumptions that greater bandwidth will be demanded by the Dutch consumer, and is economically viable to supply together with the enhanced services.

It is also a fact that the technical features of different enhanced copper, cable and fibre networks differ very significantly in terms of the three elements of bandwidth identified above. Based on information gleaned from public sources (principally the OECD) and provided by KPN, Table 2.1 below shows the bandwidth of different copper, cable, fibre networks. This shows very dramatic differences in bandwidth and service reliability. It reinforces the point that fibre, and particularly FTTH will deliver very high-speed broadband.

Further, as discussed above there are vast differences between the theoretical maximum bandwidth (as listed in the Table) and that actually be available to customers on a day to day basis. For example, attempts to upgrade the copper network through VDSL can theoretically deliver speeds of up to 50Mbit/s downstream and 30 Mbit/s upstream.[11] The maximum observed download speed in the Netherlands with VDSL2 technology with the minimum distance to a local switch has been 30Mbit/s[12]. But this speed is very unlikely to be realised for the average residential customer.

The same is the case for FTTH. A recent Ofcom study estimates that 50Mbit/s is the maximum speed of a FTTC in an idealised environment[13] with realised speeds of VDSL expected to be considerably lower.

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[10] R. Montagne, *Understanding the Digital World - The market's evolution to very high-speed*, IDATE, August 2006, p. 6.

[11] OECD Fibre Report p. 16.

[12] Internal data from KPN on DSL speeds on KPN's network provided to Case Associates.

[13] R. Williamson, J. Klein, M. Reynolds and R. Jones, *Assessment of the theoretical limits of copper in the last mile*, Sagentia, Final Report commissioned by Ofcom, 16 July 2008.

On the other hand cable operators have announced plans to upgrade their networks to EuroDOCSIS 3.0[14]. This should achieve download speed of between 60 Mbit/s to 120Mbit/s. This compares favourable to the bandwidth of FTTH networks of around 100 Mbit/s or more.

Table 2.1: Sustainability rate in the last mile network by type of technology

Technology	Type	Maximum downstream speed (Mbit/s)	Maximum upstream speed (Mbit/s)	Maximum distance
Wireless				
	HSDPA (3G mobile wireless)	1	1	250m
	WiFi	54	54	30m
	WiMAX	40	40	10km
Hybrid				
PSTN	ADSL2+	24	3.5	n.a.
	VDSL2	50	30	450m
Cable	fibre/coaxial cable (DOCSIS 3.0)	160	120	160km
Powerline	BPL	27	18	n.a.
Fibre				
POP	FTTB	100	<100	independent
PON	APON/BPON (FTTH)	622	155 or 622	independent
	GPON (FTTH)	2500	1250 or 2500	independent
	EPON (FTTH)	1250	1250	independent

Note: The maximum speed on the VDSL2 network refers to the maximum distance of 450m to the switch (that is FTTC). However, this speed is barely observed in practice. In the Netherlands the weighted average of download speeds on the planned FTTC network will be 24Mbit/s. The maximum observed download speed on FTTC in the Netherlands is 30Mbit/s for the minimum distance to the switch (maximal 500 meter).

Source: OECD, Fibre Report

[14] Press Release, *Ziggo en UPC naderen stromversnelling – uitrol grote kabelupgrade in startblokken,*, 11 Augustus 2008, www.zdnet.nl

2.2 DEVELOPMENTS IN THE NETHERLANDS

We are aware of recent publicly announced developments that indicate planned investment in FTTC, FTTH and upgraded HFC networks in the Netherlands. We do not pretend that this is a comprehensive picture but it does indicate the broad trends which have a bearing on possible market definitions and regulatory principles.

FTTH

The total number of FTTH homes connected in the Netherlands was 175,631[15] in March 2008 with more than 50% of these subscribing to FTTH services. One estimate puts the number of homes that will be connected to FTTH by 2011 at between 600,000 and 700,000.[16]

The major FTTH projects are in North-Holland, Flevoland, Gelderland, Overijsel and the Eindhoven region (Southern Holland). Amsterdam's Citynet (42,000 homes) is nearing completion and the Deventer project (40,000 homes) is completed. The main new FTTH projects will take place in Almere (70,000 homes) and Eindhoven (40,000 homes).

Reggefiber is the largest FTTH network development company whose principal shareholder is a construction company. It has controlling stake in Deventer, Eindhoven, and Nuenen projects. Reggefiber is constructing POP networks using one (unshared) fibre connection to each home.

ING Real Estate and Rabo Bouwfonds are also investing in Amsterdam and Westland (Zuid-Holland) networks.

An independent study commission by OPTA estimates assuming €30 duct cost per meter that for FTTH to cover 60% of Dutch households would cost €6.3 billion, and €14.8 billion to achieve nationwide coverage[17]. The strong cost increase is due to the

[15] Stratix, *The Netherlands: FTTH deployment overview,* March 2008, p.1.

[16] E. Compter and J. Schepers, *Fibre-to-the-Home (FttH) in the Netherlands*, Telecompaper, Report commissioned by OPTA, 8 May 2008, p. 6.

[17] Analysys Mason, *The business case for fibre-based access in the Netherlands*, Final Report for OPTA, 24 July 2008, p. 28. Also see Stratix, *The Netherlands: FTTH deployment overview*, March 2008.

fact that infrastructure in rural areas is more expensive than in densely populated areas. KPN's cost estimate for the required investment for a roll-out in densely populated areas is roughly €6 billion[18], which is similar to the estimates of the OPTA study.

FTTC

KPN has plans to upgrade its copper network to an All-IP network with VDSL and FTTC in non-urban areas. The roll-out of FTTC will see the current copper loop between the street cabinet and the Main Distribution Frames (MDFs), which connect the last mile network to the backbone, be overbuilt by fibre. Devices in the street cabinet will be upgraded so that voice, video, and data can be provided in an integrated way. KPN's plan is to rollout FTTH in densely populated areas, and FTTC in rural areas where FTTH is not commercially viable.

Hybrid Fibre-Coaxial (HFC) networks

The two main Dutch cable operators (UPC and Ziggo) have recently announced plans to upgrade their networks to compete directly with FTTH. They plan to rollout EuroDOCSIS 3.0 (Data over Cable Service Interface Specification) region by region starting in October 2008. The roll-out begins in those regions where FTTH networks are being deployed.

UPC plans to pass 400,000 to 1 million homes by the end-of this year[19].

While upgraded HFC cable networks can achieve download speeds of up to 200Mbit/s, the maximum speed has been 120Mbit/s on part of the UPC network in Amsterdam. UPC plans to offer internet packages with a download speed of 60Mbit/s to 120Mbit/s comparable to FTTH.

Ziggo's Annual Report of 2007 (p. 4) indicates that due to an upgrade in the past years, the cable network is now fully competitive with new generation networks:

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[18] Interview with KPN Chief Regulatory Officer Jilles van den Beukel, 14 August 2008.

[19] Press Release, *Ziggo en UPC naderen stromversnelling – uitrol grote kabelupgrade in startblokken*, 11 Augustus 2008, www.zdnet.nl.

> *"Zesko's hybrid network – a combination of optic fibre and coaxial cable into customers' homes – is fully upgraded to ensure it can offer customers the transmission levels for the next generation of services, particularly interactive services"*

Ziggo wants to focus on offering triple play services, the bundling of digital RTV, VoIP telephony and broadband for residential customers and on the development of an all-fibre network, City Access, for business customers.

2.3 SUMMARY

We are not in a position to nor have we been asked to forecast the future development of FTTH and NGNs in the Netherlands. Nonetheless our analysis is based on several assumptions which need to be set out clearly:

- The costs and development of FTTH in the Netherlands will result in a regional patchwork of FTTH networks facing a competitive response from upgraded cable networks with the traditional PSTN withdrawing in those areas. Given the costs of FTTH deployment it is unlikely that there will be national coverage ever (unless subsidised by Government) and only regional coverage over the next regulatory period.

- In non-urban areas where FTTH deployment is too costly will continue to receive services from copper and KPN's FTTC network.

- Cable operators are and will deploy enhanced HFC networks (EuroDOCSIS 3.0) in those fibred areas to compete with FTTH.

- VDSL and other copper based broadband products will not be able to match the bandwidth and functionality of fibre and HFC networks.

3 Market Definitions

This report is concerned principally with upstream/wholesale market definitions as they relate to the passive tier of a FTTH network. However, as will be made clear access markets (Markets 4 and 5) cannot be examined in isolation or based solely on an assessment of the direct constraints operating at the one functional level. The analysis needs to be broader to take into account the fact that wholesale and retail markets are vertically related. Indeed, as will be explained the primary market for the assessment of competitive pressures in upstream markets is the retail market. This is the so-called indirect constraints approach.

Adopting the starting point of downstream markets we believe that an analysis of indirect constraints place FTTH and cable in the same relevant WBA market, and that the copper network provides a weak(er) competitive constraint on both of these. In particular we believe that indirect constraints and product bundling (triple play) which include RTV services will result in different market definitions than provisionally proposed by OPTA.

Second, the same analysis should apply to the assessment of the wholesale physical access market. However OPTA has relied almost exclusively on the analysis of direct constraints based on the similarity of access and access prices. While we believe excessive emphasis has been given to the direct constraints by OPTA, we do not accept that even if this is the correct approach, that OPTA has shown that fibre and copper unbundling are in the same relevant wholesale physical access market. Indeed, the more likely conclusion is that copper and fibre are in different markets based on an analysis of direct constraints.

In this section we support these contentions.

3.1 PRINCIPLES OF MARKET DEFINITION

General

The EC New Regulatory Framework (NRF)[20] uses competition law principles to define markets and trigger *ex ante* obligations on network operators[21].

The acknowledged purpose of market definition in both law and economics is not as an end itself but as a tool to assist in the identification of non-transitory Significant Market Power (SMP).

The EC *Market Definition Notice* (para 7) follows the European courts stating that:

> *'A relevant market comprises all those products and/or services which are regarded as interchangeable or substitutable by the consumer, by reason of the products' characteristics, their prices and their intended use.'*

The *EC Market Definition Notice*[22] and the *SMP Guidelines*[23] set out the principles for the delineation of product and geographical markets. Both define markets in terms of products which impose a competitive constraint on one another so as to keep prices to their competitive level.

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[20] *Directive 2002/19/EC on access to, and interconnection of, electronic communications networks and associated facilities,* 7 March 2002 (*Access Directive*); *Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services*, 24 April 2002 (*Framework Directive*) and *Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services,* 24 April 2002 (*Universal Service Directive*).

[21] *Ex ante* market definitions then feed into the so-called '3-critria test' that triggers *ex ante* obligations - (1) high and non-transitory barriers to entry; 2) market not effectively competitive; 3) insufficiency of competition law.

[22] EC Commission, *Notice on the definition of the relevant market for the purposes of Community competition law*, OJ C 372/05, 9 December 1997.

[23] *Commission guidelines on market analysis and the assessment of significant market power under the Community regulatory framework for electronic communications networks and services*, 2002/C 165/03, 11 August 2002.

This definition of a market requires consideration of demand-side substitutability, supply-side substitutability, and the impact on profitability.

Demand-side substitutability relates to consumer switching between products in reaction to a change in relative prices. A group of products or services are close substitutes if an increase in the price of one above the competitive price (holding all other prices and factors constant) would cause consumers to substitute to the others to an extent that makes the price increase unprofitable for the supplier(s).

Supply-side substitutability relates to producer/supplier switching behaviour in response to changes in relative prices. The entry of new firms producing a product, and the ability of existing firms to switch production to substitutable products, is relevant if this occurs fairly rapidly and costlessly.

The EC *Market Definition Guidelines* and *SMP Guidelines* refer to the hypothetical monopolist test, or as it is more frequently called the Small but Significant Non-transitory Increase in Price (SSNIP) test, as one useful way of thinking about 'sufficient substitutability'.

The SSNIP test defines a relevant product market in terms of the ability of a 'hypothetical monopolist' having complete control of actual and prospective production of one or more products to profitably sustain a given price increase above the competitive price.

The price increase typically assumed for the SSNIP test is 5 to 10 percent lasting for one year. These price increases are arbitrary in the sense that there is no reason in economics (or law) why such price increases should be used. Nonetheless the choice of 5% or 10% will influence the breadth/narrowness of the relevant product market – the larger the hypothetical SSNIP price increases the wider the relevant product market.

There are a number of qualifications and amendments to these general principles when defining *ex ante* markets under the NRF.

The first is that it is forward looking as the purpose is to trigger and assist in framing *ex ante* regulatory obligations.

The second is that the application of the above principles especially to emerging markets such as NGNs is problematic given that the networks do not exist, the take-up and survival, and indeed the demand for, NGN products and services unknown, and the

access possibilities and ultimate network configuration still very much on paper rather than in the ground. Thus market definition for such emerging sectors and infrastructures is inherently speculative.

There are two other aspects of market definition which are particularly relevant to the consideration of NGNs – the chain of substitution and indirect constraints.

Chain of Substitution

In theory, and in practice, there are no sharp boundaries between markets such that a product naturally falls within or outside a particular market definition. It is a matter of degree, and dependent on the extent of consumer (and producer) switching that would enable a hypothetical monopoly supplier to profitably sustain a SSNIP above the competitive price.

EC competition law recognises that quality and absolute price differences are insufficient to delineate different relevant product markets.[24] In dealing with product differentiation it employs the concept of the "chain of substitution".

The chain of substitution refers to linkages between differentiated products which result in significant substitution at the margin in response to changes in their relative prices. If there are a sufficient number of consumers who are price sensitive then a change in prices of different categories of, say, cruise holidays, may substitute lower for higher priced cruises and vice versa. If this occurred across the range of different quality

[24] The EC *Market Definition Notice* states (para. 3.6): "An analysis of the product characteristics and its intended use allows the Commission, as a first step, to limit the field of investigation of possible substitutes. However, product characteristics and intended use are insufficient to show whether two products are demand substitutes. Functional interchangeability or similarity in characteristics may not, in themselves, provide sufficient criteria, because the responsiveness of customers to relative price changes may be determined by other considerations as well." Similarly, the more recent OFT *Market Definition Guidelines* (para 2.4) state: "… substitutes do not have to be identical products to be included in the same market. For example, in its Report on Matches and Disposable Lighters, the Monopolies and Mergers Commission included matches and disposable lighters in the same market because consumers viewed them as close substitutes. The products' prices do not have to be identical. For example, if two products perform the same purpose, but one is of a higher quality, they might be included in the same market. This depends on whether the price of one constrains the price of the other. Although one is of a lower quality, customers might still switch to this product if the price of the more expensive product rose and if they no longer felt that the higher quality justified the price differential."

cruises then they may be all in the same relevant product market. This chain effect may ripple through to cruises holidays and very different ends of the spectrum. If luxury cruises are in the same market as premium cruises because of evidence of substitutability, and the same evidence also exists for premium and economy cruises, then it could be claimed that all cruises are in the same product market.

This approach is referred to in the EC *Market Definition Notice* (para 57-58):

> *"In certain cases, the existence of chains of substitution might lead to the definition of a relevant market where products or areas at the extreme of the market are not directly substitutable. An example might be provided by the geographic dimension of a product with significant transport costs. In such cases, deliveries from a given plant are limited to a certain area around each plant by the impact of transport costs. In principle, such area could constitute the relevant geographic market. However, if the distribution of plants is such that there are considerable overlaps between the areas around different plants, it is possible that the pricing of those products will be constrained by a chain substitution effect and lead to define a broader geographic market. The same reasoning may apply if product B is a demand substitute for products A and C. Even if products A and C are not direct demand substitutes they might be found to be in the same relevant product market since their respective pricing might be constrained by substitution to B."* [25]

The EC Commission has used this approach to hold that different price/quality packages are in the same relevant product market in the hotel[26] and holiday cruise[27] sectors. The same has been applied to broadband and television services by OPTA, the European Commission, Ofcom and other NRAs, and in competition law cases.

Indeed, OPTA's draft decisions use the chain of substitution by holding that WBA and leased lines each form two markets based on breaks along one qualitative dimension of these services – contention rate in case of WBA, and speed in the case of leased lines.

[25] The analysis of this may not be this clear cut as recognised in the OFT *Market Definition Guidelines* at para 3.9 - 3.12.

[26] Case No IV/M.1133 *Bass PLC/Saison Holdings B.V.* Article 6(1)(b) non-opposition, (1998); Case No COMP/M.1596 *Accor/Blackstone/Colony/Vivendi*, Article 6(1)(b) non-opposition, (1999).

[27] Case COMP/M.2706 *Carnival Corp/PO Princess Cruises* Ltd. (2002).

Indirect constraints

Markets often exist at different functional levels i.e. different links in the vertical chain of supply such as wholesale and retail (upstream/downstream) markets.

Under the NRF functional markets are defined for *"services or facilities provided to end-users (retail market) and that of access to facilities for operators that are necessary to provide such services to end-users (wholesale market)"*[28]. These markets are related[29], and generally demand in an upstream (or wholesale) market is a derived demand from that in the retail market.[30]

In the past it has been usual to deal with functional market definitions by beginning with the wholesale or access products, and applying the SSNIP test directly to those products, the so called 'direct constraints' approach[31].

This is an erroneous starting point for functional market definition. The analysis of wholesale/upstream markets cannot be divorced from the definition of associated retail or downstream markets. This is because the demand for an upstream service is a derived demand from the retail market. It is 'derived' in the sense that the willingness to pay and substitutability between inputs is determined by consumers' reactions to changes in relative prices for the associated retail products.

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[28] *Explanatory Note to the Commission Recommendation of Relevant Product and Service Markets within the electronic communications sector*, C(2007)5406 rev1, Second Edition, p. 5. Also see *Access Notice.*

[29] As set out, for example, in EC Commission Notice, *Guidelines on Vertical Restraints,* 2000/C29/01*,* 13 October 2000.

[30] See, for example, the UK Office of Fair Trading guidelines *Market Definition*, OFT 403, para 5.12.

[31] The European Commission has previously (but inconsistently) taken this position, (and specifically in relation to OPTA's Market 12 analysis). A number of NRAs have also ignored indirect constraints (NITA, Arcep, NCAH, and PTS). See generally G. Edwards and V. Sorana, *Indirect Constraints and Captive Sales – Overview of regulatory practice and competition case law with regards to indirect constraints and captive sales in market definition and market power assessment,* CRA International, report to Ofcom, 3 May 2006. The Commission in particular has challenged 2005 OPTA application of indirect constraints which placed cable and ADSL in the same low quality wholesale broadband access. Commission comments pursuant to Article 7(3) of Directive 2002/21/EC;CASE NL/2005/0281: Wholesale broadband access in the Netherlands, SG-Greffe (2005) D/206588.

The theory of indirect effects is simple to state using a non-telecom's example. Assume a specific type of rice is needed to produce Mao Tai. If this variety of rice is used as the starting point for market definition, then applying the SSNIP test to the price of rice will find that producers of Mao Tai will not (and cannot) substitute to another grain or fruit. Thus, rice becomes a relevant upstream product market. However, if it can be shown that consumers regard other spirits (cognac, brandy) as close substitutes for Mao Tai, then they will substitute to these spirits in response to an increase in the relative price rice and hence of Mao Tai. This, in turn, will mean that rice used to make Mao Tai is not a relevant upstream or input product market if the substitution effect at the retail level is sufficiently strong. The hypothetical monopolist of rice used to make Mao Tai may not be able to profitably raise its price because consumers will turn to other types of spirits which they regard as close substitutes. The upstream market is therefore wider than rice and includes the inputs into the production of the other spirits. We see here that the wider upstream market would be appropriate even though rice is not directly substitutable for, say, grapes necessary to produce cognac, and clearly grapes cannot be used to produce Mao Tai. More specifically that a compartmentalised analysis of the direct constraints for inputs would be incomplete and misleading.

The necessity of starting with the retail market cannot be overemphasised especially when the analysis is used for the purpose of determining network and infrastructure access obligations. Access is not valued in its own right, but for the contribution it makes to effective retail competition which benefits end users and consumers. Note that the emphasis is on effective retail competition, rather than on whether it enables an entrant to effectively compete. An entrant may need a specific part of another's' network to enter and compete, and this may even be essential, but this does not establish that access to this input is essential for effective competition, or to determine whether access improves competitive pressures, or refusal to supply is anticompetitive.

The indirect constraint approach is fitfully gaining acceptance in EC competition law (see Annex A). The Court of First Instance (CFI) has held that indirect effects must be taken into account in both market definition[32] and competitive assessment[33] stages. The

[32] *Schneider/Legrand* and *GE/Honeywell* appeals. Also the US FTC/DoJ, *Horizontal Merger Guidelines* and Australian *Merger Guidelines* take them into account in market definition.

[33] The European Commission in *Schneider/Legrand* merger and its *Vertical Restraints Guidelines* only considered indirect effects at the competitive assessment stages. This as indicated in the previous footnote was overturned by the CFI. Ultimately this should not matter since the same competitive assessment will result. But in terms of the structure of the NRF where *ex ante* market

European Commission has now accepted that under the NRF indirect constraints should be taken into account in defining markets.[34] A number of NRAs have included cable in the WBA market on this basis e.g. RTR, BnetzA, ComReg, Anacom, Ofcom, and OPTA. Others including the European Commission have not.

OPTA's Draft Decision adopts the perspective of indirect constraints. It stresses the effectiveness of indirect competitive constraints in lowering the equilibrium price of the wholesale market especially in electronic communication because

> *"…the effectiveness of indirect constraints stems precisely from the fact that it does not work directly through the wholesale market, in particular in case wholesale competition is less intense than retail competition"*.[35]

3.2 ASSESSMENT OF THE DOWNSTREAM MARKETS

There are several features of the retail/downstream markets supplied by fixed networks:

- **Multiproduct** – Copper, cable and NGN networks provide telephony, broadband, RTV and other services.
- **Differentiated** – the quality of many of the services differ significantly.
- **Bundled** – a large proportion of services are bundled into double and triple play offerings consisting of different packages of telephony, broadband and RTV services.

Further, the deployment of NGNs will lead to several changes relevant to the assessment of markets and competitive pressures over the medium term:

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definition plays an important role it may have fundamental implications especially as in the present context it will result in cable broadband being excluded.

[34] *Explanatory Note to the Commission Recommendation of Relevant Product and Service Markets within the electronic communications sector*, Second Edition, C(2007)5406 rev1, pp. 31-37.

[35] R. Inderst and M. Valetti *Market Analysis in the Presence of Indirect Constraints and Captive Sales*, *Journal of Competition Law and Economics*, 2007, p.7.

- In areas where NGNs are deployed consumers will receive broadband at speeds many orders of magnitude (some 8-10 times) faster and with greater functionality than now currently offered by the legacy copper and cable networks.

- The ability of bundled products, particularly RTV services will be enhanced by FTTH in a way not possible through copper to provide a greater competitive constraint on existing cable RTV services.

Here we consider the prospective effects, and implications for market definitions, of these two developments.

The Broadband Market

Broadband packages currently offered by cable and xDSL vary considerably in terms of bandwidth, reliability, storage capacity and email addresses. Despite these differences regulators have placed cable and DSL packages with very different attributes in the same relevant retail product market.

This aggregation simply reflects the economics of markets with product differentiation (as discussed above under the heading of chain of substitution) and also regulatory practicalities. It would not make sense or be useful to define product markets for each different broadband package based on differences in price and non-price factors, and indeed technology. This would lead to an unmanageable proliferation of markets which would not provide practical guidance either to the effectiveness of competition or the need for regulation. The critical issue is whether different groupings of broadband packages place a competitive constraint on the pricing of one and another adjusting for differences in quality, speed etc.

Based on previous analysis we have found that cable and ADSL packages available in the Netherlands are in the same relevant retail and wholesale markets.[36] This, in our view, is intuitively obvious from the overlap of the cable and xDSL broadband packages and their respective comparability at different prices and non-price features.

[36] Expert Report of Dr Cento Veljanovski, 16 December 2003 in proceedings *Koninklijke KPN N.V. & KPN Telecom B. V. v Veducatief Net B.V. (known As NL.TREE) & Easynet Group Nederland B.V*. District Court, Ben Haag.

However, the issue is not whether there is a chain of substitution but whether and where that chain breaks to delineate separate and several relevant (broadband) product markets.

OPTA's draft decisions on WBA and ULL, while not explicitly referring to the chain of substitution analysis, do implicitly accept that along the main objective characteristics of broadband packages different wholesale markets can be delineated. For WBA this is done in terms of contention rates and for leased lines on the basis of (low and high) speed.

Similarly, we believe that with the deployment of NGNs, whether FTTH or enhanced cable, that there will be a change in broadband performance and quality – similar from changing from a bicycle to a high performance motorbike!

Table 3.1: Triple play offerings over the FTTH network

Name	Product description	Price
Bronze	30Mbit/s downstream 50 analogue TV channels Free calls to Dutch landlines	€ 65.00
Silver	50Mbit/s downstream 70 analogue TV channels Free calls to Dutch landlines	€ 80.00
Gold	100Mbit/s downstream 100 analogue TV channels Free calls to Dutch landlines	€ 115.00

Note: This triple play packages are advertised by KPN, but KPN will not be the only ISP on the FTTH network. As infrastructure has not been deployed and the active layer does not exist, there is no demand for service equipment by other ISPs yet.

Source: KPN

As we have seen (above) FTTH and upgraded cable networks will increase bandwidth by a factor of 8 - from the now average speed of 12 Mbit/s on ADSLx to a deliverable speed of 100 Mbit/s. For example, the Almere FTTH pilot project already offers

broadband at speeds from 30Mbit/s to 100Mbit/s (see Table 3.1 above). At these speeds customers can access IPTV and HDTV at superior quality than on the current xDSL network. Upstream speeds will also increase markedly or be symmetrical, and the reliability of the services will be better with a contention rate of 1:1. In short a major leap forward in quality and service level.

It also appears from publicly available information that upgraded HFC networks will be able to compete directly with FTTH broadband packages. UPC has announced it will offer cable broadband at speeds of 60 to 120Mbit/s, as has Ziggo.[37]

This can be contrasted with the likely offerings of copper. KPN 's internal data shows that the VDSL2 technology of the planned All-IP FTTC network will be able to achieve an average speed of around 24Mbit/s among all customers and a maximum speed of 30 Mbit/s to those users living within 500 meter distance from the cabinet (70% of all lines).

In our view the break in substitution is likely to come at effective speeds of around 30Mbit/or more where VDSL is unlikely to offer competitive packages. Those seeking high-speed broadband will substitute to FTTH and upgraded cable.

To this must be added other factors which we have already identified. On a forward looking basis, it is clear that enhanced HFC cable and FTTH will directly compete in various regions and that the copper network will be withdrawn from service in those areas. This has implications for the definition of the relevant geographical market (see below). To the extent it is assumed that there will be direct cable and fibre but not copper platform competition in these areas it is reasonable to conclude that the relevant product market is for very high bandwidth broadband delivered by cable and fibre but not copper.

Radio and Television (RTV) Services

There are two separate considerations relevant to the assessment of RTV services in the Netherlands:

1. The weak competitive constraints imposed on cable RTV services; and

[37] Press Release, *Ziggo en UPC naderen stromversnelling – uitrol grote kabelupgrade in startblokken*, 11 Augustus 2008, www.zdnet.nl.

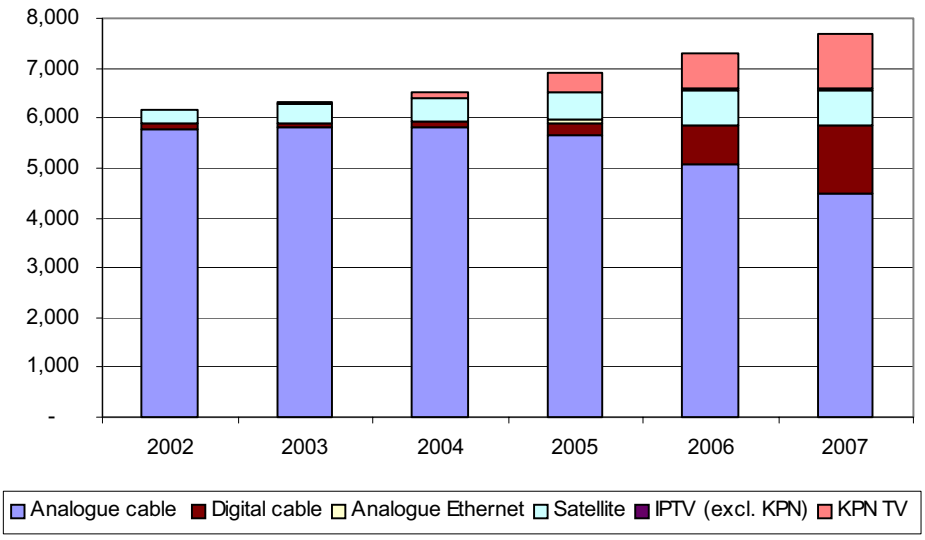
2. The impact of bundling of RTV services with broadband and telephony by cable, and other fixed operators - so called multiplay offerings.

Single Product Considerations

RTV services are provided by cable, other providers offer off-air Digital-To-Home services such as KPN's digital terrestrial service (Digitenne), satellite RTV, and Internet Protocol television (IPTV) over xDSL.

Notwithstanding the proliferation of technologies and alternative services, cable has maintained its dominance of the provision of analogue and digital RTV services (see Figure 3.1 below). Over 83% of all households subscribe to a cable RTV services[38], and only 9% to satellite RTV services.

Figure 3.1: RTV shares by technology ('000s subscribers)



Source: Case Associates' calculations based on KPN data

[38] Liberty Global Incorporation, *Annual Report 2007*, United States Security and Exchange Commission, p. I36.

In order to reinforce the point Table 3.2 show the disparity in the 'market' shares of telephony, broadband and RTV between cable and copper networks. This shows clearly that while cable has been able to achieve parity with copper in the provision of telephony and broadband, it has made no in-roads into cable's share of RTV services.

Table 3.2: Market shares by network, May 2008

Service	Cable	PSTN	other networks
Television	81%	0%	19%
Broadband	40%	45%	15%
Telephone	47%	53%	0%

Note: Other networks refer to digital terrestrial (Digitenne), Internet TV and satellite in case of TV services. In case of broadband, other networks refers to alternative DSL providers and Wireless DSL providers that do not make direct use of the PSTN/ISDN network

Source: Case Associates' calculations based on KPN data

This is because cable operators have a number of advantages in the provision of RTV services:

1. a first mover advantage having been the sole supplier of all RTV services;

2. the only network which can transmit both analogue and digital RTV services. All others transmit digital RTV services only.

The second factor may seem a trivial legacy consideration but in fact it turns out to have considerable competitive significance for two reasons:

First, cable's analogue RTV services appear acceptable to many existing Dutch cable customer who do not regard the additional services offered by digital and other RTV services as sufficiently appealing. They either are not prepared to switch to digital, and if they do tend to switch the cable digital RTV. Further even when they migrate to another provider (which would require them to have an additional connection) they appear to treat satellite and terrestrial digital offerings as complementary to the basic cable analogue RTV services. Studies show that 81% of the Dutch analogue RTV subscribers

are satisfied with their current service package[39]. Although an analysis of market shares (see Figure 3.1 again) shows that many customers have switched to digital RTV services, half of them have kept their analogue package.[40]

A second consideration is switching costs, although we regard this as secondary. Analogue RTV services can be received simply by plugging the customers' TV into a socket connection. There is no additional equipment needed for the service. Terrestrial and satellite digital RTV on the other hand requires a set-top box (digital decoder) or a new digital television set. The costs of a set top box can range up to €247[41]. Hence, when considering to migrate away from the cable analogue RTV providers (like Ziggo and UPC) customers will be deterred by the additional costs of securing a provider specific set-top boxes. Cable analogue customers are to some extent 'locked-in', and this has significantly muted competitive pressures in the RTV service market.

As a result of the apparent consumer satisfaction with cable analogue RTV services and the absence of alternative analogue RTV providers, the competitive constraints on cable RTV are muted, placing IPTV and/or off-air digital RTV in separate relevant product markets.

FTTH networks will change this. FTTH networks can offer both analogue and digital RTV services (see Table 3.1 again). Given the popularity of analogue RTV services among Dutch consumers and the absence of switching costs in form of provider specific set-up

[39] OPTA, *Marktanalyse omroep Ziggo B.V. – Ontwerpbesluit*, Voorontwerp, 5 Augustus 2008, p. 8.

[40] KPN digital terrestrial television service, KPN Digitenne, offers up to 25 TV channels for only €6.95 per month. Customers that have a broadband internet connection with KPN can make use of the Interactive TV offering, an internet TV service which offers 50 digital channels and a variety of movies to download at a price of €9.95 per month (exclusive broadband connection)[40]. Internet services from KPN or its ISP HetNet are available for at least €19.95 per month. KPN's TV packages offer a significant price discount relative to cable TV operators. UPC offers a standard analogue TV package with 30 channels for €16.37 (UPC) per month and a starter package for digital TV which offers 50 extra channels in digital quality for additional €3.99 per month (UPC). Ziggo's standard package with 60 analogue TV channels and 22 digital TV channels costs €15.90 per month. For an additional €9.95 per month, customers can upgrade to 167 digital TV channels (Source: KPN data provided to Case Associates).

[41] Prices for set-top boxes of digital TV services vary with operators. KPN offers its first set-top box for digital TV for free, both for Digitenne and IPTV. UPC's regular price for the set-top box is €99, the promotion price is €34.95.The set-top box by cable operator CAIW for instance costs 247EUR (Source: websites of KPN, UPC and CAIW).

boxes, the deployment of FTTH is likely to be regarded by consumers as a close substitute for cable RTV services.

In short, copper does not offer a product that is seen as a substitute for analogue cable RTV services; and by implication access to the copper network by potential RTV operators is not a direct (or indirect) substitute for access to cable and prospectively fibre to supply RTV in competition with cable.

Multiplay offerings

A related issue is the impact of the present ineffective competition in (analogue) RTV services for the provision of other retail services. Specifically, whether voice, broadband and RTV (and indeed other products) constitute several or one bundled product market. There is a strong feeling among fixed operators facing stiff competition from cable, that triple-play offerings (telephony, broadband and RTV) put them at a competitive disadvantage. This is supported by the absence of pricing pressure from triple play offerings by KPN's and third-party ISPs (see below).

Products can be bundled in a number of combinations – double play, triple play and quadruple play consisting of internet, RTV and fixed and mobile telephony.

Both cable and copper networks have increased there double play telephony and broadband offerings and these have been successful.

More problematic have been double and triple play packages which bundle RTV service since the copper network does not have the capability to supply analogue RTV services, and hence offers no directly substitutable product for cable analogue RTV services.

Table 3.3 below gives an overview of the separate and triple play prices currently offered by cable and ISPs. Cable operators are able to bundle RTV with telephony and broadband at discounts to the separate prices of each service. KPN can only provide IPTV over copper and relies on bundling digital terrestrial RTV to the customer's RTV set. As a result ISPs using KPN's network do offer triple play packages including digital but not analogue television services.

A survey by Ernst & Young has shown that lower costs (57% of the respondents) are the main reason for switching to bundled services and not high quality content (5%)[42]. Without the ability to offer discounts and RTV services that are independent of broadband services and can therefore be used on a household's main TV set, KPN and other alternative providers are unlikely to be able to compete effectively on the multiplay market.

Table 3.3: Price comparison for triple play and component products (average monthly subscription rates)

Provider	Product type TV channels/downstream		Triple play	Television	Broadband	Telephony	Bundle discount
UPC	90 digital+DVR	/ 24Mbit/s	€ 63.00	€ 13.00	€ 50.00	€ 12.00	€ 12.00
	90 digital+DVR	/ 10Mbit/s	€ 45.00	€ 13.00	€ 30.00	€ 15.00	€ 13.00
	90 digital	/ 16Mbit/s	€ 49.00	€ 9.00	€ 40.00	€ 9.00	€ 9.00
Ziggo	60 analogue+22 digital	/ 0.8Mbit/s	€ 39.95	€ 19.22	€ 16.63	€ 8.29	€ 4.19
	60 analogue+22 digital	/ 8Mbit/s	€ 49.95	€ 19.22	€ 24.96	€ 8.29	€ 2.52
	60 analogue+22 digital	/ 16Mbit/s	€ 64.95	€ 19.22	€ 39.96	€ 8.29	€ 2.52
CAIW	163 digital	/ 16Mbit/s	€ 67.54	€ 26.82	€ 36.98	€ 5.00	€ 1.26
Delta	no triple play bundle offered						
KPN	50 digital (Internet TV)	/ 1.6Mbit/s	€ 44.90	€ 9.95	€ 34.95		€ 0.00
	50 digital (Internet TV)	/ 3Mbit/s	€ 52.90	€ 9.95	€ 42.95		€ 0.00

Note: The product descriptions and information on KPN products are based on KPN data. Prices are the average monthly subscription prices for a period of 12 months, including one time expenses. Note that the prices for digital TV set-top boxes range from €247 with CAIW. UPC offers additional services like its digital video recorder (DVR) with its TV packages. The price for broadband by KPN refers to the bundle of internet and fixed telephony. Our data from KPN indicates that there is no telephony only offer.

Source: OPTA Draft Decision Ziggo and KPN

Driven by pricing discounts the demand for triple play bundles has increased from 2004 to 2006, while the demand for dual play bundles has decreased[43]. In 2004 the majority of customers that bought more than one product from the same provider bought fixed and mobile telephony, in 2006 the focus shifted towards broadband and RTV services. This

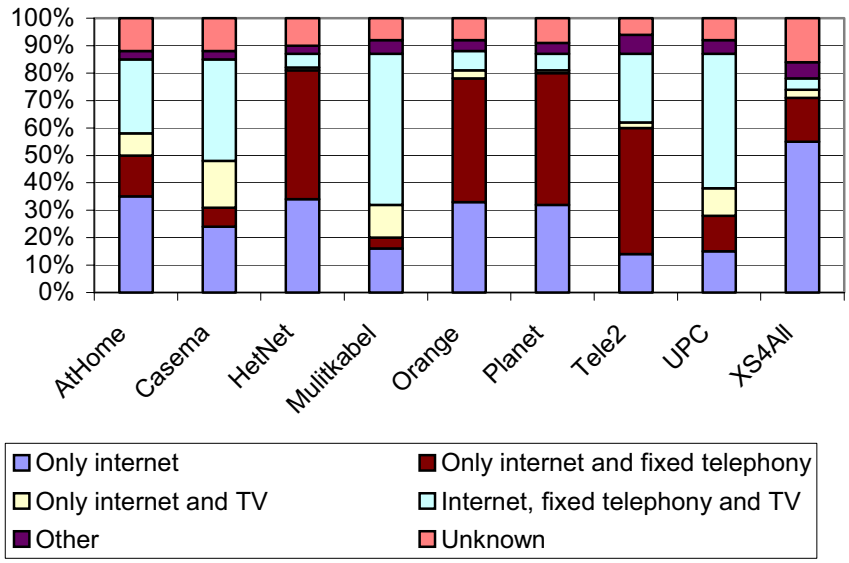
[42] Ernst & Young, *The Bundle the Jungle – Navigating the European multi-play market*, November 2007.

[43] OPTA, *Annual Report and Market Monitor 2006*, Figure 23.

trend has continued and until the first quarter 2008, 22% of all broadband subscribers had a triple package for broadband, telephony and RTV[44].

While cable operators like @Home, Casema, Multikabel (now Ziggo) or UPC have a high share in dual (internet and RTV) and triple play products (internet, fixed telephony and RTV), KPN and its service providers HetNet, Planet, and XS4All have not established significant markets for multiplay yet (see Figure 3.2 below).

Figure 3.2: Customers with bundled products by provider (Q1 2008)



Source: Telecompaper

ISP's Orange and Tele2 and KPN's ISP's HetNet, Planet and XS4All cannot compete with cable operators @Home, Casema, Multikabel and UPC on multiplay, although they offer lower prices. HetNet, KPN, Planet and Tele2 highest quality triple play packages'

[44] E. Achterberg, *Dutch operators show varying degrees of success with multi-play packs*, Telecompaper, Research Brief, p.1.

price range is €52.90 to €67.90 per month. These services offer a maximal download speed of around 3Mbit/s and up to 53 digital TV channels (Interactive IPTV).

Cable operators offer triple play with superior quality at a lower price. UPC's triple play offers start at a download speed of 10Mbit/s and go up to 24Mbit/s in combination with 90 digital TV channels for €39 and €65 per month respectively. Ziggo's highest offer is €64.95 per month for 16Mbit/s download.

Cable operators have a competitive advantage in triple play offerings through their ability to provide higher quality at a substantial discount relative to other ISPs. Moreover, they are able to offer analogue RTV which does not require set-up costs or a broadband connection.

Ernst & Young's study has shown that *'especially in the Netherlands TV providers (20% of the respondents) and not telephony (3%) or internet providers (4%) enjoy the advantage of demand for bundled services'*[45]. Thus, the ability to offer analogue RTV services seems to be the main driver in the development of triple play giving a significant advantage to cable operators[46]. Cable providers have a competitive advantage in the multiplay market based on their ability to offer price discounts on the bundle as well as through the ability to offer analogue RTV.

The Economics of Bundling

A central consideration is whether these bundled products constitute distinct product markets in addition to separate markets for the individual services. That is whether there is a product A and product B market, and in addition a bundled product AB market. In particular whether triple play products which include RTV services are in a separate

[45] P. Verhees, Chief Telecommunication Advisor of Ernst & Young in The Netherlands, quoted in *Ernst & Young: Prijs tecombundel belangrijker dan content,* 10 October 2007 (http://www.ey.nl/?pag=93).

[46] When asked for their reasons of sourcing more than one service with the same provider, 34% of the Dutch cable customers said that they *'chose the TV provider and it made sense to get other services from them'* . The same response was given by 8% of internet provider customers who have access to digital IPTV services rather than analogue TV (Source: Ernst & Young, *The Bundle Jungle – Navigating the European multi-play market,* Appendix: in depth KPN analysis).

relevant retail product market and also whether they place an indirect competitive constraint on cable and fibre but not copper.

The present bundling of RTV, telephony, and broadband is what is known as mixed bundling. Mixed bundling is where the consumer can buy either each product/service separately, or a bundle of the same services. This contrasts to pure bundling where the products are tied in an offering and cannot be purchased separately.

Assessing whether mixed bundling, especially triple play constitutes a separate product market involves consideration of the number of factors.

First, where products A and B are complementary they may be in the same market as they are not substitutes. The classic, if somewhat trivial example, is left and right shoes. This complementarity can be horizontal such as cars and tyres, or vertical such as a photocopy machine and consumables such as toners (so-called aftermarkets). The telecommunications sector is full of bundled products and indeed many market definitions under the NRF are effectively bundled products. It is simply the way they are sold and it is practical to treat these as one product and hence market. But physical complementarities may not lead to economic complementarity. This is because the complementary service may nonetheless constitute a separate market with its own supply and demand factors. For example call origination and termination is viewed by the consumer as one service – a completed call - but the NRF defines two separate markets because of the different constraints on their respective prices.

The second way in which several products can constitute a single separate relevant market arises from transactional efficiencies. The classic example is chequing accounts which offer a bundle of services – chequing, direct debit, overdraft facilities etc. These arguably constitute one product and a relevant market (sometimes referred to as a cluster market). In the telecoms sector a market for call origination services has typically been defined which includes voice, SMS, MMS, voice mail and other services. As far as the customer is concerned he or she buys a bundled service and the network operators supply these services as a bundle. Competition takes place in respect of the bundle.

Under the NRF one way to identifying whether products A and B which are available separately and as bundle are in separate relevant product markets is to apply the SSNIP test. If a hypothetical monopolist is able to profitably raise the price of the bundled product it implies that consumers do not see component products A and B as sufficiently close substitute or there might be conditionality of demand for product A on the

availability of product B so that demand for the two products is strongly correlated. Such market characteristics imply a separate market for the bundle AB.

One interesting perspective on the impact of bundling is found in OPTA's Regulatory Policy Note *The bundle, the market?* [47]. This explores some of the interactions between cable and copper networks (although not NGNs) based on the convergence of services on the two.

The evolution of cable networks to provide RTV and two-way communication services and their national footprint means they now directly compete with the copper PSTN in the provision of broadband and telephony services. These previously non-competitive networks are now in direct competition for customers. Potential customers have a choice between telephony and broadband supplied by either cable or copper, and each places a competitive constraint on the other.

However, this convergence has not and cannot take place for analogue RTV services. Copper cannot provide analogue RTV services which compete with cable analogue RTV services, and as this has had an acknowledged effect of weakening the competitive constraints on cable operators, despite the availability of digital services on copper and off-air networks. Without competitive analogue RTV services offered on the copper network there is, what the OPTA author's call, asymmetric substitution. Once the bundle that includes RTV services has been bought from the cable operator, an increase in the price of the bundle might be profitable as customers do not switch back to component services offered by copper operators. At the bundled level cable and copper networks constitute separate markets.

If this analysis is applied on a forward-looking basis it has the following implications in areas where FTTH replaces copper. FTTH networks can provide both analogue and digital RTV services in addition to high-speed broadband and telephony. Thus fibre will offer a symmetrical range of services and hence is more likely to provide a competitive constraint on cable RTV service and be in the same relevant product market.

[47] OPTA, *The bundle, the market?*, Regulatory Policy Note, No. 5, August 2007.

3.3 UPSTREAM MARKETS

OPTA has published two draft decisions covering the WBA (market 5),[48] and the Wholesale (Physical) Infrastructure Access Market (market 4)[49].

These draft decisions provisionally identify a number of *ex ante* wholesale access markets:

- Two separate WBA markets for cable, copper and fibre – a low-quality with a contention rate less that 1:20 and high- quality with a contention rate between 1:1 and 1:20.
- Two physical access markets – an unbundled access market to copper (MDF and SDF access) and fibre (ODF access); and a separate market for cable.
- Two wholesale and retail leased line markets – low capacity (up to 20Mbit/s) and high capacity (more than 20Mbit/s).

In delineating these wholesale markets, OPTA has examined both direct and indirect constraints. It has correctly taken the position, somewhat in the face of EC Commission opposition, that market definition must begin with an analysis of the related retail markets. However, OPTA has equally stressed the need to look at direct constraints in any overall judgement about market definition.

We assess the two wholesale markets in turn.

WBA Market

The market for WBA (Market 5) is defined as *"non-physical or virtual network access including bitstream access at a fixed location"*[50]. The ERG defines bitstream access as

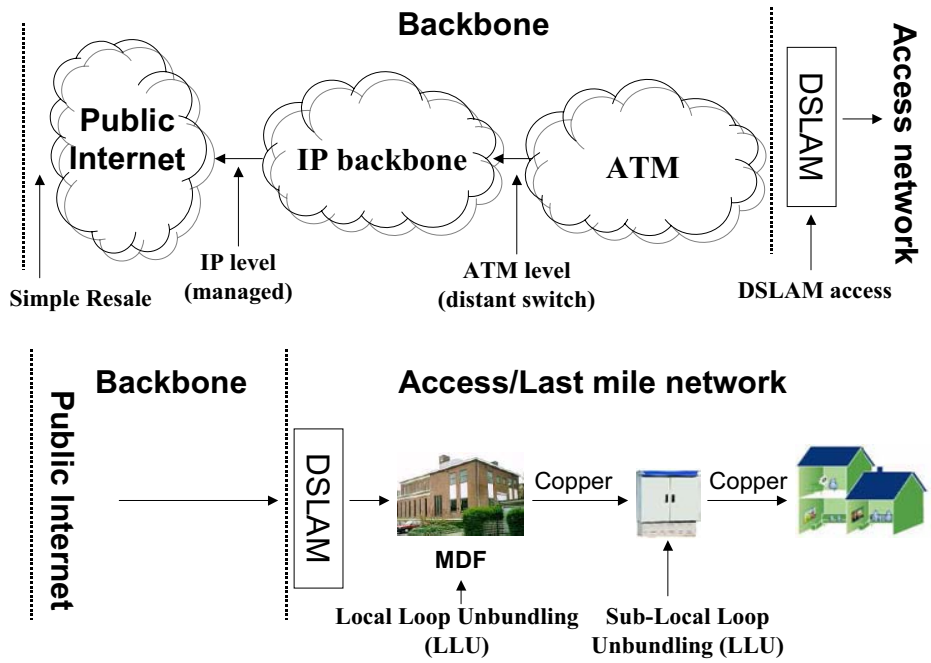
[48] OPTA, *Marktanalyse Breedband, Wholesale – Breedbandtoegang, Onwerpbesluit*, 29 Juli 2008.

[49] OPTA, *Marktanalyse Breedband – Ontbundelde toegang op wholesale-niveau – Ontwerpbesluit*, 29 Juli 2008.

[50] *Commission Recommendation on the Relevant Product and Service Markets within the Electronic Communication Sector (Second Edition),* C(2007)5406 rev1, p.8

a situation where an SMP operator installs a high speed access link to the customer's premises and makes this access link available to third parties. It consists of the access link together with related backbone network, but excludes resale offers which do not allow product differentiation by the access seeker.

Figure 3.3: WBA (bitstream access) and physical access



Source: Case Associates

OPTA's WBA Draft Decision includes cable, fibre and copper in the same relevant wholesale market.

OPTA's conclusion is based in large part on the following analysis of indirect constraints. Using cost data supplied by KPN for 2007, OPTA calculates that 11% to 14% of all retail customers must switch from copper to cable to render a 10% price increase of WBA on

copper unprofitable. Based on an estimate of demand elasticity of –2.5[51] and KPN's market shares of retail internet and broadband bundles (49%) and broadband only (64%), OPTA finds that a 10% price increase in WBA rates would lead to a 5% and 6% price increase in retail prices respectively, which would induce an approximate switch from copper to cable of 12.3%. That is the price increase would be unprofitable.

While we agree with OPTA's approach to consider indirect constraints, there are three remarks on its methodology; two of which are technical and the third fairly significant:

- First, OPTA uses an estimate of own-price elasticity[52] for the SSNIP test which indicates the percentage decline in quantity demanded for copper products after a 10% price increase. This does not estimate how many customers switch to cable, which would be estimated by the cross price elasticity of demand between copper and cable broadband, but also includes customers that stop using broadband services. The percentage of customers switching to cable might be significantly lower leading to a different conclusion on indirect constraints.

- Second, OPTA bases its calculation of the retail price increase following a 10% increase in WBA (and ULL) on KPN's market share in the respective retail market. However, the actual pass-through of the input price increase depends on the own price elasticity rather than market shares. Even a monopoly might not pass a cost increase through to its customers if demand was perfectly elastic and all customers stopped buying its product. Considering the own-price elasticity might lead to a different price increase, and hence a different conclusion about indirect constraints.

- Third, and most importantly, this *ex post* analysis provides no clue as to whether fibre services are substitutable for copper. Indeed, OPTA's analysis is an odd combination of *ex post* and *ex ante* analyses. While it might be applicable to present broadband packages there is no reason that these relationships will hold for the type of packages offered by fibre and enhanced HFC cable.

[51] This estimate relates to the own price elasticity of broadband customers in Austria and is based on a consumer survey by Schwarz et al (2007), *Demand Estimation and Market Definition for Broadband Internet Services*, (http://ssrn.com/abstract=1081261). OPTA considers this estimate as most appropriate for the Netherlands because its broadband market has similar characteristics to the Austrian one. Both are characterised by high cable and broadband penetration.

[52] OPTA, *Marktanalyse Breedband, Wholesale – Breedbandtoegang, Ontwerpbesluit*, 29 Juli 2008, p. 111.

The third point we regards as important, As already noted broadband packages offered by FTTH exceed the data range of the analysis on which OPTA has based its estimates of elasticity and critical loss. As we have seen current ADSL and VDSL average speeds available to customers are 12Mbit/s and 14Mbit/s (24Mbit/s with the FTTC roll-out), compared with FTTH and upgraded HFC cable networks with speeds of around 100Mbit/s or more. A SSNIP test based on these considerations (if it were possible) might lead to the conclusion that once customers are used to high-speed broadband they do not substitute back to copper (assuming that they can given that fibre will have replaced copper). This would lead to a lack of competitive pressure from copper on fibre and cable, and a separate product market consisting of fibre and cable.

There are further complications brought about by our analysis of the RTV market. As OPTA has itself recognised copper cannot compete effectively with cable based analogue RTV. On the other hand fibre can provide both analogue and digital RTV. As a result while fibre and cable can compete directly, copper cannot. This difference is further exacerbated by increasing attractiveness of triple play offerings.

Given the current average and maximum speeds on the PSTN, we believe that there is a break in the chain of substitution around 30 Mbit/s, in the market for WBA. Further we do not believe apart from a transitional period that copper and FTTH will coexist in the same geographic market.

Market 4 – Physical Access

The Wholesale (Physical) Infrastructure Access Market (Market 4) consists of both unbundled and shared line access at a fixed location, whether at the local or sub-loop of the network.

OPTA has concluded that physical access to cable networks is not practical. OPTA's decision to put cable in a separate market to copper is based on an analysis of indirect constraints, while its decision to put fibre in the same physical access market as copper is based largely the analysis of direct constraints.

OPTA has provisionally found that unbundled access to fibre (ODF-access) and unbundled access to copper (MDF or SDF-access) are in the same wholesale market. Unbundled access to the FTTH network will be guaranteed by the access obligation, so that access seekers have the opportunity to switch between copper and fibre.

We do not agree with OPTA's analysis and/or conclusions for the following reasons:

1. OPTA defines two relevant retail (and wholesale) markets for leased lines, one for symmetric low capacity (up to 20Mbit/s) and one for asymmetric high capacities (more than 20 Mbit/s) based on a substitution analysis in the retail market[53]. Given our finding that there are capacity limits on copper, OPTA's high-speed leased line market is unlikely to include copper.

2. The decision by OPTA to discount indirect constraints in the analysis of copper/fibre substitution is unjustified. There is no economic reason why the same retail competitive constraints which place cable and fibre in the same WBA market should not be relevant to the assessment of the physical access market for cable and copper. This is particularly so given that the empirical evidence that ULL has had a positive competitive effect is weak (see below)

3. OPTA's analysis of direct constraints is unconvincing. It is erroneously based on the alleged 'similarity' of estimated prices and not the SSNIP test, and ignores the fact that copper access is both costly and the costs specific to copper, and that fibre access requires the access seeker to make different and additional investment. The presence of these technology-specific costs and related switching costs mean that copper and fibre are not in the same relevant wholesale market (see next section).

4. OPTA's market definitions are therefore, in our view, highly contrived since they are predicated on a regulatory decision that physical access will be imposed on FTTH and copper but not cable. This pre-determines market definition. If the analysis is conditional on the access regime, then the definition of the relevant market is a regulatory not economic construct, and almost self-defined by the extent to which access is mandated.

Analysis of Direct Constraints

Under standard *ex ante* market definition principles if physical access options are to be in the same market third parties seeking access must be able to substitute between

[53] OPTA, *Marktanalyse Huurlijnen – Ontwerpbesluit*, 29 Juli 2008, p. 73.

these in response to a 5-10% SSNIP and that transferring between different access options must be relatively costless. This is not the case.

OPTA's Draft Decision on ULL access delineates a separate physical access market for cable based on the different architecture and hence costs of coaxial and copper networks. This seems correct. Cable networks do not have a central office or MDF to which competitors can gain access. In a cable network, the head-end to the access network is a Cable Modem Termination System (CMTS) which sends and receives digital cable modem signals on the network. To gain physical access, alternative operators will have to invest in EuroDOCSIS technology to be able to operate their own backbone and roll their network out to the "multitap"[54], the last splitter of individual coaxial cables. Moreover, services of different providers on the coaxial network are not independent of each other. Given the physical obstacles OPTA does not think that unbundled access to cable is a physical substitute to copper or fibre.

For FTTH OPTA has provisionally concluded that Fibre Unbundling (FU) is a substitute to copper unbundling. This decision is based on product similarity and the finding that the estimated costs of ODF-access are not 'much higher'[55] than the costs of MDF-access. There are in our view several problems with OPTA's direct constraints analysis supporting this conclusion:

- First, the costs are not 'similar' as claimed by OPTA; they differ. The Analysys Mason study estimates the average incremental monthly costs per subscriber for FU ranges from around €25 in dense urban areas to €30 in rural areas. Access to the copper network (for Sub-loop Unbundling (SLU)) has an estimated cost of around €38 and €55 for urban and rural areas respectively, and the costs for WBA (which would be possible on cable) are constant at €60. Ignoring MDF-access, the cost difference between fibre and copper ranges from €13 to €25. KPN cost estimates for MDF, SDF and ODF-access differ. KPN's current charge for MDF-access at the local network level is €7.83 per month[56], the charge for access to the sub-local level (SDF-

[54] OPTA, *Marktanalyse Breedband – Ontbundelde toegang op wholesale-niveau – Ontwerpbesluit*, 29 Juli 2008, p. 108.

[55] OPTA, *Marktanalyse Breedband – Ontbundelte toegang op wholesale-niveau – Ontwerpbesluit*, 29 Juli 2008, p. 114.

[56] OPTA, *Wholesale price cap-besluit*, 27 September 2006, p.61.

access) is €7.11 per month[57]. Thus, there will be little cost difference between the future and the current access to the copper network. For FTTH access (ODF-access) the estimated monthly costs will be higher. Information provided by KPN shows that they vary between €12 and €15 per month for both KPN and alternative providers. The price depends on the capital expenditures in the respective area. In the Reggefiber FTTH project in Almere for instance KPN pays €14.25 monthly for ODF-access. Hence, there is likely to be a difference between monthly access costs on copper and fibre. The discrepancy between these and Analysys' cost estimates is because Analysys estimates are averages and therefore include infrastructure costs. The access point on fibre (ODF) will be on the local level close to the MDF location while the SDF will be at the sub-local level, say the street cabinet. Hence, the latter implies substantial roll-out investments while the former mainly implies investments in active equipment.

- Second, OPTA does not apply the correct (SSNIP) test to define the physical access market. Instead it relies on the alleged price 'similarity' between FU and copper unbundling, which is not the test for market definition. The correct test is the reaction of the hypothetical monopoly access seeker's to a change in price i.e. a SSNIP. The direct constraints approach would seek to examine whether a 5% to 10% increase in the price of access on one infrastructure while holding access prices on the other constant will result in substitution between copper and fibre, and more broadly between physical access and WBA. OPTA has failed to show that this is likely.

- We believe that it is unlikely that a SSNIP test would show that copper and fibre access are in the same relevant wholesale market for another more important reason. The SSNIP test requires that there are no significant investments and other switching costs associated with different access options deemed to be in the same relevant wholesale market. This is not the case for those contemplating investment in access to the new (yet to be built) FTTH network. The infrastructure and equipment costs are likely to be considerable and imply significant fixed costs of migrating to from copper to fibre. An access seeker which has already invested in ULL on copper is not able to frictionlessly switch the FU on a FTTH network. Similarly, once a company has invested in a roll-out to the SDF it is unlikely to make a new investment in ODF-access equipment in response to a price increase of SDF-access and vicer versa. These one-time investment expenses are neglected in OPTA's analysis

[57] OPTA, *SLU tarievenbesluit*, 25 September 2007, p.28. Note that this access charge to sub-loop unbundling refers to the current PSTN not the planned All-IP FTTC network.

although they create substantial switching costs and mute any switching between copper and fibre access. Hence using direct constraints analysis the two networks are unlikely to be part of the same relevant wholesale product market.

- Finally, it is unlikely that copper and fibre will coexist in the same geographical area. We assume in line with current thinking that FTTH will be progressively deployed in urban areas with a FTTC network planned in rural areas. The closure of the MDFs (which has been deferred to 2010) will force access seekers to invest in access to the ODF (FTTH) or SDF (FTTC) in the case where fibre has been deployed. Thus MDF access will not be the issue any more. What matters for providers is whether to invest in SLU or in FU.

In light of these considerations we believe the evidence using the direct constraints approach points to physical access to the copper and fibre being in separate relevant wholesale markets.[58]

Impact of ULL Obligations

There is a further reason for caution over OPTA's provisional conclusion that FU and copper Unbundled Local Loops (ULLs) are in the same physical access market which goes to the heart of the NRF and proposed physical access obligations which are to be imposed on fibre. This is that the key assumption triggering *ex ante* obligations does not appear to have empirical support.

The purpose of defining wholesale and access markets is to trigger *ex ante* access and price control obligations which will encourage effective competition and accelerate broadband take-up. The OECD[59], ERG and others have been vigorous proponents of network unbundling as a way of increasing broadband penetration. However, the

[58] KPN will probably continue to be the sole provider of ULL and hence has SMP in Market 4. In September 2005, 420 of KPN's 1,367 MDFs in the Netherlands had equipment installed by other operators and 28% of all DSL lines were unbundled at this local loop (3% fully unbundled and 25% with shared access). To March 2007, the number of LLU had increased significantly, but so had the number of total broadband subscriptions. The share of LLU remained at 27% (11% fully unbundled; 16% shared) (Source: ECTA Broadband Scorecard Q3 2007). Thus, the share of alternative providers providing unshared services has increased.

[59] OECD, *Communications Outlook*, 2007, Paris; OECD, *Developments in Local Loop Unbundling*, 2003, Paris; OECD, *Local Access Pricing and E-Commerce*, 2005, Paris.

evidence does not support these claims. Most of the published studies show that the effects are small[60], transient[61] and statistically insignificant[62]. The most recent study commissioned by the OECD claims that ULL has been the most significant factor in the absence of direct platform competition.[63] However, subsequent analysis of the same data shows that this conclusion is based on a statistical error which when correct shows no effect attributable to ULL, and that the normal diffusion of new technology largely explains the growth of broadband within the OECD.[64]

It is also noted that the Netherlands is one of the few countries where there is active and vigorous competition between copper and cable networks. This is significant and often ignored in the delineation of *ex ante* markets and regulatory obligations. The ERG's statement of regulatory principles for NGNs ignores the role played by cable competition, while acknowledging its importance. Moreover, OPTA appears at time to endorse the view that 'two is not enough' for effective competition, although again it has acknowledged that in the provision of broadband competition has become increasingly vigorous and effective. There is evidence that in countries where there is strong competition between cable and DSL operators, broadband Internet take-up is higher. The crude OECD national statistics bear this out. Broadband penetration in the Netherlands is currently second highest among all OECD countries. By the end of 2007,

[60] S. Wallsten, *Broadband And Unbundling Regulations In OECD Countries*, Working Paper 06-16, 2006, AEI-Brookings Joint Center for Regulatory Studies.

[61] M. Denni and H. Gruber, *The Diffusion of Broadband Telecommunications: The role of competition,* paper to International Communications Society conference, Pontevedra, Spain, 2005.

[62] W. Distaso, P. Lupi and F. Manenti, *Platform Competition and Broadband Uptake: Theory and empirical evidence from the European Union*, Information Economics and Policy, 2006, Vol. 18, pp. 87-106; J. Kim, J. Bauer and S. Wildman, *Broadband uptake in OECD Countries: Policy lessons from comparative statistical analysis*, paper to 31st Research Conference on Communication, Information and Internet Policy, September 19-21, 2003, Arlington, Virginia, USA; I. Cava-Ferreruela and A. Alabau-Munoz, *Broadband Policy Assessment: A cross national empirical analysis*, Telecommunications Policy, 2006, Vol. 30, pp. 445-463. J. Hausman and G. Sidak, *Did Mandatory Unbundling Achieve Its Purpose? Empirical evidence from five countries*, Journal of Competition Law and Economics, 2005, Vol. 1, pp. 173-245.

[63] OECD, *Catching-Up in Broadband – What will it take?*, Working Party on Communication Infrastructures and Services Policy, paper DSTI/ICCP/CISP(2007)8/FINAL, Paris.

[64] G. Boyle, B. Howell and W. Zhang, *Catching Up in Broadband Regressions: Does Local Loop Unbundling Really lead to material Increases in OECD Broadband Uptake*, New Zealand Institute for the Study of Competition and Regulation Inc., July 2008.

34.8% of the population to broadband services[65] this was only exceeded by Denmark (35%) and well ahead of the OECD average of 20%. A study by Howell[66] shows that direct network competition between DSL and cable is more effective in promoting coverage and take-up of broadband than ULL.

3.4 GEOGRAPHICAL MARKETS

In OPTA's explanation of its decision affecting Dutch cable networks of 5 August 2008[67] it defines separate geographical markets for cable delineated by the network coverage of the relevant cable networks. This leads to four separate geographical cable markets defined by the network coverage - Ziggo, UPC, CAIW and Deltas cable networks and their direct competitors.

It is also the case (and an assumption of this report) that the deployment of FTTC will take place in a patchwork of local and regional networks. This contrasts with the near ubiquitous presence of the copper PSTN at present.

Thus on a forward-looking basis there will not be one national market for fibre but a series of regional markets and these will not contain all three technologies. The most likely outcome is for direct platform competition between cable and fibre, without the presence of an effective constraint imposed by copper.

The regional nature of the cable market together with the regional deployment and operation of FTTH networks means that the geographical market will be regional rather than national. This points to another reason for market definitions that include cable and fibre but not in copper.

[65] OECD *Broadband Portal*, www.oecd.org.

[66] B. Howell, *Broadband Uptake and Infrastructure Regulation: Evidence from the OECD Countries*, ISCR Working Paper BH02/01, February 2002. See DotEcon/Criterion Economics, *Competition in Broadband Provision and its Implications for Regulatory Policy*, October 2003.

[67] OPTA, *Marktanalyse Omroep Ziggo B.V - Ontwerpbesluit*, 5 Augustus 2008.

4 Conclusions

Under the NRF and competition law the SSNIP test has been adopted for the delineation of relevant retail and wholesale product markets. The SSNIP is a subtle test as recent decisions and analysis has shown. Apart from direct substitution between two products subject to a SSNIP test, there is also substitution between products that differ in quality and price through the chain of substitution, and indirect constraints felt in the wholesale market which emanate from competitive pressures in the retail market. Applying these accepted approaches together with the delineation of the relevant geographical market leads us to the following views about the relevant *ex ante* retail and wholesale markets:

Retail

- Fixed telephony provided by copper, cable and fibre operators are likely to be close substitutes.
- Cable and FTTH will supply broadband packages at speeds of 30Mbit/s and above. It is unlikely that copper VDSL will be able to match these speeds. We therefore believe that there is a break in the chain of substitution for broadband packages at around 30Mbit/s which would place cable and fibre in the same retail broadband market but not copper.
- Copper and off-air digital RTV services do not place a competitive constraint on cable RTV services. Hence copper RTV and cable RTV are not in the same relevant

product market. However, fibre will provide analogue RTV services and place a direct constraint on cable RTV services.

- FTTH which will provide triple play bundles including analogue RTV services will present a more effective competitive constraint on cable RTV services and hence more likely to be in the same relevant retail product market, assuming of course that it has content which consumers consider close substitutes.

Wholesale

- Copper is not part of the prospective WBA market for high-speed broadband (30Mbit/s and above) and related services.

- There are separate wholesale physical access markets for copper and fibre because of significant upfront capital and switching costs to access seekers (and KPN) from moving from copper to cable, and from fibre to cable. Also copper and fibre networks are not likely to coexist in the same geographical market.

Geographical

- Fibre will be deployed and replace copper; while cable will upgraded in areas where fibre has been deployed. It is therefore most likely that cable and copper will be in the same regional/local markets without the presence of copper apart from a transitional period. Thus copper will not provide an effective direct competitive constraint on fibre and cable.

ANNEX A Indirect Constraints

The necessity and importance of starting the analysis at the retail market is recognised in regulatory and competition laws, although often not in an entirely clear and consistent manner. It is recognised in the EC *Recommendation:*

> *'The starting point for the definition and identification of markets is a characterisation of retail markets over a given time horizon, taking into account the demand-side and supply-side substitutability. Having characterised and defined retail markets, it is then appropriate to identify relevant wholesale markets.'*[68]

The EC *Access Directive* (para 1) states that where a network operator has SMP, the NRA must:

> *'… considers that denial of access or unreasonable terms and conditions having a similar effect would hinder the emergence of a sustainable competitive market at the retail level, or would not be in the end user's interests'*[69]

The UK Office of Fair Trading's revised *Market Definition Guidelines* (para 5.2) states the position clearly:

[68] *Commission recommendation on relevant product and service markets within the communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and the Council on the common regulatory framework for electronic communications networks and services*, 2003/311/EC, 11 February 2003, p.7.

[69] *Access Directive*, Article 12.

> *'When considering the substitutes of a wholesale product, it may be necessary to consider substitution possibilities at the downstream level. For example, suppose a supplier produces a wholesale product A which is a necessary input for supply of a retail product B. Suppose also that a vertically integrated supplier that does not supply a substitute wholesale product supplies a product C which is a substitute for B at the retail level. The ability of customers to substitute to product C from product B at the retail level may constrain the ability to raise the price of the wholesale product A.'*

The Advocate General's opinion in *Bronner*[70] (followed by the Court) stated:

> *'58. Thirdly, in assessing this issue it is important not to lose sight of the fact that the primary purpose of Article 86* [now 82] *is to prevent distortion of competition - and in particular to safeguard the interests of consumers - rather than to protect the position of particular competitors. It may therefore, for example, be unsatisfactory, in a case in which a competitor demands access to a raw material in order to be able to compete with the dominant undertaking on a downstream market in a final product, to focus solely on the latter's market power on the upstream market and conclude that its conduct in reserving to itself the downstream market is automatically an abuse. Such conduct will not have an adverse impact on consumers unless the dominant undertaking's final product is sufficiently insulated from competition to give it market power.*

It may be noted that in Commercial Solvents Advocate General Warner, in coming to the same result as the Court, also considered the position on the downstream market:

> *'I do not think that the question whether the market for the raw materials for the production of a particular compound is a relevant market can, logically, be divorced from the question whether the market for that compound is a relevant one. The consumer, after all, is interested only in the end product, and it is detriment to the consumer, whether direct or indirect, with which Article 86 is concerned' (para 266)''.* [71]

The implication of this for the passive tier depends on whether downstream competition between services provide by cable and FTTH provide an effective competitive constraint on one another.

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[70] Case D-7/97, *Oscar Bronner GmbH & Co. KG v. Mediaprint Zeitungs-und Zeitschriftenverlag GmbH & Co. KG and Others*; and Opinion of Advocate General Jacobs delivered on 28 May 1998, European Court Reports 1998, page I-7791.

[71] *AG's Opinion,* para 58 & 59