Regulatory Policy Note

02

Infrastructure and services-based competition in the broadband access market

A scenario for dynamic regulation of access to the fixed network of the incumbent

OPTA

INDEPENDENT POST AND TELECOMMUNICATIONS AUTHORITY

INFRASTRUCTURE AND SERVICES-BASED COMPETITION IN THE BROADBAND ACCESS MARKET

A scenario for dynamic regulation of access to the fixed network of the incumbent

Explanatory note

The Dutch Independent Post and Telecommunications Authority (OPTA) regulates the postal and telecommunication markets in The Netherlands. OPTA is an independent executive body that commenced its activities on 1 August 1997. OPTA's mission is to stimulate sustained competition in the telecommunications and post markets. In the event of insufficient choice OPTA protects end-users. OPTA regulates compliance with the legislation and regulations on these markets.

In terms of market conditions, market structure and regulatory framework, telecommunications and postal markets present a continuously changing landscape. In this environment, OPTA has committed itself to improving the economic reasoning on which strategic choices are made in such a way that market parties can contribute to and have a clear understanding of the development of OPTA-policies, now and in the future. In 2003 the OPTA bureau was complemented with the Economic Analysis Team (EAT) headed by the Chief Economist. EAT is responsible for developing economic reasoning and stimulating discussion on key issues within the telecommunications and postal markets. To achieve this, EAT produces two kinds of policy notes - short discussion papers. Economic Policy Notes focus on economic issues and principles. Regulatory Policy Notes focus on strategic economic issues in specific regulatory fields. To stimulate discussion EAT organises roundtables. With its products and activities the Economic Analysis Team expects to add value to the economic debate in Dutch telecoms and post.

Often, lessons can be drawn from past cases. Policy Notes will try to benefit from analyzing such cases. These Notes, however, are aimed at contributing to the development of future OPTA policies and are focused on providing sound economic reasoning to that effect. For the purpose of these Notes it is not necessary to take into account other considerations, either of a factual or of a policy nature, that may have played a role in these past cases. As a consequence, discussion of these cases should not be considered or construed as an attempt to revise or evaluate these cases. Furthermore, Policy Notes are not aimed at reviewing past policies or expressing future policies. They are solely intended to stimulate discussion and critical comment within as well as outside of OPTA, thus laying a basis for the development of future policies.

The analyses and conclusions expressed in Economic and Regulatory Policy Notes of the Economic Analysis Team (EAT) do not necessarily reflect the opinions of the Commission of OPTA. As such, the opinions of EAT, in whatever shape or form, do not have a legal status. Quotes from and references to these Notes can be made freely, provided that such quotes and references sufficiently express the preliminary character and purpose of the Notes.

Contents

Abstract

Regulators need to consider numerous aspects when determining whether to impose or lift access obligations. Important questions in this respect include the intended purpose of the obligation and the manner in which that goal is achieved. One of these goals is to find a balance between infrastructure and services-based competition. Viewed from a long-term perspective, economic efficient investments in infrastructure should not be impeded. Research of the scenario in which regulation of access to the fixed public communication network of the dominant operator in one type or the other remains, shows that it is important to analyse thoroughly which type of access fits the balance best. An important criterion in this research is whether existing infrastructure can be easily duplicated. If this is the case, no access obligation is necessary. If this is difficult, an access obligation may be justified. As long as duplication of local loops is still extremely difficult, local access to the existing local loop seems the most appropriate way for efficient rollout to take place. Often, regional access is, from an economic point of view, a necessary step in between. Types of access that are complementary stimulate rollout. When types of access become each other's substitutes, this function lessens. In that case, withdrawal of access obligations must be considered. This will become imminent as local and regional types of access evolve towards each other. Pricing of the different types of access will have to take their respective relations into account. Some (temporary) types of access will have to incorporate a dynamic investment incentive to prevent impediment of efficient rollout.

1 Introduction

Regulators need to consider numerous aspects when determining whether to impose or lift access obligations. Important questions in this respect include the aim of the obligation that is envisaged and the manner in which that goal is achieved. One of these goals is to find a balance between infrastructure and services-based competition. A number of points requiring consideration in order to achieve this balance are cited in the Economic Policy Note, *Economic Considerations on Balancing Infrastructure and Services Based Competition*.[1] Viewed from a long-term perspective, economic efficient investments in infrastructure should not be impeded. This Regulatory Policy Note (RPN) explores the way in which such considerations may run out in part of the broadband access market in case that the premise for discussion is a scenario in which access obligations to the fixed public telephone network are and access obligations to cable networks are not examined. It will become clear that the inclusion of dynamic aspects in our policy choices will create the largest scope for the creation of greater infrastructure-based competition. This RPN applies a number of economic considerations covering infrastructure and services-based competition to a scenario in which the regulation of access to the dominant public fixed telephone network is deemed to be justified on economic grounds.

2 Definition of the area of study

The broadband access market can be analysed from numerous perspectives. Market developments are anything but static and new technologies can have a far-reaching effect on the structure of the market and the conduct of its players. A comprehensive analysis of all the potential forms of infrastructure-based competition and the role of access obligations in this respect is not possible within a single regulatory policy note. The following breakdown has therefore been chosen.

- This RPN focuses on the fixed telecommunications market. This is where current developments are taking place. The development of the mobile infrastructure for broadband Internet services is still limited.
- The definition and analysis of markets within the new legal framework need to determine whether broadband services provided through cable networks and KPN's fixed network constitute a single market. This RPN does not pre-empt this.
- This RPN presents a scenario within which access obligations to the fixed public telephone network are examined. This scenario has been selected as a premise for discussion. This selection has been prompted by current developments in the broadband access market and the present situation in which this network is regulated. It is also important to examine the circumstances in which existing obligations may be eased or lifted.
- Reduction to a single scenario makes it possible to focus on a number of forms of access to the fixed public telephone network.
- While reference is made to areas of overlap with other scenarios involving cable and future fibre-optic networks in the analysis, they are not examined in detail in this paper. The considerations which are dealt with in this RPN, can also be applied to those scenarios in the same way.

[1] EPN 01, December 2003.

3 Why is competition important in the provision of broadband access internet services?

During the meeting of the European Council in Lisbon, Portugal, in March 2000 emphasis was placed on the potential for growth, competitiveness and employment offered by the transition to an electronic knowledge economy. In particular, the importance of access to an affordable communications infrastructure and world-class services was stressed. The e-Europe 2005 plan of action promotes a multiplatform approach to the introduction of broadband, driven by healthy competition between the services that are provided through competing platforms. Competing network infrastructures are vitally important for the achievement of sustainable competition involving networks and services in the long term.

Where there is actual competition, the new framework stipulates that *ex ante* regulatory obligations should be eliminated. However, in the interim those companies which enjoyed a privileged position, having special or exclusive rights to install infrastructure facilities, continue to benefit from those early investments, in particular, those involving facilities with a lengthy economic life in the local access network. Granting others access to these facilities in such a way that it creates a level playing field but does not remove any incentive for new investments in infrastructure will ensure that during the transition to a fully competitive market users will nevertheless be able to benefit from alternatives and competition. Investments in new and competitive infrastructure will ensure that such transitional provisions governing access can be abandoned even more rapidly.[2]

Within the framework of European policy it is important for OPTA to examine its regulatory policy on broadband access services, in order to determine which future directions will be economically prudent and consistent, and will tie in with the new regulations.

[2] Recommendation made by the Commission concerning the relevant products and services markets in the electronic communications sector which can be subjected to *ex ante* regulation in accordance with Directive 2002/21/EC of the European Parliament and Council on a common regulatory framework for electronic communications networks and services.

4 Broadband market at a glance

At present end users in the Netherlands can obtain access to broadband Internet[3] through two existing fixed infrastructures: KPN's communications network and cable operators' broadcasting networks.[4] All of the cable operators use their own Internet service providers (ISPs), such as Chello in the case of UPC and @home in the case of Essent. KPN has an obligation to provide certain forms of access, on the basis of which other providers can offer broadband services through the KPN network. Consequently, ADSL wholesalers are able to use the KPN network. KPN also acts as an ADSL provider itself. KPN and also other ISPs offer KPN ADSL using an agency model.

The current situation of the market for broadband Internet access is depicted in the following diagram.

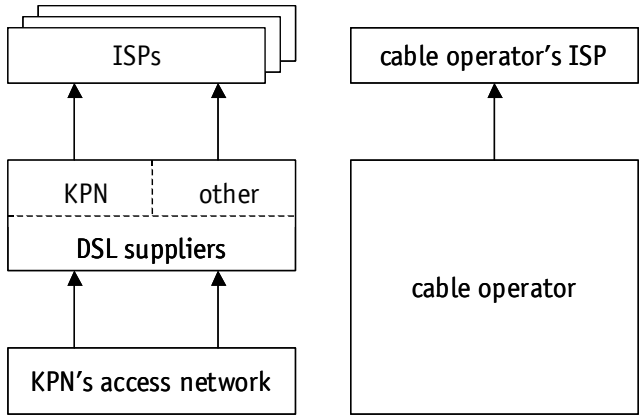

Figure 1

Figure 2 provides a breakdown of the ISP broadband market share.

[3] The following definition of broadband is used in this paper: always on; flat fee; minimum upstream: 64 kb/s; minimum downstream: 256 kb/s.

[4] At the end of 2003 there were approximately 940,000 broadband Internet connections through the cable network and about 950,000 via the KPN (ADSL) communications network.

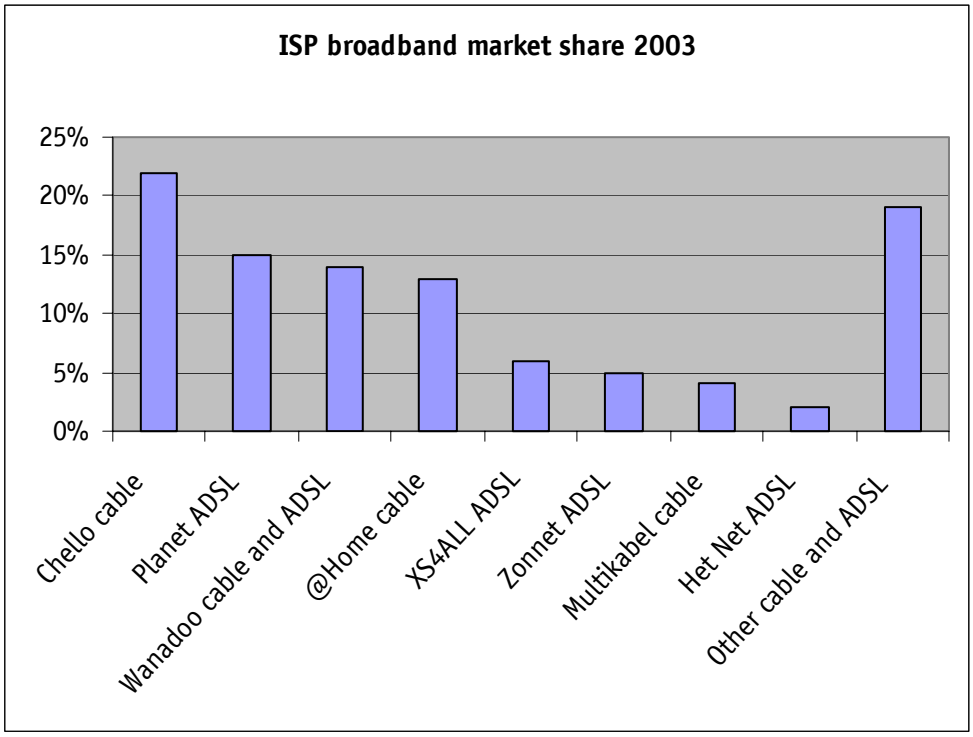

Figure 2 – Source: TNO [Netherlands Institute for Applied Scientific Research] – Netwerken in cijfers [Network Figures], Quarterly Report, December 2003

The question as to whether broadband Internet services provided through both networks are part of one and the same market is still the subject of research. Apart from similarities in the services provided, there are also differences between the two types of delivery. Cable networks provide regional but not national coverage. Different economies of scale may apply. Not all cable networks are technically suitable for the transmission of Internet services (broadband or otherwise), while there are absolutely no cable connections in some areas and consequently no broadband connections via cable either.

The number of exchanges in the Netherlands which are suitable for broadband Internet increased in 2003. The KPN roll-out provides coverage to approximately 87% of Dutch households. KPN has indicated that its roll-out will include all exchanges in 2004. This represents coverage of approximately 97%. By combining its own infrastructure with access to the KPN network, Versatel offers coverage of approximately 50% and has launched plans to boost its roll-out to 65%. Similarly, Tiscali has a coverage of about 50%. BBned, which supplements this approach with bitstream access offers coverage of approximately 90%. The cable companies provided coverage of about 70% in 2003. This represents a slight increase compared with 2002.

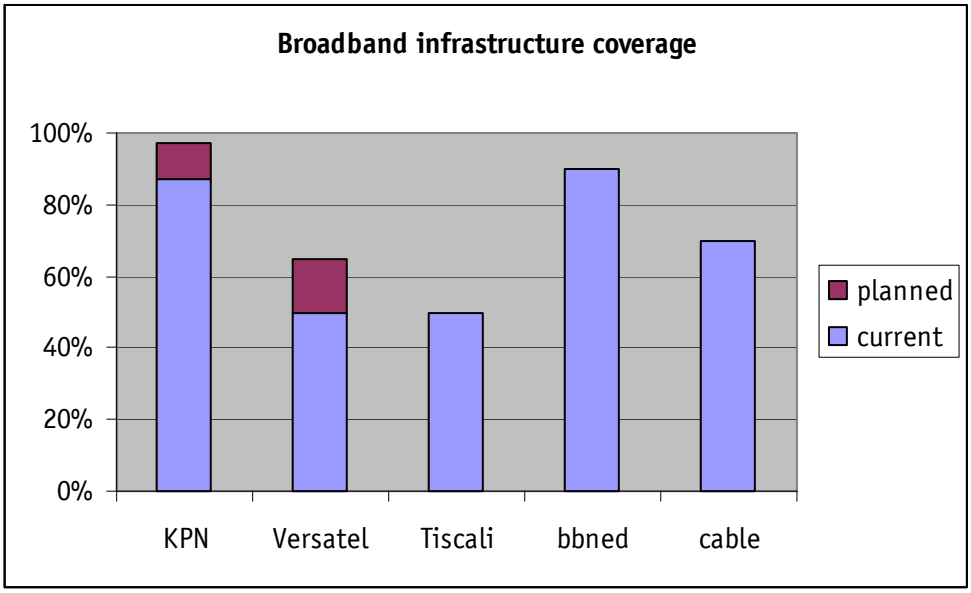

Figure 3 – Source: the companies concerned, OPTA, 2004

Other infrastructures could provide end users with broadband access in the future. For various reasons wireless technologies such as WLL, UMTS, WiFi and satellite Internet are not yet expected to have any significant effect on the market structure in the next three years. [5]

In addition, there is currently a great deal of discussion about fibre-optic networks. Studies are being conducted into the installation of new fibre-optic networks and/or the replacement of existing networks by optical fibres.[6] Various municipalities have announced their interest in the realization of fibre-optic connections for every resident. KPN is calling for a single national fibre-optic network.[7] Cable operators have responded to this by stating that fibre-optics represents a revolutionary development which is spurred on by competition. At the same time they have said that, urged on by competition and utilising private channels, a revolution is occurring in the use of existing infrastructures which are increasingly capable of offering larger bandwidth and speed. [8]

The realization of fibre-optic networks is limited at present. Currently, about 25,000 users, mainly students, are connected to broadband Internet services via optical fibre. The extent to which any new initiative will actually lead to the roll-out of a fibre-optic network on a significant scale, is still to be seen. It is also unclear whether fibre-optic networks will replace existing ones or will develop alongside the current infrastructure.

[5] WLL and UMTS represent future developments that are too remote to be regarded as realistic substitutes now already. A large number of local experiments are being conducted in relation to WiFi at present but this technology depends on another broadband access infrastructure and is not viewed as a substitute. Satellite Internet is mainly used in sparsely populated regions but involves less than 2,000 connections requiring a separate return channel (for example, through ISDN) as well.

[6] The extension of optical fibre is only relevant to networks, such as KPN's copper ones, the coaxial cable networks of cable operators and the prospects for other alternative network providers' proprietary fibre-optic connections.

[7] www.kpn.com, *KPN en maatschappij, Deltaplan Glas* [KPN and Society: The Fibre-optic Delta Plan] (September 2003)

[8] Platform Nederland Breed, 'Breedband' [Broadband] in *Economie en Maatschappij* [Economy and Society] (January 2004).

Broadband Internet is offered through the cable networks and KPN's communications network. There are differences between the types of services. It will also be possible to offer broadband Internet through other infrastructures in the future. Wireless technologies are still in their infancy. It is unclear as to how initiatives for the establishment of fibre-optic access networks will become a reality.

5 Economic considerations for the broadband market

During the telecommunications boom a great deal of network capacity was installed with the exception of connections for end users. Connecting individual end users is expensive, as a result of which existing network operators (KPN and the cable companies) enjoyed a major advantage over new entrants. Access to these local loops may be regarded as one-way access[9] with the incumbent enjoying a monopoly on input which is vitally important to new entrants, although the former requires nothing of the latter. A local loop is vitally important to new entrants, because it represents the path to end users. Established market players control the bulk of this path. New entrants are not able to duplicate these connections on a large-scale quickly and efficiently. The investments required for this are considerable, as are the risks of not being able to break even. In this regard, the absence of an existing clientele plays a role. The degree of difficulty involved in duplication represents the foremost reason why a specific form of access may be necessary here.

Both the fact that it is difficult to duplicate the infrastructure and the type of access (one-way access) may be reasons for considering access obligations. If the latter are imposed, one will need to take into account the fact that investments will be required to upgrade the existing infrastructure to facilitate broadband transmission. The cable operators, in particular, have had to invest heavily in order to render their infrastructure two-way. Tariffs could thus include a mark-up to cover these investments and the risks involved in them.

Bennett et al. [9] have analysed the broadband situation prevailing in the Netherlands at the time. Their key question was and is still relevant: How can policy and regulation promote the growth of and investments in broadband capacity or at least not frustrate them, and ensure that consumers will benefit from competition? They specify which factors contribute to ensuring that a market finds itself in a situation of high or low efficiency.[10] Then they determine incentives for market players to achieve a higher level of efficiency. Should there be only a limited number of incentives or none at all, there will be a role for policy to move the market in the direction of greater efficiency.

The authors analyse how the broadband market can develop towards a situation of both high static and dynamic efficiency, and postulate the following lessons for policy.

- An optimum access policy is of vital importance and could boost both static and dynamic efficiency. In order to achieve this, access obligations to those parts of the incumbents' infrastructure which can be replicated should be limited. It is also advisable to differentiate between access obligations in the case of new entrants who invest and those who do not. Low access rates are good for static efficiency. Pre-notification of increases in access rates provide the appropriate incentives for investments, where the infrastructure can be replicated.
- A policy that is technologically neutral is important but very difficult to achieve. [11] Policy choices or the implementation of policy should therefore never limit the development of various new infrastructures, so as not to push the market in a specific direction. For example, before

[9] See Bennet, De Bijl and Canoy, *Future Policy in Telecommunications: An Analytical Framework* (2001).

[10] There appear to be four categories of such factors: market structure and entry, anti-competition action, regulation and competition policy, and technology.

[11] Duties for access to the fixed network, for example, quite simply have implications for the competitive relations between various infrastructures.

obligations are imposed on access to cable networks, one will need to consider whether this will manipulate technological alternatives or obstruct dynamic efficiency. The regulation of access is less relevant where sustainable network-based competition exists.

- Mandatory access to cable is good for static efficiency on the Internet market (and for the television market). While its effect on dynamic efficiency is unclear, potential harm can be limited by time-dependent access regulation.
- Beware of 'prioritisation technologies' or the use of closed, proprietary technologies to limit Internet access for consumers or to discriminate in respect of speed and the provision of content. This is bad for both static and dynamic efficiency.

The potential for conducting a study into the economic rationale for access to communication networks is created by a new legal framework, which is oriented more towards competition law. It also enables one to re-examine existing access obligations. The definition and analysis of the market should show whether broadband services through cable networks and KPN's fixed network constitute one single market. In addition, the degree of sustainable competition in this market is relevant to the question of whether to impose any duties or not, such as an access obligation. This RPN can and does not seek to pre-empt this. However, it is possible to consider various scenarios. A single scenario is explored in this RPN. This scenario is:

⇒ Access to the fixed network will remain available to broadband Internet service providers in one form or another.

This is based on various reasons and assumptions:

a. Apart from the similarities there are also differences between the provision of broadband services through a fixed network and through cable networks. These differences are the reason to investigate the economic relevance of obligations with respect to access to the fixed network.
b. An important reason for this is the absence of so-called wholesale competition. ISPs cannot themselves choose through which network they wish to reach their customers. In this respect the network providers, KPN and the cable operators consequently do not compete with each other. One of the reasons which has at any rate been advanced for this in the recent past, is that in technical and administrative terms cable operators would not be in any position to offer similar access.
c. From a consumer's perspective there are also differences. With one connection (the fixed network) consumers can subscribe to the services of a multiplicity of ISPs, whereas with the other connection (cable network) they would automatically need to take out a subscription to the only ISP associated. Consequently, a consumers' choice of ISP is not technologically neutral and there are obstacles to switching.
d. In addition, there are geographical differences at least where cable-based ISPs are concerned. After all, one can only opt for a subscription to Chello in an area covered by UPC. Wanadoo is an exception in this respect in that it offers its services through both a cable and the fixed network. These differences also play a role when viewed from an ISP's perspective. In order to offer national services one would need to negotiate with multiple cable operators to obtain access, if possible. Viewed in terms of costs, it is not very efficient for an ISP to serve its customers via the cable networks.[12]

[12] See also Verdonck, Klooster & Associates B.V., *Third Party Cable Access in the Netherlands*, (January 2004)

Naturally, the current situation prevailing in the market has partly come into existence due to existing access regulation. It is an open question as to whether this market would have existed, if the access obligations imposed on KPN had been revoked. At present the ISPs associated with KPN hold a very strong position when it comes to broadband Internet via ADSL. For the moment this scenario assumes that, given the position of KPN ISPs on the fixed network and the monopoly of the cable ISPs, there is a justified need for access to at least one of these networks. For the purposes of this scenario, this RPN will first examine how the existing alternatives for accessing the fixed network should be viewed in economic terms.

Naturally, market conditions are more complex than the area of study covered by this RPN. The limited range of the latter, which nevertheless makes it readily readable, does not permit all relevant questions to be considered simultaneously.

Follow-up studies to this RPN could extend its analysis to encompass more scenarios, like a scenario in which no access obligations are imposed on either the fixed or the cable network or the scenario in which access obligations are imposed on both types of network. This could, for example, lead to the following questions:

- Will a network duopoly arise given the existence of a more fragmented cable market?
- Does a network duopoly represent the only optimum economic situation and should the regulation of access accompany this optimisation or not? What pressure will third or fourth generation networks (being developed) bring to bear and will this boost prosperity?
- Will rational economic access to cable networks arise of its own accord thanks to incentives produced by the existence of access to the fixed network? In other words, will 'wholesale' competition arise of its own accord? Why has this not occurred to date and which factors are impeding or promoting this?
- What would the economic consequences be, if the existing obligations for access to the fixed telephone network were to be revoked? Would there be economic grounds for starting to regulate access to cable? Alternatively, are there reasons to regulate both?

Connecting individual end users in order to offer them broadband services is very expensive. Access to the networks of KPN and the cable operators may be viewed as one-way access. Both this type of access and the fact that the infrastructure is difficult to duplicate constitute reasons for considering the imposition of access obligations. Bennet et al. *have drawn a number of lessons for regulatory policies in this respect. One scenario will be analysed, which may involve the existence of an economic rationale for the position of such access obligations, and the existing obligations governing access to KPN's fixed network will be examined.*

6 Economic considerations relating to the fixed network

6.1 Types of access

At present a distinction may be drawn between four types of access to the public telephone network, which are used by market players to offer broadband services (Internet and otherwise), thereby competing with what KPN itself and the local cable operators (if any are present) offer. All four types represent a form of one-way access. Two types are available at the regional level within KPN's network topology, while the other two are available at the local level.[13] Most market players are now connected to regional access points to a greater or lesser extent. A gradual roll-out has thus occurred to this level.[14]

A limited number[15] of market players have rolled out their services to the level of the local exchange in certain regions. This indicates that, while it may indeed be difficult in principle, it is not impossible to achieve a roll-out to this level. In itself, an infrastructure extending to the local loop therefore does not constitute a natural monopoly or duopoly of networks established by former public monopolists. For the moment, the local loops themselves, that is to say the lines running from the local level to the end users, exhibit many of the characteristics of natural monopolies.[16]

Since it is particularly difficult and probably not always efficient to duplicate local loops, there may be grounds for imposing obligations in respect of access to them. We refer to this as local level access. In principle, it is not impossible for market players to achieve a roll-out to this level, as is evident in practice. However, the requisite investments are substantial and one only usually proceeds with them once one obtains some certainty as to whether there is any potential to establish a clientele that is large enough to justify the investments.

A market player does not immediately proceed from scratch to install his own local loop extending to the local level, and certainly not one with national coverage. Initially, only the regional infrastructure can be replicated. However, practice shows that a regional roll-out can provide a step-up to extending it to the local level. Access to the regional level is often an essential prerequisite as well as a potential incentive for the further roll-out to the local one. Consequently, temporary access to this level subject to certain conditions is justifiable. Regional access should mainly be viewed as a scenario providing a step-up towards access at the local level. For this reason the types of access at the regional level are first analysed in economic terms, following which the forms of access at the local level are examined.

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[13] One of the two types of access at the regional level, bitstream access via partial unbundling, is only available in theory. The Court of Rotterdam reversed the decision handed down by OPTA along with the relevant access obligation in December 2003. The case is now on appeal with the *College van Beroep voor het Bedrijfsleven* [Trade and Industry Appeals Tribunal].

[14] In practice there is also a form in which market players resell KPN broadband Internet services. This is referred to as the agency model. As this does not involve a distinct, internally managed proprietary service provided at one's own risk (in relation to investments or otherwise), this will not be part of this analysis See "Future developments" for more clarification.

[15] A total of eight organisations are involved, about four of which have completed a substantial roll-out (see also Figure 3).

[16] For a detailed discussion see Viscusi *et al.*, *Economics of Regulation and Antitrust* (1995) and Armstrong *et al.*, *Regulatory Reform, Economic Analysis and British Experience* (1994).

The types of access that are discussed, are as follows.

At the regional level:

- bitstream access via full unbundling at the level of the regional exchange;
- bitstream access via partial unbundling at the level of the regional exchange.

At the local level:

- full unbundling of the local loop via the main distribution frame (MDF) in the local exchange;
- partial unbundling (line sharing) of the local loop at the level of the local exchange.

6.2 Important points in EPN 01

This EPN identifies the economic arguments that should be considered in balancing infrastructure and service-based competition.

The EPN recommends the following.

a. The imposition of obligations may be more or less advisable, depending on the form of access. It is more self-evident where one-way access is involved. In the case of two-way access and access to competing bottlenecks (a special form of two-way access) it will depend on the concrete market situation.

b. Where the infrastructure is easy to replicate, it would be advisable not to impose any access obligations or one subject to relatively high tariffs. If it is not easy to replicate infrastructure, in principle, an access obligation subject to relatively affordable rates would be economically prudent.

c. Rates for access to the existing infrastructure should be based strictly on future costs. Those for access to any new infrastructure ought to contain a mark-up by way of compensation for the investment risk involved.

d. Make allowances for a gradual roll-out. The other dynamic process which needs to be taken into account when discussing infrastructure, as opposed to services-based competition, is the manner in which a new entrant secures a position in the market. Those entrants that build an alternative infrastructure, do so gradually. Resale may be necessary initially together with a broad and affordable range of access. At a later stage sections of the network that could easily be replicated (offering relatively little in the way of economies of scale) may become more expensive and ultimately be deregulated. It is thus a process both of developing tariffs and one of reducing the number of regulated access products over time. This demands a type of start-up scenario in order to accommodate the asymmetrical position of new entrants.

e. Regulators frequently determine tariffs based on forward-looking principles in order to accommodate dynamic considerations. Consequently, these forward-looking principles make allowances for the cost savings which are achieved in the course of time. The use of the latest technology also makes it possible for potential entrants to make the appropriate make-or-buy decision. Tariffs based on historical cost are usually higher17 and are more likely to lead to a 'make decision'. Barely profitable or even unprofitable rates do not provide any incentive to the incumbent to continue to make forward-looking (innovative) investments in the network. In addition, a lack of profit on access services acts as an incentive for an incumbent to refuse access.

[17] Technological developments have led to considerable cost-savings. However, wages have risen sharply. A forward-looking tariff may exceed a backward-looking one if labour costs account for a greater share of expenditure.

The economic analysis of the existing forms of access to the fixed public telephone network centres on the following questions.

- *To what extent can the relevant infrastructure be replicated?*
- *To what extent would any access obligations be justified?*
- *Is access to new or existing infrastructure involved?*
- *How can allowances be made for a gradual roll-out?*
- *How could dynamic pricing be implemented while retaining incentives for further roll-out?*

6.3 Economic considerations in relation to types of access at the regional level

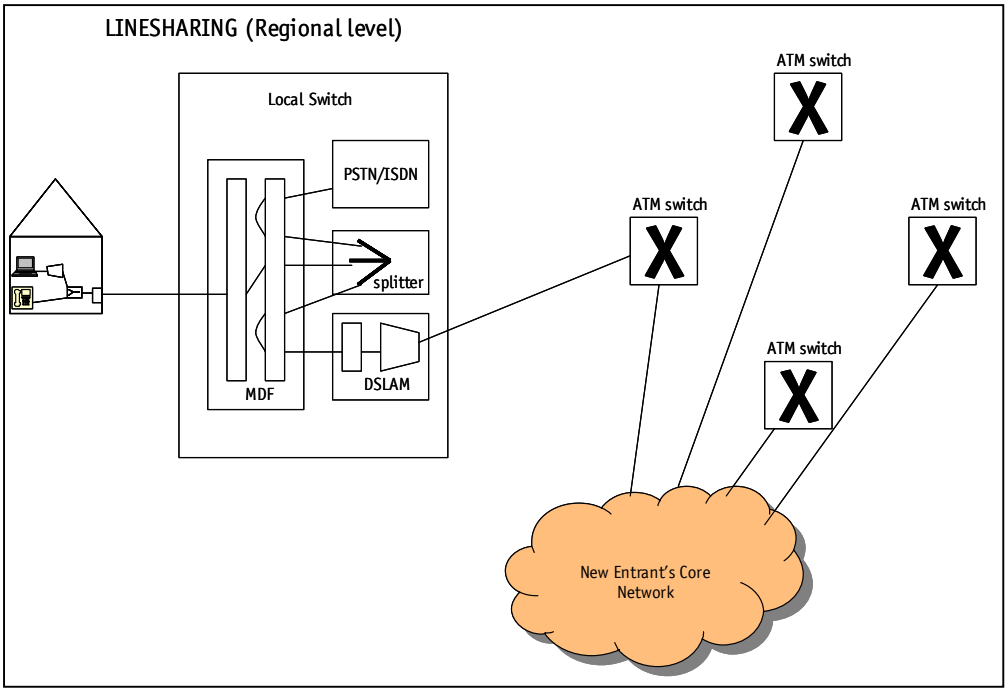
6.3.1 Relevant network components

When a new entrant procures bitstream access at the regional level, he invests in his own infrastructure up until that level. In the Netherlands there are 14 'super' regional access points for this purpose. At the regional level a connection is established using a so-called ATM switch, an exchange which constitutes part of the so-called ATM infrastructure of the incumbent's network. Part of the ATM infrastructure stands on its own, while part is integrated into the incumbent's traditional fixed public telephone network (PSTN). A new entrant invests less in his own equipment (he uses a DSLAM and the incumbent's splitter, if necessary) compared with forms of access at the local level. A new entrant needs to have his own core network, an IP router which can work with ATM technology,[18] and possibly his own ATM switch depending on the traffic profile on the services he offers. In addition, a new entrant requires co-location at the regional level.

There are two ways of obtaining bitstream access at the regional level, namely, partial unbundling (line sharing) and full unbundling.

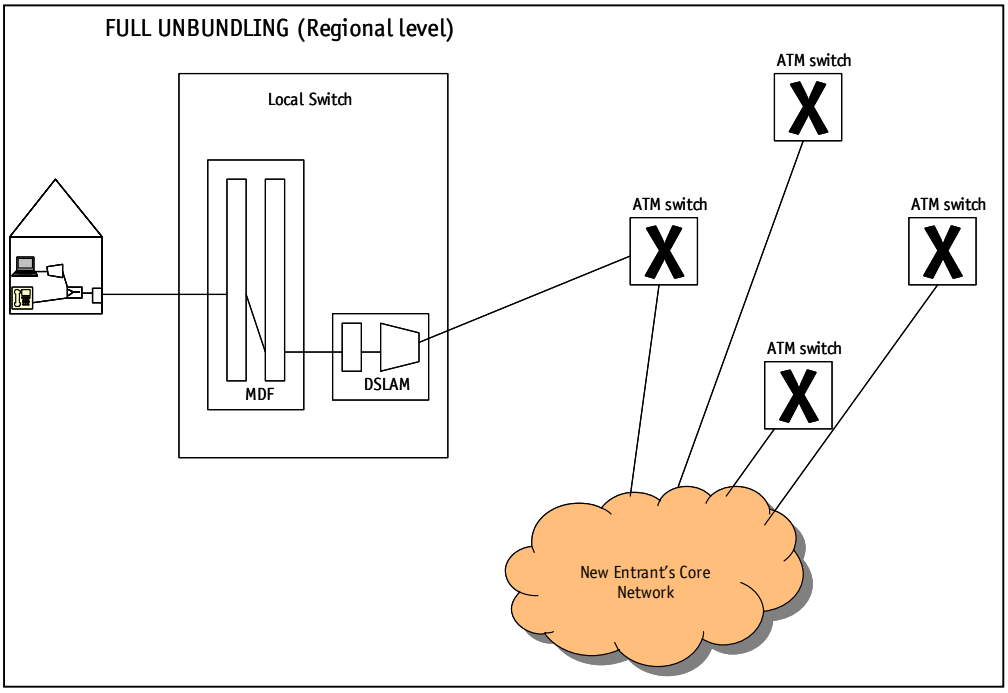
[18] In connection with the incumbent's decision in favour of ATM, this form of access is only available through ATM and not IP.

The partial unbundling (line sharing) of the local loop at the level of the regional exchange[19] consists in



sharing the entire connection of the end user's location through the local exchange to a regional one. These providers focus on those customers who do not wish to purchase too much bandwidth and who would also like to continue to source telephone services from the incumbent. A new entrant would invest in his own infrastructure up until the regional level. In addition, he would require co-location at the regional level.

Full unbundling at the level of the regional exchange encompasses the acquisition of the capacity of the



entire connection from the end user's location through the local exchange to a regional exchange in order to offer broadband services, which require a great deal of capacity, through this dedicated connection. The incumbent continues to

[19] In practice this type of access is not used owing to the Court of Rotterdam's nullification of the relevant obligation. This provided grounds for one market player to proceed immediately with his roll-out to the local level without any certainty of establishing a clientele. The step-up variant is therefore not necessarily the only way. It is unclear whether this means that there is no actual obstacle to further roll-outs by other market players.

provide, through another line, separate telephone services, which are therefore not shared on the same line. A new entrant would invest up until the regional level.

6.3.2 Ability to replicate infrastructure and access obligations

A new entrant would follow the incumbent's network topology up until the regional level, if he were connected to all 14 regional access points using an ATM switch. It has been shown in practice that these investments are not difficult to replicate. Most of the existing entrants have already completed their roll-out to all (20) or most of the regional points for gaining access to other services and/or connecting their own network to that of the incumbent. Practice has shown that a roll-out from the regional to the local level is more difficult. However, the reasons for this are not exclusively to be found in the difficulty of replicating infrastructure between the regional and local exchanges. While it is true that the incumbent's network topology with its numerous local exchanges is not the most efficient in economic terms, the presence of a limited number of players at the local level (selected) indicates that the investment itself is not insurmountable. At any rate it may be assumed that it is relatively easy to replicate the transmission routes themselves (also called backhaul). Duplication of facilities inside the local exchanges on a large scale is far from simple. In economic terms efficiency is therefore established in that economies of scale play a far more significant role in the roll-out section from the regional to the local level than to the former. An access-related obligation at this regional level therefore appears to be justified for the time being, also on account of its nature as a 'step-up' for a potential roll-out to local levels.

It does not seem possible to replicate the ATM infrastructure up until the local exchanges along with features and functionality similar to that of the incumbent which are partly integrated in the PSTN, because there are no ATM interconnection points at the level of the local exchanges. As it happens, this would be particularly inefficient in economic terms. This means that the alternative available for new entrants is to roll out an entire ATM network right up to the end users' connections immediately, an investment which does not appear to be realistic for the time being.

6.3.3 Access to new or existing infrastructure

In principle, a new entrants' roll-out to the regional level has been accompanied by access to existing infrastructure (based on the rationale that interconnection points cannot now be viewed as new within the context of broadband access). However, access to facilities, which make it possible to provide broadband services, is more recent. The equipment in which the incumbent has himself invested for the provision of his own broadband services (a DSLAM and a splitter, if necessary), may be considered to constitute a new infrastructure, more so because new entrants themselves invest in this equipment in the case of local forms of access.

In the case of bitstream access, a connection is established with the incumbent's ATM infrastructure. Not all of the regional exchanges which act as interconnection points are equipped for this. The incumbent's ATM infrastructure may be characterised as a mixture of complementary and replacement investments in and around the PSTN. The incumbent completed these investments in 2001. However, they were investments in the core network. In addition, the incumbent installed 14 ATM switches at the regional level especially for access ultimately to the local loop at the regional level. Bitstream traffic is routed through these ATM switches. Most of the investments are thus rather recent and one may therefore refer to a new infrastructure.

6.3.4 Gradual roll-out and dynamic pricing

It is less easy to make or replicate investments from the regional to the local level owing to the increasing benefits of economies of scale and scope which are required for this purpose, as well as on account of the less efficient topology of the incumbent's network. However, these investments are possible in economic terms, as is also revealed in practice. This means that it is economically prudent to incorporate a dynamic investment incentive in the tariffs for bitstream access. As such, the rates for bitstream access should exceed those for local access in both variants. Moreover, the relative gap between these rates should be large enough to encourage the efficient roll-out to local levels (at any rate in those regions which are sufficiently densely populated to yield the benefits of economies of scale for a new entrant), or at any rate not to frustrate it. This would accord with the step-up nature of regional access. In addition, the step up from regional to local access requires that regional access obligations should be of a temporary nature. Should it appear that regional forms of access are substitutes for local ones, depending on the degree of substitution first the tariffs should be given free rein after a period of time, following which the regional access obligation can be abandoned as such in the future.

However, allowances will need to be made for the fact that the incumbent's investments also encompass new infrastructure. The current ATM exchanges which are equipped for access (14), are linked to each other by means of their own transmission loop. The rates should therefore also include a mark-up which is enough to cover the incumbent's investment risks.

The line sharing variant of bitstream access should represent a step-up scenario for line sharing at the local level in the same way that the variant of bitstream access involving full unbundling should represent a step-up scenario for full unbundling at the local level. This will only take root if line sharing at the regional level and full unbundling at the same level are not substitutes. If these types of access become substitutes, the question will again need to be raised as to whether obligations should still remain in force in the case of both forms of access and, if that is indeed so, whether pricing will involve an elementary choice. If a roll-out on the part of new entrants enjoys top priority, the rates for regional line sharing will need to exceed those for full unbundling at the regional level, while retaining an incentive for investments. To summarise, the tariffs for line sharing at the regional level will at any rate need to include a dynamic investment incentive in the form of an additional mark-up for the use of new infrastructure.

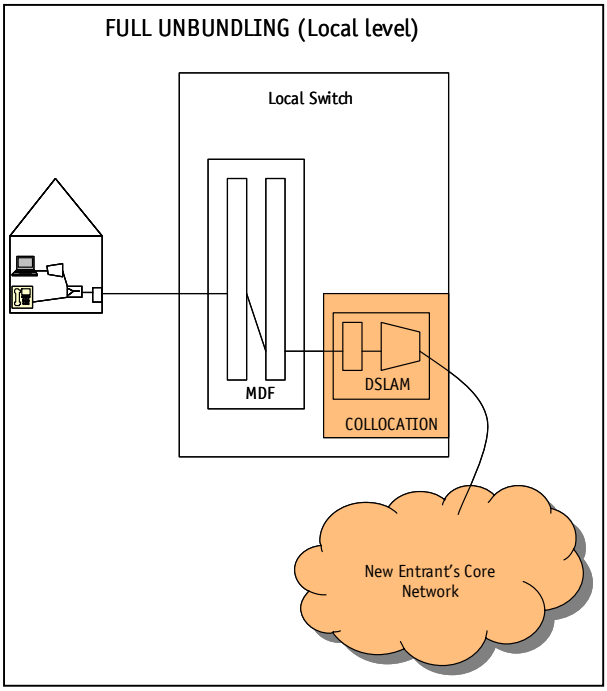
There are two alternatives for broadband access at the regional level (bitstream access): regional line sharing and full unbundling at the same level. For the time being, access at this level is justified because of the difficulty of rolling out to the local level at once. Access at the regional level acts as a 'step-up' for a further roll-out. Because of this 'step-up' nature a temporary access-related obligation seems to be justified. The rates for access will need to include a dynamic investment incentive in order to encourage the actual roll-out to the local level. Most investments for the purposes of bitstream access are quite recent and one can therefore refer to new infrastructure. The tariffs will therefore also need to contain an additional mark-up for the use of this new infrastructure.

6.4 Economic considerations in relation to types of access at the local level

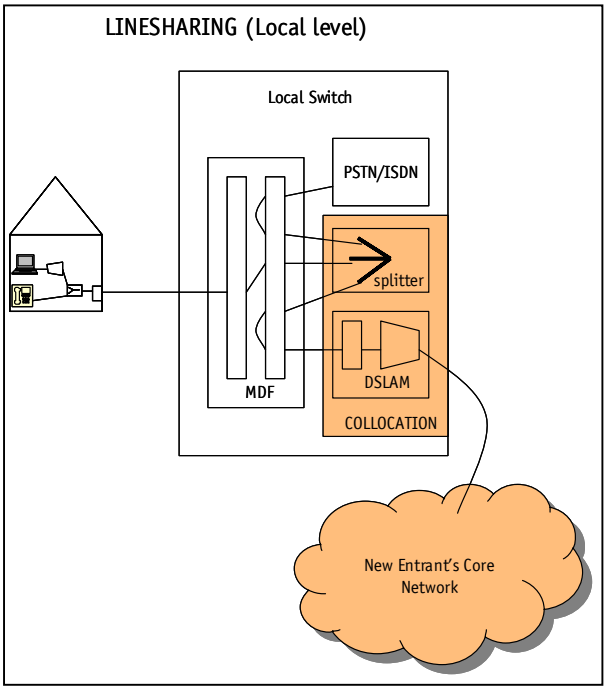
Wholesale DSL providers have been buying these types of access since 2001. The line sharing variant, in particular, accounts for a great many purchases compared with full unbundling.[20]

6.4.1 Relevant network components

In actual fact, *full unbundling* encompasses the rental of the local loop which runs between the local exchange and the customer's premises. A new entrant connects his own infrastructure to the incumbent's main distribution frame in the local exchange. He invests in his own DSLAMs and rolls out his own infrastructure up until the local level. In practice, second lines, in particular, are unbundled completely, so as not to have to provide any telephony services. However, there are now market players who do offer such services and who are usually connected to the PSTN – usually at the regional level – for this purpose. This development was also mainly due to the impossibility of obtaining interconnection at the local level.



This way of using the incumbent's network requires most of the investments from the new entrant himself, with the exception of the installation of a local loop of its own.



The *partial unbundling of the local loop (line sharing) at the level of the local exchange* entails that the local loop is shared by the incumbent and the new entrant. At present, this type of access is mostly used by providers of broadband services (Internet and otherwise). The new entrant purchases high frequency capacity of the loop for the purpose of providing data services. The incumbent continues to use the low frequency capacity of the loop to provide telephony services. In this case the new entrant also invests in his own infrastructure up until the local level, as well as in equipment and co-location facilities in the local exchange. However, the wholesale tariff for line sharing is significantly less than the wholesale tariff for full unbundling,[21] because the line is

[20] Of the approximately 201,000 unbundled connections at the end of 2003, line sharing accounted for about 83% while some 17% were fully unbundled.

[21] As of 1 July 2003 the monthly rental for line sharing amounts to EUR 2.25 and for full unbundling EUR 9.89.

shared. The incumbent retains the relevant subscriber and hence full cover of the fixed costs of the local loop. The wholesale tariff for line sharing only need to cover the additional costs involved.

6.4.2 Ability to replicate the infrastructure and access obligations

From a technical point of view, new entrants are required to follow – that is to say, duplicate – the incumbent's network topology right until the local level. Assuming that a roll-out until the regional level (primarily core network) is rational in economic terms, this mainly involves transmission routes to and equipment in local exchanges (complementary investments). Access obligations are justified at this level as long as it is still very difficult to duplicate the local loop itself and alternatives such as access to a cable network are no substitute.

In the case of full unbundling a new entrant then rents the local loop and also invests in equipment, so as to channel the services he provides himself to his customers as best possible. In this respect one should also consider equipment for quality-of-service-management and administrative (billing) systems. In the case of line sharing a new entrant actually rents more from the incumbent. There are cost benefits because the local loop is shared. This could represent a stronger incentive to an entrant to extend his roll-out to the local level. The question is whether line sharing in itself constitutes a step-up to full unbundling (complementary) in the future or represents a substitute of it. The latter could be the case, if a new entrant does not see any added value in offering as comprehensive a range of communication services as possible, in particular, the inclusion of telephony services and the subscription (the latter is only possible using full unbundling). For the time being, both forms appear to be complementary, with line sharing accounting for the bulk of purchases and growth.[22]

Should it appear that full unbundling and line sharing are not complementary but that they are substitutes, the efficiency in economic terms of imposing both types of access obligations will be open to discussion. In this case one should opt for having full unbundling as the only mandatory form of access.

At present it is not yet clear if and when the duplication of parts of the local loop will become an economically realistic alternative on a reasonable scale. However, one cannot exclude the possibility that it will. In that case the only type of local access should be in the form of full unbundling.

6.4.3 Gradual roll-out and dynamic pricing

There do not appear to be any short-term alternatives available for full unbundling. Tariffs will therefore need to be set on a strict cost-oriented basis.[23] Given the far-reaching roll-out and investments on the part of a new entrant, the rates will need to be relatively lower (compared with other types of access requiring less investment).

The incorporation of a dynamic element would only be prudent, if it became possible to duplicate a local loop on any scale. After all, a dynamic element is chiefly intended to act as an incentive for further investments. One cannot exclude the possibility that this type of investment is becoming more profitable on a selective basis (certain regions, specific densely populated neighbourhoods or industrial areas, new

[22] See footnote 20.

[23] See also EPN 01, December 2003.

buildings) but on an increasingly larger scale. In this respect, the relative conditions, compared to other forms of access, will need to continue to provide an appropriate incentive. Full unbundling will have to remain the most enticing variant within this context. In view of the rather slow development of local loops in the past and the technological uncertainty of future alternatives, dynamic regulation appears to be too risky for the moment.

Line sharing rates would also need to be set on the basis of costs, given the use of existing infrastructure. If full unbundling and local line sharing are complementary, the same method would be used to price both these types of access. If they are fully substitutable, line sharing should not be a mandatory form of access and the regulation of tariffs will consequently lapse. However, if line sharing can and must serve as a step up to full unbundling, the rates for it should contain an incentive to promote an actual shift to it. After all, at present it is 'cheaper' to buy line sharing than full unbundling. Moreover, the question is whether the price difference provides economic justification for the addition of telephony services (and the subscription).

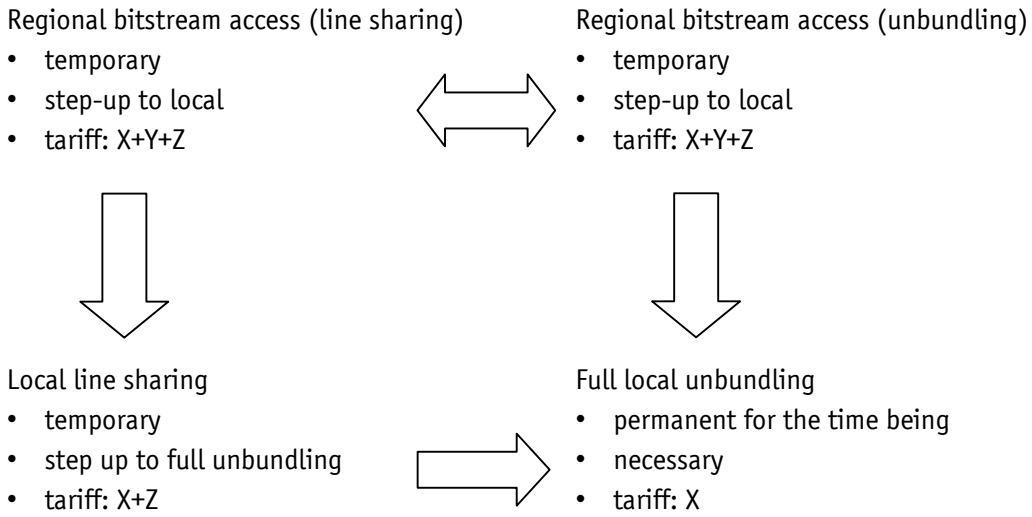
Assuming that the acquisition of subscribers through full unbundling does indeed provide grounds for higher tariffs, the dynamic incentive included in line sharing rates will need to move in the direction of an identical pricing level. In other words, line sharing tariffs will need to move towards those for full unbundling in the course of time, depending on the actual situation n the market.

There do not appear to be any short-term alternatives available for full unbundling. Tariffs will therefore need to be set on the basis of strict cost orientation.[24] *Given the far-reaching roll-out and investments on the part of a new entrant, the rates will need to be relatively lower (compared with other types of access requiring less investments). If line sharing can and must serve as a step-up to full unbundling, the rates for it should contain an incentive to promote an actual shift to it. Assuming that the acquisition of subscribers through full unbundling does indeed provide grounds for higher tariffs, the dynamic incentive included in line sharing rates will need to move in the direction of an identical pricing level. In other words, line sharing tariffs will need to move towards those for full unbundling in the course of time depending on the actual situation in the market.*

[24] See also EPN 01, December 2003

6.5 Summary of dynamic regulation of existing forms of access

Substitute or complementary?



X – costs
Y – mark-up for new infrastructure
Z – dynamic incentive

6.6 Future developments

Voice over IP (VoIP) or Voice over DSL (VoDSL) represents an important technological development. Both provide telephony services for end users via the Internet. In the first place, this type of service could change the situation at the local level. If any new entrants who purchase line sharing at the local level, include VoIP in their range of broadband services, it will be possible for them to use this form of access to offer a comprehensive package to their customers, including telephony services. In this case end users would only continue paying the subscription fee to the incumbent for their connection to the network. This form of line sharing would be a good deal more of a substitute for full unbundling. Providers would have an incentive to provide subscriptions as well. Shifting to full unbundling would then become a more realistic alternative.

The introduction of VoIP may also have implications for the manner in which one should view bitstream access through full unbundling and line sharing at the regional level. Both types of access in combination with VoIP-services could provide a step-up to local roll-out. In addition, the two types of access at the regional level would increasingly constitute a substitute as a result. This would raise discussion about the necessity to mandate both types of access. In this case the pricing of the form of access which survives, will definitely need to include a dynamic investment incentive.

6.6.1 The relevance or irrelevance of resale types

One of the possible consequences of VoIP is that the question raised by some market players about the potential for the resale of subscriptions will become relevant. After all, they would be providing all services through 'dedicated' lines and they would no longer need to share these lines with the incumbent

because of the latter's telephony services. Another possibility is that wholesale line rental is considered an appropriate remedy. In this case, resale would be a solution for a problem noted in relation to competition in the market. An initial analysis of the economic considerations involved in this follows.

The resale of subscriptions entails that a new entrant would only assume administrative responsibility for the local loop. From then on end users would obtain subscriptions from this provider, even though the incumbent would still technically provide the underlying local loop. This type of access is referred to as wholesale line rental (WLR). At present (May 2004) the incumbent does not offer this type of access.[25]

WLR requires relatively limited investments (management facilities) in the existing infrastructure on the part of the incumbent. Generally, WLR will, however, probably reduce investments in infrastructure by the incumbent. The incumbent will not be able to exploit the investment and hence the new functionality or capacity for his own profitability only: new entrants will also be able to use it through WLR. The roll-out of fibres to the curb or the implementation of SDSL or VDSL may therefore be hampered.

In addition, new entrants experience no incentive to invest in the roll-out of infrastructure, since WLR will give them relatively easy access to functionally similar existing facilities of the incumbent. In particular, the existence of WLR may well reduce the incentives for a new entrant to use other types of access, such as full unbundling, that imply more investment in the roll-out of a new entrant's own facilities.
The wholesale tariffs for the overall package of subscription (local loop) and services (telephony and broadband Internet access) would need to reflect these thoughts. If the total wholesale tariff is consequently less than that of full unbundling, the latter would no longer constitute a realistic economic alternative. After all, the resale variant entails far less investment. So, only in a well-defined step-up scenario could WLR fulfill a necessary and useful role.
The analysis of this scenario is as follows.

6.6.1.1 Use of existing infrastructure

WLR enables an entrant who is already active on the broadband market (DSL provider) to act as a virtual local loop operator. Combined with other existing types of access, the entrant can position himself on the broadband market as a carrier's carrier. In addition the entrant, like the incumbent at this time, can become a vertically-integrated provider who is active in various related markets: connections, broadband access, internet access and telephony services. With reference to telephony, an entrant could distinguish himself with new technologies (VoIP) and/or could focus on advantages of economy of scope (fixed to mobile convergence, e.g. by means of an alliance with one or more mobile providers), and/or could acquire the know-how with reference to providing services by means of an alliance with a CPS telecommunications operator, for example.

Considering the relative ease with which connections can then be virtually acquired, it is improbable that an entrant would invest significantly in building its own local loops. An entrant will primarily invest in the provision of services (administrative services such as billing and CRM) and in facilities related to customer service, probably resulting in more competition in services. It is also possible that an entrant

[25] The incumbent only uses an agency model for ADSL. This is not considered to be a type of resale, in the first place because the service is not offered using the entrant's brand name. KPN obliges the agent to mention the KPN brand name in its sales promotion. The second reason is that KPN selects the agents and can deny its competitors access to the status of agent.

will invest in new, more efficient technology (VoIP), with the potential for lower user tariffs for telephony services and/or bundled service packages.

Advantages for the user are created in the form of one-stop shopping: one single bill for all telecommunication services, while three bills are currently received (one from the incumbent for the connection, one from a CPS telecommunications operator for outgoing telephony traffic and one from an ISP for Internet access). The combination of advantages of scope, the use of new and less expensive technology, and fierce competition can be expected to lead to a situation in which an integrated bill to the end user amounts to less than the total sum of the three former bills.

6.6.1.2 Potential for replication, access obligations and services-based competition

In itself, the establishment of a subscription relationship (through resale of the local loop) with the end user can be replicated by full unbundling of the incumbent's local loop and ultimately by establishing local loops by the new entrant. Hence, WLR is not an essential type of access in itself.

Providers higher up the chain (CPS telecom operators, niche service providers, ISPs) can 'descend' and also develop offerings of vertically-integrated services. Certainly if the incumbent has an obligation to process all (in contrast tot the current situation in which not all user traffic can be processed using CPS) user traffic via CPS, the same one-stop-shopping advantages could exist as described above for DSL providers. Those providers higher up the chain will then primarily invest in the provision of new services, probably resulting in increased services-based competition.

All types of new entrants can be expected to achieve a quick geographic roll-out, given the relative ease obtaining geographical coverage using WLR.

The conclusion to be drawn from the expected effects as described above is that service-based competition will probably be promoted by obliging the incumbent to provide WLR, but that infrastructure-based competition will not. This is a two-edged sword, since the risk of inefficient duplication will not be present. However, efficient duplication will not take place either.

6.6.1.3 Gradual roll-out and dynamic pricing

The question is whether infrastructure-based competition can still be promoted with the aid of dynamic pricing and/or conditions while continuing to stimulate services-based competition.

In a static economic approach, setting tariffs on the basis of marginal costs would seem logical. The marginal costs of WLR access to the local loop are extremely low: the incumbent need only invest in management facilities to a limited degree. If based on marginal costs plus a mark-up, the tariffs for WLR would be less than those for full unbundling and would consequently negate the incentive to invest up to and including this level. In today's market, this could mean that those market players who have already invested through to the level of using unbundling would see their investments devalued.

In a dynamic economic approach if access is appropriate, other access types should be taken into account as well as dynamic pricing. So, only in a well-defined step-up scenario could WLR fulfill a necessary and useful role.

There are two ways in which WLR could function as a step-up possibility:

1. From local line sharing to local full unbundling.
   Entrants that use local line sharing can combine their service with the WLR-offer in order to build out their client base to be able to switch to full unbundling and/or establishing their own local loops. In this case the initial tariff for WLR should be higher than the tariff for complete unbundling and should increase over time.
2. From regional levels to local levels.
   Bundling of services with line rental can stimulate entrants at a regional level to roll out if they search for a more permanent way of servicing their customers with a "one-stop-shopping"-solution. In this case, not only should the tariff increase over time, but the access possibilities should be limited in time. In other words, WLR should only be available for a few years for establishing a client base and rolling out to the local level and will then be terminated.

WLR requires from the incumbent limited investments in the existing infrastructure but generally keeps the incumbent from investing in facilities that will enable innovation. The acquisition by a new entrant of a subscription relationship can be replicated by using full unbundling. However, the latter option is generally more expensive. WLR could therefore discourage investments in infrastructure. Only in a well-defined step-up scenario could WLR fulfill a necessary and useful role. In such a scenario, WLR should only be a temporary obligation, the tariffs for it should be determined with appropriate caution and should exceed the wholesale tariffs for full unbundling.

7 Thrust of existing regulatory policy

Unlike the new legal framework, the current one has not explicitly provided any scope or authorisation for a breakdown of competition into different types. OPTA has therefore not been able to give priority to infrastructure rather than services-based competition. In a general sense OPTA has devoted a limited amount of attention to infrastructure and (or as opposed to) services-based competition in its decisions and rulings. This is also to be expected, because the obligations imposed on market players holding a significant market power follow from the EC's thoughts in favour of promoting competition based on the concept of 'open network provision' (ONP). For instance, KPN had an obligation to grant access to its network, so as to permit other providers to offer services to consumers, and to be able to compete with KPN. Later the EC did deal with the importance of infrastructure-based competition, as in its recommendation for unbundled access. The grounds underlying the European Commission's approach in the various directives, recommendations and communications, and the national legislation based on them can be found in those of OPTA in its relevant decisions. After all, the obligations that are to be imposed, are derived directly from the law, which is in turn based on a specific approach.

7.1 Analysis

This section considers the various findings concerning a number of relevant rulings.

7.1.1 MDF access guidelines[26]

In these guidelines OPTA has developed criteria for determining whether an application for access to a local loop is reasonable. These criteria were later followed by the regulation on unbundled access.[27] Briefly, it acknowledges that in a more mature market a provider which wishes to use a local loop, would be more likely to pay a fee which would be in line with a sum based on its actual value (replacement value) as also applies in the case of the main network within the system presented in the EDC model. However, KPN sets – and used to set – local loop tariffs (also referred to as end user charges) on the basis of historic cost. In order to accommodate both an entry scenario for new entrants up to the local level and not to discourage investments in alternative infrastructure (cable operators) these guidelines develop a system of tariffs with a rising scale to commercial levels.
However, tariffs are only regulated dynamically in the case of full unbundling and not in the case of line sharing, and are frozen after a few years. A glance at the tariffs reveals that line sharing rates have fallen far lower in the course of time, while those for full unbundling have hardly changed.

7.1.2 Unbundled local loop (ULL) reference range (RR)

Two decisions concerning the ULL RR deal with infrastructure and services-based competition in greater detail: policy rules governing unbundled access[28] and a ruling on new line services (NLS)[29]. Both cite the grounds set out in the Regulation as their basis and developed them further. For instance, the policy

[26] Richtsnoeren met betrekking tot ontbundelde toegang tot de aansluitlijn ("MDF-access"), 12 maart 1999

[27] Regulation (EC) No 2887/2000 of the European Parliament and of the Council of 18 December 2000 on unbundled access to the local loop (*OJEC* L 336, 2000, p.4).

[28] Beleidsregels inzake ontbundelde toegang tot het aansluitnet (linesharing), 2 juli 2002 (OPTA/IBT/2002/201182)

[29] Oordeel inzake de levering van nieuwe aansluitlijnen in het kader van RA ULL, 11 juli 2002 (OPTA/IBT/2002/201508)

rules discuss whether providers should invest in a splitter themselves for line sharing or if they may ask KPN to do this. It is therefore not so much infrastructure as opposed to services-based competition that is discussed, as the degree of investment in one's own infrastructure. The various investments are compared and a decision is made in favour of the direction that is most efficient in economic terms. In this respect, attention is devoted to, amongst other things, the economic effects of not having to utilise any space in one's own co-location facility and the relationship between one's own substantial investments compared with those made by KPN and its ability to recoup them.

On the one hand, the Regulation considers that it would not be feasible for new providers to duplicate the local access infrastructure of an established operator completely within a reasonable period of time. On the other hand, the Regulation considers that incumbent operators need not establish an entirely new local infrastructure in order to satisfy new entrants' requests specifically. This approach can be found in the NLS ruling seeking to draw a line between those applications for unbundled access to new local loops, which KPN is required to honour, and those which it is no longer required to honour. KPN need not satisfy any request, if it would have to establish an entirely new infrastructure to do so. The reason underlying this is that it would amount to the same thing, if the new entrant were to do this himself or ask someone else to do so.

7.1.3 Bitstream access (BSA)

These dossiers mainly devote attention to non-discrimination, the comparison of the provision of KPN services (KPN's ADSL offered by other providers) with one's ability to offer similar services oneself. Being able to make an offer oneself is important. Without BSA it is considered to be impossible or inevitably uneconomical to make one's own offer. It is impossible to connect end users to a new entrants own infrastructure or through and alternative one (cable) in an economically acceptable manner. The relationship between BSA and local access was not dealt with in this case.

7.2 Findings and conclusion

In the first instance, the decisions and rulings issued by OPTA within the legal framework from 1998 to 2003 promoted services-based competition, in particular. KPN is required to provide access to its network and associated facilities for this purpose. The chief reason is that other providers do not possess an extensive finely meshed network. The business case was also considered, namely, the question as to whether one was able or not to establish one's own network extending to end users. Providers therefore need to be able to offer their services to end users through KPN's network, so as to create a competitive climate and consequently a level playing field. In addition, there was the argument concerning the commercial feasibility (or not) of duplicating KPN's network or parts of it. One can see that a limited amount of attention has been devoted to infrastructure-based competition in a number of decisions.

8 Conclusions: recommendations on incentives for infrastructure-based and services-based competition in the broadband access market

The new legal framework offers scope for pondering economic considerations and incorporating them in measures to promote sustainable competition. Viewed from a long-term perspective, economically efficient investments in infrastructure may not be hampered. They lead to infrastructure-based competition, which gives rise to the most sustainable form of competition. Services-based competition, which will generate more infrastructure-based competition in the future, plays an important role in this respect. However, services-based competition which discourages investments, is less stable.

This RPN has analysed a scenario in which access obligations remain intact in relation to the public fixed telephone network in one form or another. The existing types of access have been analysed using the economic considerations presented in EPN 01. In particular, attention has been devoted to the potential for replicating infrastructure in relation to access obligations, to the utilisation of new or existing infrastructure and to the implications of a dynamic implementation of access obligations and the pricing involved.

The analysis conducted in this regulatory policy note shows that a dynamic implementation of measures for the purposes of developing the broadband access market does not obstruct services-based competition and, at the same time, can promote infrastructure-based competition. Both the imposition of access measures and the regulation of access tariffs should occur closely in line with investment incentives. In this respect, the relative relationship between various types of access and alternative networks needs to be involved.

In summary, the following conclusions have been drawn with regard to the scenario that has been examined.

1. The current forms of access to KPN's communications network appear to be proportional at present, because they are not substitutes (yet) but complement each other.
2. Local and regional types of access are moving closer to each other. Where two or more types of access are fully substitutable, a number of types of access regulation should be withdrawn. Increasing substitution could lead to the withdrawal of one local and at least one regional type of access.
3. Wholesale line rental chiefly promotes services-based competition and should only be made mandatory, if it clearly constitutes a step-up to a local roll-out of infrastructure;
4. Emerging services, such as VoIP, are accelerating developments towards the substitution of local forms of access.
5. The tariffs for the current types of access to KPN's communications network could more closely reflect the relative relations between them. This would yield more dynamic investment incentives.

The following page contains a summary of the economic considerations governing the regulation of current types of access to the fixed network.

Legend accompanying the table

T New entrant demanding access

I Incumbent (owner of the network)

A Absolute

R Relative

Form of access	Obligation	Infrastructure	Characteristics	Investments	Tariffs			Effect on new developments
					Level	Incentive for investments	Intended effects	VoIP
regional	*Yes, set-up to local roll-out*		*Easy to replicate*					
Bitstream access through linesharing	Proportional as long as BSA is no substitute	Mix of existing and new		T to RAP, I onwards	A: mark-up on (forward looking) cost R: higher than local linesharing	YES	Roll-out to local level	can accelerate development of a BSA substitute
Bitstream access through full unbundling	Proportional as long as cable access is no substitute	New, no roll-out tot local level is needed		I complementary/ replacement	A: mark-up on (forward looking) cost R: higher mark-up than regional linesharing	YES	Access given current lack of alternative; lift access regulation when regional linesharing is a substitute; lift tariff regulation when cable is a substitute	Step-up scenario to local roll-out possible
local	*Yes, access network replication very difficult*	*role of economies of scale and scope*	*replication difficult*					
Full unbundling	Proportional as long as no real alternatives available (own roll-out, cable access)	existing		T to LAP and equipment, I in exchange, rents line	strict cost orientation, low mark-up (limited risk)	DEPENDS, at first: NO	optimal infrastructure roll-out except for access network	
Linesharing	proportional as long as full unbundling is no substitute	existing		T to LAP and partly equipment, I in exchange, shares line	A: strict cost orientation, low mark-up; R: tariff should grow to and extend over unbundling tariff	YES	Infrastructure roll-out and step-up to full unbundling; lift access regulation when full unbundling is a substitute; lift tariff regulation when cable is a substitute	can accelerate substitution by full unbundling two scenarios: step-up to full unbundling or discouragement of full unbundling
resale WLR	No, can discourage investments unless step towards gradual roll-out, in that case limit access in time	existing	administrative alternative for infrastructure	I control facilities, discouragement of innovation I, T new services	A: cost orientation (total cost); R: higher than tariff for full unbundling and rise in time	YES	Service-based competition; only economically sound if temporarily and as step-up to unbundling (investments in own infrastructure)	

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Economic Analysis Team

The **Dutch Independent Post and Telecommunications Authority (OPTA)** regulates the postal and telecommunication markets in The Netherlands. OPTA is an independent executive body that commenced its activities on 1 August 1997. OPTA's mission is to stimulate sustained competition in the telecommunications and post markets. In the event of insufficient choice OPTA protects end-users. OPTA regulates compliance with the legislation and regulations on these markets.

OPTA has committed itself to improving the economic reasoning on which strategic choices are made so that market parties have a clear understanding of what to expect from OPTA now and in the future. In 2003 the OPTA bureau was complemented with the **Economic Analysis Team (EAT)** headed by the Chief Economist. EAT is responsible for developing economic reasoning and stimulating discussion on key issues within the telecommunications and postal markets. To achieve this, EAT produces two kinds of policy notes – short discussion papers. *Economic Policy Notes* focus on economic issues and principles. *Regulatory Policy Notes* focus on strategic economic issues in specific regulatory fields.

With its products and activities the Economic Analysis Team expects to add value to the economic debate in Dutch telecoms and post. For further information visit **www.opta.nl** from where you can download EAT publications.

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