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**Report on Next Generation Access -
Economic Analysis and Regulatory Principles**

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A. Introduction

This ERG Report “Next Generation Access – Economic Analysis and Regulatory Principles” is a follow up document of the October 2007 Common Position on NGA (ERG CP NGA)¹ looking at the economic and regulatory analysis in light of ongoing roll-out, the draft NGA Recommendation and more recent economic studies including the ERG Statement on the development of NGN Access, ERG (08) 68, December 2008.

It is a report examining the latest evidence on NGA roll-out strategies (including cable) as well as regulatory approaches being announced or implemented across Europe by ERG members since the adoption of the ERG CP NGA to ensure that the original conclusions remain valid and fit-for purpose for national regulators to follow and take account of the latest developments. It also explores some new issues which may later be picked up again.

The October 2007 ERG CP NGA identified a number of key implications raised by the rollout of next generation access networks and developed some regulatory principles based on the current European Regulatory Framework for Electronic Communications. The main conclusions of the ERG CP NGA, reassessed hereafter, may be summarized as follows:

The principle of promoting competition at the deepest level in the network where it is likely to be effective and sustainable is still appropriate for the regulation of enduring economic bottlenecks in NGA networks. Where it is practically and economically feasible to promote infrastructure based competition, this should be the aim of national regulatory authorities (NRAs). NRAs will therefore strive to maintain the level and balance of infrastructure competition achieved and pursue the movement up to the economically viable rung which may vary across Member States and within Member States depending on regional characteristics. In those instances where replication of access is not considered feasible, promoting service competition is an important goal for the NRA. As long as competitive conditions have not changed the roll-out of NGAs does not provide an opportunity to roll back regulation on existing services.

It is likely that the most effective strategy for NGA deployment will utilise a mixture of technologies to deliver these services depending on specific local characteristics. Conditions are likely to differ greatly among Member States and within different regions of Member States leading to a more heterogeneous market structure as the NGA roll-out may not happen everywhere.

NGA investments are likely to reinforce the importance of scale and scope economies, thereby reducing the degree of replicability, potentially leading to a shift of the enduring economic bottleneck possibly resulting in a change of the most suitable access point(s) for the promotion of competition. The concept of the ladder was considered to stay in place. However to maintain the level of competition reached, NRAs may have to adjust the access products on

¹ ERG (07) 16rev2. “ERG Opinion on Regulatory Principles of NGA”. This ERG Opinion constitutes at the same time the ERG Common Position on NGA (http://erg.ec.europa.eu/documents/docs/index_en.htm).

different rungs of the ladder to complement each other and to fit to the NGA hierarchy. Given that NGA networks may be more likely to reinforce rather than fundamentally change the economics of local access networks, NGA may be likely to, at least, provide the same competition challenges to regulators as current generation wireline access networks.

For the purpose of this paper, two broad scenarios had been defined, one being called FttCab and the other one FttH/FttB. Fibre to the building was included in the Fibre to the home scenario even though, technically, it has to be considered a hybrid solution.

More specifically regarding unbundling adapted to NGA it was concluded that, independently of the technology adopted physical access (layer 1) to the copper or to the fibre or a portion of the bandwidth (wavelength), from a connection point/distribution frame, would be considered unbundling. Fibre has to be included in Market 11 (now Market 4). If SMP is assessed on such a widened Market 11 (including the fibre loop, as described above), unbundling of the optical local loop could be imposed as an obligation.

Access to duct sharing as a remedy could be imposed as a complementary remedy on a widened Market 11 encompassing both copper and fibre loops; or alternatively as a direct remedy to an SMP position on a separate relevant market of ducts used for electronic communications services, if such a market fulfils the 3-criteria test. Additionally a strengthening of the powers of NRAs allowing them to impose a symmetrical obligation to any electronic communications operator to negotiate sharing of facilities (ducts, in-house wiring, etc.) under reasonable requests from another operator was recommended.

With regard to bitstream access it was considered a remaining characteristic that the competitor accesses the wholesale service at layer 2 or layer 3 of the communication protocol (ISO) stack, whereby the freedom of the competitor to control quality parameters is reduced, compared to the LLU case, where the authorized operator gets access to the physical line (layer 1 access). Furthermore, bitstream access at MDF or equivalent aggregation nodes was deemed to become more important with fibre being rolled out closer to the end-user.

Before the current access network is replaced by a NGA, it should be clear whether all the regulated services can continue to be delivered in the NGA. If this is not the case (e.g. phase-out of MDF access), an equivalent alternative should be determined. This equivalent alternative should be developed and implemented. After it is possible to actually buy the equivalent alternative, phase-out of the (old) regulated service should be allowed.

Since October 2007, there have been a large variety of roll-out strategies being announced or implemented across Europe which some NRAs have had to address. The ERG considers it timely to examine the latest evidence to ensure that the original conclusions remain valid and fit-for purpose for national regulators to follow and take account of the latest developments. Specifically, in this document ERG re-examines the economic analysis and regulatory implications in light of:

- information on the ongoing NGA rollouts (including cable) in Member States;

- the more recent economic studies and academic literature that has been undertaken;
- the regulatory approaches that have been announced and put into practice by ERG Members since the adoption of the ERG CP NGA;
- the debate that has arisen in relation to the European Commission's plan for the a forthcoming NGAN recommendation; and
- the current debate on the Regulatory Framework Review and more generally on Broadband strategies both at national and European levels.

To take account of the latest evidence in the respective countries the country case studies used in the ERG CP NGA have been updated. They are summarised in the following section. In Section C Economic Analysis in the light of factual developments it is assessed to what extent the factual NGA developments in the respective countries reflect the results and principles of the economic analysis of the ERG CP NGA. In addition a new sub-section was added summarising the findings of some the recent studies attempting to assess the value of NGA to wider economy and society. In the main chapter of the document (Chapter D) recent regulatory decisions are analysed with regard to the Regulatory Principles derived in the ERG CP NGA. The following aspects are dealt with in specific subsections: market definition and analysis, access obligations and the ladder of investment, price control measures including an assessment of investment risk, regulatory/competition law treatment of joint projects, symmetric regulation and procedural issues during the migration period. Conclusions of the respective chapters are summarized in Chapter E Overall Assessment. The Annexes 1-3 referred to in the document ("NGA Country Case Study Updates", "Table on NGA Factual Developments" and "Table of Price Control Measurements used") are contained in separate files.

B. Summary of Country Case Studies

In its CP NGA the ERG concluded that the existing differences between Member States with regard to either the chosen scenarios or the pace of migration made it implausible that a one-size-fits-all approach could reflect the specific regulatory needs of individual countries.

In order to take account of recent developments with regard to NGA networks in the individual countries, a comprehensive country case fact finding was conducted (see Annex 1). The following 22 countries provided country case studies: Austria, Belgium, Czech Republic, Denmark, Estonia, France, Germany, Greece, Ireland, Italy, Lithuania, the Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, Switzerland and UK.

Out of these 22 country studies, 12 constitute updates of the country case studies that were delivered for the ERG CP NGA.² The other 10 country studies are new ones. In addition, a

² See Part 2 of the Supplementary Document to the ERG Opinion on Regulatory Principles of NGA (ERG (07) 16rev2b NGA Opinion Supplementary Doc).

new table captures in a nutshell the main factual NGA developments and regulatory decisions in 19 of these countries (Annex 2).³

In particular, the current country case studies allow an overview on recent NGA developments and evaluate its pace since the last country case studies. This relates to the NGA technologies that are deployed both by incumbents and competitors and it may help to identify whether certain tendencies can be observed. E.g., is there a focus on one of the scenarios (Fibre-to-the-Cabinet [FttCab] or Fibre-to-the-Building/Fibre-to-the-Home [FttB/H]) that were distinguished in the ERG CP NGA? Beyond providing an inventory of current NGA rollouts, the case studies address the issue of further roll-out plans. Furthermore, the stock-taking exercise addresses the availability of major wholesale access products in the respective countries.

As regards the main NGA scenarios – either FttCab or FttB/H – it turned out that in most countries both scenarios are looked at or even implemented, either by incumbents and/or competitors even though it may only be field trials or small scale deployments (for example, in Spain the incumbent conducted pilots based on FttCab and FttH). This result confirms the finding of the ERG CP NGA that even within a certain country there may be different network roll-out strategies.⁴ This may be attributed to the fact that economic viability of roll-out strategies is largely influenced by specific local characteristics.

A focus on a specific scenario is to be observed in (e.g.) France, the Netherlands, Italy, Sweden and the Slovak Republic. For example, in France both incumbent and competitors rather focus on FttH roll-out in bigger cities. This caused a debate on where the concentration point for inhouse wiring should be located. In Italy, a significant part of NGA roll-out is currently done by Fastweb applying a FttH strategy.⁵ In the Netherlands, a shift in the incumbent's strategy from VDSL to FttH could be observed. FttH using point-to-point architecture seems to be the strategy gaining predominance, both by a joint venture between the incumbent and Reggefiber and by a number of local FttH initiatives. FttX strategies – either FttB or FttH – also dominate in Sweden where there is a large number of fibre connections from the incumbent and in particular local open access FttX networks. In the Netherlands and Sweden, this large FttX footprint may be explained by the competitive pressure from cable networks. As a response to competitive pressure not only from cable but also from increasing fibre roll-out by municipal utilities the incumbent in Switzerland, having a FttCab coverage of 75% already, is deploying multi-fibre FttH networks in a point-to point architecture. More specifically, it is intended to roll out four fibres from each apartment/unit up to the operator's first manhole at a distance of 150m from the house. In France, multi-fibre solutions are under discussion for in-house wiring up to the concentration point.

In the Slovak Republic, both incumbent and competitors seem to deploy in particular FttH GPON solutions, and in Spain the current commercial offers of the incumbent are based on FttH.

³ The table is based on the information provided in the updated country case studies, also including a comparison with regard to the information provided in 2007.

⁴ ERG (07) 16rev2, p. VI

⁵ Currently accounting for approx. 25 % of all FttH connections in Europe.

A very pronounced difference between incumbent and competitors with regard to the chosen NGA deployment strategy can be observed in Germany, where the incumbent concentrates on FttCab roll-out whereas in particular regional/local carriers rather follow scenario 2 (in particular FttB).

Given the recent focus of discussions, two new aspects have been added to the analysis: First, information on “joint” projects, which may be projects between incumbents and competitors (e.g. Netherlands) or between different competitors. Second, projects involving public entities or partnerships between incumbent and public utilities (e.g. Switzerland) are presented. Networks built under these heading are often characterized as “open-access-networks”.

In many countries there is not much information available on the roll-out plans of incumbents and competitors alike. This may correspond to the observation that in many cases operators are currently engaged in field trials (even if they deploy the “other” NGA scenario).^{6,7}

Overall, the country cases support the result of the ERG CP NGA that there are significant differences between and within countries, which reflect differences in the economics of NGA networks, resulting from e.g. different densities or loop length but also from the relevance of competitive pressure from cable networks.

Furthermore it can be concluded that the scenarios as discussed in the ERG CP NGA still hold. However, in some countries emphasis has shifted from Scenario 1 (FttCab) to Scenario 2 (FttH/B). Furthermore, the FttH Scenario requires determination of a concentration point for access to in-house wiring.

C. Economic Analysis in light of Factual NGA Developments

In the ERG CP NGA, the ERG considered the economic implications of the envisaged access and backhaul upgrades for the electronic communications sector such as the replicability of fixed NGA networks or the balance between infrastructure and service competition stating the validity of the principle of promoting competition at the deepest level in the network where it is likely to be effective and sustainable. In analysing the economics of NGA networks, the results of a number of business case studies were evaluated as well as the other factors impacting on the feasibility of NGA roll-out and the regulatory implications of economics in an NGA environment. Since its publication in 2007, further studies and papers have been published. The purpose of this chapter is therefore to summarise these subsequent publications and identify whether the original analysis remains valid and highlight any additional insights when consid-

⁶ Thus, depending on the outcome of current field trials and roll-out they may need to adapt their mid-term strategies.

⁷ Nevertheless, there are some countries where roll-out announcements were made (France, Portugal: incumbents and competitors; Belgium, Ireland, Italy, the Netherlands, Spain, Switzerland, UK: incumbent; Germany: competitors).

ering the regulatory implications of NGA economics. This chapter broadly follows the format of Chapter 3 of the ERG CP NGA and assesses to what extent the factual NGA developments in the respective countries reflect the results and principles of the economic analysis of that CP. In addition a new section was added summarising the findings of some the recent studies attempting to assess the value of NGA to wider economy and society.

C.1 General principles

This section assesses to what extent the factual NGA developments reflect the results and principles of the economic analysis of the ERG CP NGA.

In the ERG CP NGA, it was noted that the launch of NGA networks would result in a number of issues arising that would require regulators to consider whether the roll-out of these new networks would result in a fundamental change in the underlying economics of wireline local access networks and possibly requiring adjustments of regulation. In particular it was noted that increasing relevance of economies of scale and scope will lead to changes in the structural barriers to market entry affecting the 3-criteria-test and the degree to which assets are replicable. Several of the studies and papers that have been published subsequently have reinforced these conclusions⁸.

First, since the publication of the ERG CP NGA, none of the literature has indicated a fundamental shift in technology with most of the studies as well as academic literature focused on wireline NGA. Specifically, alternative technologies (e.g. wireless) may not provide an adequate competitive alternative to wireline deployments of NGA networks yet with the exception of cable infrastructure. Therefore, in absence of alternative infrastructures, other than cable, NRAs continue to need to consider if the NGA network of an incumbent may be replicable in the foreseeable future. This requires an assessment of the economics of NGA network deployments.

Second, diversity of solutions continues to pervade NGA around Europe and the rest of the world. Several EU Member States have city-wide NGA deployments. For example, in a number of French cities alternative operators are deploying FttH in part utilising sewers to reduce the cost of rollout. A company is following a similar strategy in a number of UK cities. In the Netherlands and Sweden there are several public-private partnerships in municipal schemes, in addition to purely private investments. In addition, there are actual or announced fibre to the cabinet rollouts by several incumbent operators, including in Belgium and Germany. Indeed, many Member States are seeing a patchwork of different NGA solutions being rolled out. Outside of Europe, AT&T is rolling out a FttCab network and Verizon offers FttH in certain US cities. This is in part because of the poor quality of existing DSL services (due to long copper lines) and because of strong competition from cable operators. In Japan and South Korea, national governments have made fibre deployment part of their national technology plan and

⁸ See Parliament Office of Science and Technology, Next Generation Broadband Access, April 2008, Postnote No.305; and Benoît Felten, Senior and Vince Vittore, Fiber to the World: A State of the Union Report on FttH, Yankee Group, December 2008.

invested several billion euro. Due to the high population density and greater proportion of aerial cables, it is relatively cheap to deploy fibre in these countries and an ever increasing proportion of broadband connections in Korea and Japan are fibre-based.

C.2 Business case studies

In the ERG CP NGA the results of a number of business case studies were summarised.⁹ Having conducted analysis for the ComReg in Ireland¹⁰ and the OPTA in the Netherlands¹¹ to assess the commercial attractiveness of SLU in these countries, Analysys Mason (AM) developed an economic model for BIPT to assess the commercial attractiveness of sub-loop unbundling (SLU) to alternative operators in Belgium¹². Like the previous two AM studies, this found that very specific conditions needed to be met to make SLU commercially viable. In particular, without regulatory intervention regarding the conditions under which backhaul and co-location services are made available for SLU, the SLU business model was clearly not as commercially attractive as LLU for an alternative operator.¹³

The European Competitive Telecommunications Association (ECTA) recently published a study by WiK showing that the viability of competitive entry using passive inputs and fibre-to-the-cabinet varies significantly between the countries studied (i.e. Germany, France, Italy, Portugal, Spain and Sweden)¹⁴. This study estimated the market share required to deliver a positive business case for an alternative investor using varieties of SLU. This varied by country, and by geography type, showing the importance of models that reutilise existing assets or share investment in new assets.¹⁵ Indeed both the ECTA study and the independent Caio review produced for the UK Government point out the economic benefits of sharing assets and infrastructure.

More broadly still, AM was also commissioned by the Broadband Stakeholder Group (BSG), to quantify the deployment costs for three different types of fibre-based infrastructure and technology in the United Kingdom¹⁶. Specifically, the cost model considered FttCab using VDSL, FttH using GPON and point-to-point fibre. Like the WiK study for ECTA, the AM cost model contained a geographical dimension. Consequently, differences in costs between areas of the UK were recognised in addition to an analysis of the potential differences in operating cost between current generation networks and the three NGA technologies. This work showed that

⁹ Specifically by Analysys Mason, Arcep, JP Morgan, Ovum and WIK.

¹⁰ http://www.comreg.ie/_fileupload/publications/ComReg0810a.pdf.

¹¹ <http://www.opta.nl/download/Analysys+Final+Report%2Epdf>.

¹² Analysys Mason, The business case for sub-loop unbundling in Belgium, report for BIPT, 9 July 2008

¹³ However, a viable case could be constructed provided a strict set of conditions were met, including that an alternative operators limited its SLU roll-out to the densest part of the country, that backhaul links to the MDFs are rented from the incumbent and that the alternative operator co-locates its equipment with the incumbent.

¹⁴ The Economics of Next Generation Access, WIK-Consult GmbH for European Competitive Telecommunication Association, http://www.ectaportal.com/en/upload/ECTA%20NGA_masterfile_2008_09_15_V1.zip

¹⁵ For example under one scenario, the minimum market share of all communications customers for a competitor using sub-loop unbundling in 'less urban areas' (covering 5 million homes) was 31%. This was based on an assumption of the competitor sharing 80% of the costs of its ducting i.e. sourcing the ducting it requires from existing sources (e.g. duct access, use of sewers etc). As the assumption on the level of sharing falls to 20%, the market share required increases to 37%.

¹⁶ Analysys Mason, The costs of deploying fibre-based next-generation broadband infrastructure, Final report for the Broadband Stakeholder Group, 8 September 2008

the costs of deploying FttH are five times the costs of deploying FttCab, and that the costs of deploying point-to-point fibre are around 15% higher than for FttH/GPON. Access to alternative infrastructure such as utility networks has the potential to significantly reduce deployment costs by up to 16% for FttCab/VDSL and 23% for FttH/GPON. For all three of the technologies, the fixed costs of deployment were far greater than the variable costs: the significance of which is that the total investment required per premise connected will depend significantly on the extent of take-up of services. Of course, the results are based upon a model with a large number of assumptions and the actual costs of a real deployment are likely to differ from those presented in the AM report and indeed from country to country. Given such economic hurdles, some have argued that a more readily available way for alternative network operators (altnets) to reach customers nationwide at the same time as the national incumbent is through the use of active products, as argued by Lewin et al¹⁷.

The original ERG CP NGA identified a number of key implications raised by the rollout of next generation access networks. In terms of economic implication, the ERG concluded that such rollouts were likely to reinforce the importance of economies of scale and scope, reducing replicability and reinforcing enduring economic bottlenecks. Since the publication of the ERG CP NGA, a number of further studies have been undertaken examining the business case for different types of NGA rollout in a number of Member States, as summarised above. These additional studies have confirmed the ERG's previously identified conclusions.

C.3 Regulatory implications of NGA economics

ERG is committed to promote effective competition and encourage efficient and timely investment in NGA networks. Efficient and timely investment involves investment decisions on the most appropriate technology at the right time and in specific locations by operators. Two of the most significant issues to address are:

- providing regulatory certainty through a clear and consistent regime; and
- taking account of the uncertainty and risk in investment.

Providing regulatory certainty through a clear and consistent regime

Whilst there is consensus among authors of the need for regulatory certainty there are disparate views on what this constitutes in practice and reflects as much the point at which the conclusion was drawn. For example, Lewin et al. argue that a lack of clarity over how they will be regulated, particularly in terms of price when they have significant market power (SMP) in NGA supply is deterring fixed incumbents from investing in NGA¹⁸.

¹⁷ David Lewin, Brian Williamson, Director and Martin Cave, Regulating next-generation fixed access to telecommunications services, Revised January 2009

¹⁸ Ibid.

Gavosto et al. apply a real option model to explain NGA investment decisions. They argue that extending or the possibility of extending existing current regulation to future decisions can delay the investment being made. However it is worth noting that they do not consider that it prevents the investment altogether as regulation affects the investment decision only in the initial period when uncertainty is very high.¹⁹ Moreover, it is worth stressing the ERG position, as noted in the ERG CP NGA, that it is not the role of regulators to provide operators with incentives to make particular investments at a particular point in time. Rather, they should endeavour to ensure that the incentives for efficient investment are not distorted, and that regulation prevents the exploitation of market power.

Finally, Williamson argues that utility style regulation and TSLRIC fail in terms of incentives for efficient investment, and in the case of TSLRIC in relation to credible commitment. At the other end of the spectrum, he considered that regulatory forbearance would likely fail the test of providing assurance to downstream competitors and end users. Instead, Williamson proposes, as an intermediate option, anchor product regulation, whereby some basic voice and broadband products are subject to price commitments, whilst other higher bandwidth services are offered on non-discriminatory terms but not subject to ex-ante price regulation. He argues that such an approach would also improve the prospects for platform competition and/or contractual relationships that reduce the risk of future pressure for more extensive regulation²⁰.

Taking account of the uncertainty and risk in investment

The issue has risen to prominence recently, following the publication of the draft NGA recommendation by the European Commission (EC), which sets out its view that NGA network investments warrant a project-specific risk premium that would remain and following the tabling of various amendments in relation to risk and risk sharing during the current review of the EU electronic communications framework.

The issue of risk premium and risk sharing is considered in more detail in Section D.3.2. However, in terms of the literature a number of suggestions have been put forward. The economic consultants OXERA consider given that there are two main types of uncertainty associated with NGA network investments: one, is that there is uncertainty about the spread (i.e the variance) of potential outcomes around the expected value on the returns on the investment; and the other, is that there is considerable uncertainty about the distribution of demand given that limited market testing of services using high-speed broadband. Given the combination of these two uncertainties, it is argued in the paper that regulators need to ensure that they provide appropriate compensation for the return on and return of capital²¹.

By contrast, the WiK study for ECTA takes a critical view of proposals for (general) risk premiums for NGA investment. They would increase the critical market share required and lower the incentive for competitors to invest. The risks involved with NGA investment could be relatively

¹⁹ Andrea Gavosto, Guido Ponte and Carla Scaglioni, Investment in Next Generation Networks and the Role of Regulation: A Real Option Approach, 11 December 2007.

²⁰ Williamson, Next generation networks: why a fresh regulatory approach is required, 24 June 2008.

²¹ OXERA, Dealing with uncertainty: how to encourage investment in NGA networks? Agenda, December 2008.

low for an incumbent able to use existing, or in some cases depreciated, network elements, and/or having a high market share.

C.4 Economic and Social Value of NGA

According to several authors, NGA has the potential to bring real benefits to society by, for example, improving the capacity and reach of the underlying electronic communications infrastructure that applications and services are delivered over. However, it is still too early to assess the full economic and social value of NGA. In most EU countries, NGA deployment is still in its early stages, and any benefits from investment are yet to emerge in the economic data. In fact, it is expected that the full potential benefits associated with NGA will only materialise once NGA services become widely available. Consequently, the literature to date has focused on qualitative assessments of NGA investment and there are no empirical studies quantifying the benefits.²²⁻²³

A separate report for the BSG provides a framework for assessing where the costs and benefits related to the deployment of next generation broadband might accrue across the economy and society.²⁴ They distinguish between benefits that are private (that is captured by the individual or business) and those that accrue more widely. Private benefits are categorised into: doing what people do now more productively (time savings), doing more utilising existing applications, and doing new things and transformations. They estimate that ‘time savings’ could generate a benefit of almost £1 (€1.1) billion per annum to the UK economy. They argue that the benefits from doing more of existing applications and doing new things are potentially large but difficult to quantify. The wider benefits include: reducing costs of transport congestion; enabling virtual agglomeration; improved economic adaptability and resilience; improved access to lifelong learning; social inclusion, more flexible working and enhanced social capital. The scale of these benefits could be considerable but will depend on a wider set of policy options and choices. In conclusion, whilst many assertions have been made about the need to facilitate a modern ‘knowledge economy’ through the widespread availability of high-speed services, currently there is little evidence available to make any quantitative assessment about

²² A report by the Information Technology & Innovation Foundation, in the US, sets out four main functionalities enabled by NGA: faster file transfer speeds for uploads and downloads; ability to transmit streaming video; possibility of real-time collaboration and ability to use many applications simultaneously. The report argues that, together, these functionalities are capable of supporting a whole host of online applications and services that could boost economic growth and improve quality of life – See Stephen Ezell, Robert Atkinson, Daniel Casastro and George Ou, *The Need for Speed: The Importance of Next-Generation Broadband Networks*, March 2009, The Information Technology & Innovation Foundation.

²³ Although the potential for innovation is significant, it is difficult to predict whether households and businesses will actually be willing to pay a significant price premium for NGA services. However, there is some evidence to suggest that demand for bandwidth is increasing and may soon outstrip what current generation services can support - for example, a ‘Green Paper’ by the Broadband Stakeholders Group (BSG) in the UK (March 2006) suggests that by 2012 bandwidth demand for most bandwidth intensive households could reach 23 Mbps downstream and 14 Mbps upstream. Demand is likely to be driven by households wanting to watch multiple HDTV programmes on demand via broadband and demand for fast upload speeds to share photos, videos and other user generated and peer-to-peer file sharing. Unforeseen applications may also emerge that drive up demand for NGA services.

²⁴ Plum Consulting, *A Framework for Evaluating the Value of Next Generation Broadband*, a report for the Broadband Stakeholder Group, June 2008.

the tangible economic and social benefits that NGA might bring, with the single most sighted and application for such high speeds being to deliver TV-like, video services.

D. Analysis of Regulatory Decisions and Principles

Based on the country case studies, this chapter will analyse how the regulatory principles derived in the ERG CP NGA relate to both the regulatory decisions taken so far by NRAs and consultations preparing decisions in Member States.

Furthermore this chapter will take up new issues, that have not been dealt with extensively in the ERG CP NGA: e.g. pricing principles, risk assessment, joint projects, migration and symmetric regulation.

D.1 Market definition and analysis

The process of defining a market is an important step in assessing whether ex-ante regulation is required to promote competition. Market boundaries are determined by identifying constraints on the price setting behaviour of firms. The two main sources of these constraints are likely to be demand-side and supply-side substitution. That is, the extent to which, in response to a relative price increase, customers are able to substitute away from the relevant products (demand-side substitution) or suppliers can switch to, or increase production of the relevant product (supply-side substitution). Other constraints which may be relevant to the definition of the relevant economic market include common pricing constraints and the homogeneity of competitive conditions.

In the NGA CP, the ERG remarked that the inclusion of the fibre loop into the old Market 11 (now Market 4) definition is compatible with the definition of the Access Directive (AD) and the ERG proposed to change the Recommendation on relevant markets to include fibre into the relevant market(s). In the 2007 Recommendation on relevant markets, the EC redefined (as suggested by the ERG CP NGA) the new Market 4 as *“Wholesale (physical) network infrastructure access (including shared or fully unbundled access) at a fixed location”*. The market definition was broadened from only metallic loops and sub-loops to all relevant physical and passive infrastructures necessary to reach the end consumer (including optic fibre).

Regarding Market 5, the ERG CP NGA stated that the old Market 12 comprises all kinds of wholesale broadband access products that can be delivered higher in the network i.e. differentiation of quality, services, functionalities, NRAs will assess in their respective market analysis whether these different wholesale products can indeed be considered substitutes also taking into account the corresponding end user service (e.g. IPTV features) that will be provided on the basis of wholesale broadband access. In the 2007 recommendation the new Market 5 was not broadened but merely redefined as *“Wholesale broadband access. Market 5 comprises non-physical or virtual network access including ‘bitstream’ access at a fixed location. Market 5 is situated downstream from the physical access covered by Market 4, in that wholesale broadband access can be constructed using this input combined with other elements”*.

The distinction between Market (4) (→ layer 1) and Market 5 (→ layer 2, 3) as defined in the ERG CP NGA is considered clear and still valid even with the emergence of new bitstream products with more functionalities offering greater scope for innovation. As long as the substitutability gap remains these market should not be blurred in an NGA environment. In addition, in some countries a bitstream product with additional functionalities and diversification possibilities has already existed for some years. Where this has been the case and NRAs have conducted a market review, the NRAs have included this enhanced bitstream product in Market 5 as it does not provide the same flexibility as available with a Market 4 product because the access seeker depends on the technological choice of the SMP operator. This is true for all the different current types of bitstream services.

All recent notifications followed the 2007 Recommendation on relevant markets susceptible for ex-ante regulation separating Market 4 and Market 5.

The majority of NRAs consider that ducts are an ancillary service of Market 4. This is supported by the Explanatory Note which states that access to either ducts or alternative network elements as a remedy to the operator exerting SMP could be considered. The French NRA has included ducts in the Market 4 definition with comments from the Commission requesting ARCEP better to justify the inclusion of ducts in market 4 without raising serious doubts. Other NRAs point out that access to ducts exist in the national law as a common obligation or due to National Competition Authority (NCA) decision.

Some NRAs included multicast functionality in Market 5. The EC commented²⁵ to the Danish NRA that adding multicast functionality is only proportional and justified when the internet access product alone is no longer sufficient to compete effectively in the retail broadband market.

In the Italian case, multicast functionality was included in Market 12 and in the bitstream SMP Reference Offer as a consequence of the general access obligations on layer 2/3 SMP network nodes (Ethernet switches) functionalities. Thus, multicast functionality is not related to any dominance of the incumbent in Market 18. A bitstream offer, when including multicast functionality, allows alternative network operators (altnets) to provide triple play broadband offers and compete with LLU-based providers (including the incumbent). The provision of complete network functionalities by the SMP operator can also be seen as a consequence of non-discrimination obligations in the provision of wholesale access by the SMP wholesale division.

D.2 Access obligations and the ladder of investment

As was already stated in the ERG CP NGA, both active (i.e. bitstream services) and passive products (such as SLU and duct access) have different advantages. Active products may result in lower costs, but can limit product and price innovation and differentiation to alternative operators. Passive products on the other hand offer much more opportunity for differentiation,

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but suffer from the risk of duplicative investment and fragmentation, increasing the cost of competition.

In particular, the following wholesale products are relevant in the context of NGA roll-out:

Passive access services:

- Duct access;
- Dark fibre;
- Fibre Unbundling (xPON, Fibre Point to Point);
- In-house wiring/cabling (multi-/monofibre);
- Sub-loop unbundling (copper).

Backhaul services:

- Duct access;
- Dark Fibre;
- Wavelength Division Multiplexing services;
- Managed Capacity (Ethernet (L2/L3) , SDH).

Bitstream (active) access:

- WBA (Ethernet including ALA²⁶, IP).

A detailed look at different wholesale products will be taken in the project “Next Generation Access – Implementation issues and wholesale products” (*PRD2*).

The country case studies provided the following results on the availability and regulatory treatment of different wholesale access products. Unbundled fibre access is only available on regulated terms in the Netherlands. On the other hand, SLU is mandated in almost all countries (except for Poland and Slovak Republic) but is not widely used. For a narrow majority of countries in-house wiring is not a regulated access product.

Duct access in the backhaul is available or planned in the majority of countries. Duct access in the access segment is available in Portugal, France, Norway and Spain. Dark fibre in the backhaul networks is also a regulated wholesale product in the majority of countries. Bitstream products are available in almost any country. A regulated xWDM access product in the backhaul currently only exists in the Netherlands. In Italy, xWDM is part of the Ethernet bitstream access.

As concluded in the ERG CP NGA²⁷ the principle of the ladder of investment remains valid in an NGA environment.

As stated in the ERG CP NGA, the expected result is a more sophisticated ladder, with changes in the relative importance of their rungs and, in general, different dynamics, as a consequence of a shift in the economic bottlenecks. In any case the principle of promoting com-

²⁶ Active Line Access

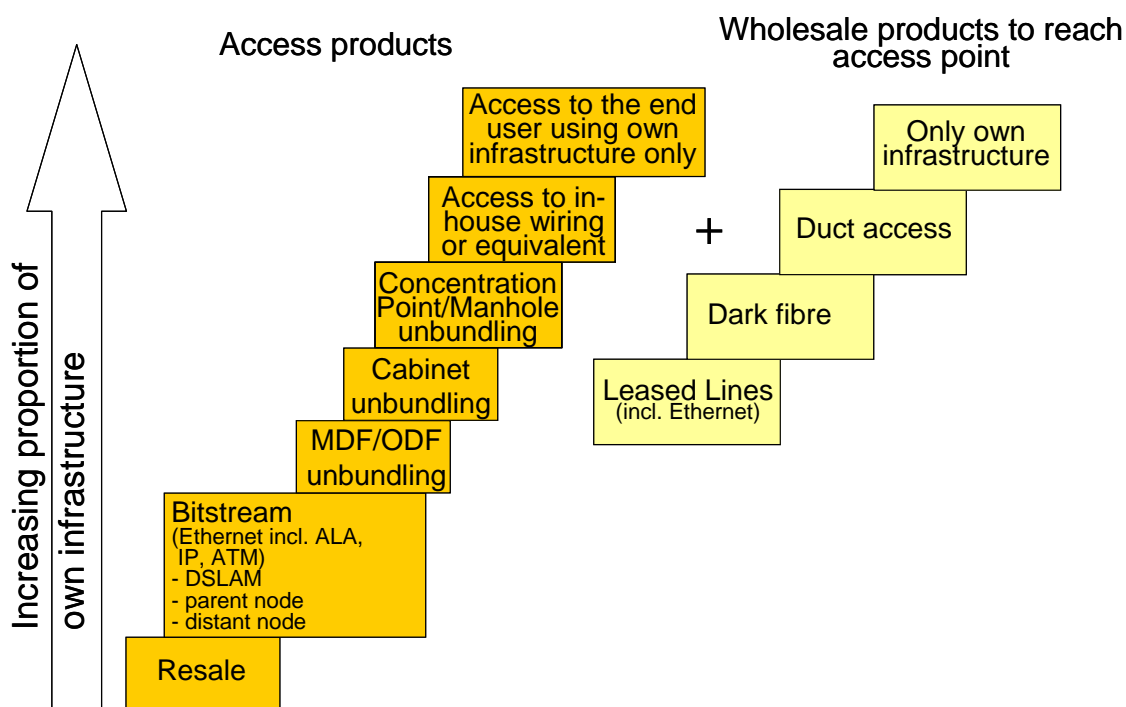
²⁷ See ERG (07) 16rev2, Chapter 4.6

petition to the deepest level possible is still appropriate. In the NGA environment this level may change due to the increasing economies of scale or the change of the possible access points. In the NGA environment the lesser importance of LLU may imply both a stepping back to the Bitstream Access (BSA) rung (which means that BSA is likely to become more important and sophisticated) or stepping up to street cabinet/duct access/own deployment. The specific dynamics will be determined by the operator’s choice.

Taking into account these statements, the NGA ladder of investment can be presented in the following way:

The ladder in the left hand side of the diagram in Figure 1 displays the different access products (linked to access points). It applies for both, copper and fibre. The concentration point is an access point located between the cabinet and the building (outside the building). Where an alternative operator climbs up the ladder, it will have to progressively invest in more own infrastructure, but not each rung must necessarily be used. This may differ depending on the relevant roll-out scenario. Depending on the roll-out scenario intended (FttCab, FttB/H) different rungs of the ladder are relevant. The right hand side of the diagram shows the different backhaul products in the access/concentration network an alternative operator may use to reach the access points. Various combinations of access products (left hand side) and backhaul products (right hand side) are possible depending on the network architecture. However, the highest rung “Direct access to the end user” can only be reached with “own infrastructure” and “duct access”.

Figure 1: NGA Ladder of investment



D.3 Price control measures including assessment of investment risk

D.3.1 Price control measures

The analysis of the various countries and their (draft) decisions on NGA regulation and price control measures shows that there is a difference in price control measures between access services, backhaul services and bitstream services (see Annex 3, Table).

This table also shows that, so far, most NRAs use LRIC and thus confirms broadly the view expressed by ERG in its response to the Draft NGA Recommendation in October 2008²⁸. According to this response, LRIC is an established, well understood and widely adopted methodology that allows for fair cost-based pricing which in principle may also be used for NGA investment, but if NRAs have used another method up to now it is not necessary either to change their method.

Furthermore, it is important to have a consistent application of costing methodologies and pricing principles across different wholesale products as otherwise margin squeeze situations or inefficient entry may occur. This applies equally between wholesale product as well as between wholesale and retail products.

New pricing models²⁹ as suggested by some incumbents foresee different long-term vs. short-term access arrangements for NGA networks. Short-term access prices would be high (on a per usage basis), whereas long-term access prices would be low. Long-term access would be available to the incumbent and exclusively to those access seekers having made a long term commitment before deployment of the network. Short-term access would be available to as many new entrants as today, leading to a lower price for those who have made commitments compared to the access price for third parties without commitments.

Regulators have to check the implications for competition and how to ensure non-discrimination for different access seekers. Any margin squeeze has to be prevented. This needs particular care in analysing new pricing models with differentiating elements such as contract duration, fixed and variable pricing elements (e.g. upfront-payments) or volume, which might imply price discrimination of different access seekers. In particular it has to be assessed whether any suggested pricing elements are anti-competitive per se. Notwithstanding regulatory scrutiny new pricing models by SMP operators have to comply with European competition law principles.

Taking into account differences of market situations and market dynamics - e.g. pressure from cable (NL) and/or utilities (Switzerland) and/or mobile (Austria) - between the different Member

²⁸ See IRG/ERG Response to the Draft Recommendation on the regulated access to Next Generation Access Networks (NGA) of 18th September 2008, ERG (08) 38rev2, October 2008 and ERG Report on Regulatory Accounting in Practice 2008, ERG (08) 47, September 2008. This report is currently being updated.

²⁹ These pricing models should not be confused with risk sharing arrangement that will be looked at in Section D.3.2

States, one has to take notice that different business models dominate in different Members States, calling for different wholesale pricing models to incentivise competition and investment. Each NRA needs the flexibility to accommodate its own pricing models. Therefore, the EC's NGA Recommendation should not be too prescriptive on pricing models.

Competition, in particular infrastructure competition, promotes investment as can be seen in countries with high cable penetration. Regulation should set the framework in such a way that it promotes competition.

The ERG considers that NRAs should follow established principles of regulatory accounting that do not risk to distort investment decisions and the earlier guidance of the EC on cost accounting and accounting separation.³⁰ Therefore, the ERG reiterates that NRAs should have the necessary flexibility with regard to the application of regulatory accounting principles.

In which way this flexibility may be implemented to support the market development with a pro-competitive regulation is described in the following paragraphs with the examples of OPTA and Ofcom as so far only a few NRAs have taken decisions.

The Netherlands

The first NRA having imposed an obligation of fibre unbundling was OPTA. In the Netherlands, a special developed price control measurements have been drafted for the pricing of FttH unbundled fibre access as new infrastructure to be build with high, mainly upfront investment, demand uncertainty and uncertainty about regulatory intervention during the life time of this investment of more than 20 years. For this purpose Policy Rules for Tariff Regulation of Unbundled Fibre Access has been published. A key element is that a price-cap is set for a period that exceeds the length of a regulatory period of three years when it is checked for excessive return rates. Only in the case were these excessive return rates are realized the wholesale price cap is adjusted downwards. Within the check on excessive returns, a premium is included in the normative rate that allows some (initial) positive business case to be realised. For the calculation of the wholesale price cap a (standard) discounted cashflow model (DCF) is used, that is derived from the business case for the investors in FttH (in NL: Reggefiber/KPN). The combination of a long-term price certainty (both in actual price and in pricing principles) and the ability to allow a positive business scenario as part of the investment project are measurements that encourage investments in NGA, without hampering access competition.

United Kingdom

In the UK, in March 2009, Ofcom published its statement on its approach to NGA: to allow pricing flexibility for active wholesale products and to set prices that reflect cost and risk in the case of passive products. The approach to pricing active wholesale products in particular is

³⁰ Recommendation on accounting separation and cost accounting systems under the regulatory framework for electronic communications of 2005, 2005/698/EC.

based on the assumptions that there will be competitive constraints from current generation broadband and other operators, and that the availability of upstream passive products will mitigate the risk of anti-competitive outcomes. Demand uncertainty also makes it difficult for the regulator to set efficient prices. Ofcom also said however that if its assumptions did not hold, it would review its approach to pricing. This approach is designed to promote efficient investment in NGA, whilst ensuring that there continues to be competition in the market.

More particularly, Ofcom also considered an anchor product pricing approach whereby some basic voice and broadband products are subject to price commitments, whilst other higher bandwidth services are offered on non-discriminatory terms but not subject to *ex ante* price regulation. The UK regulator concluded subsequently that such an approach could have merit during the transition from current to next generation networks.

D.3.2 Assessment of investment risk

As with every investment there are opportunities and risks associated with uncertainties attached to investments in new infrastructure. The opportunities arise from the provision of new services, potentially higher revenues and lower expected operational costs. As NGA roll-out is capital-intensive the cost of capital plays an important role. Investments will only be made if there exists at least a reasonable return relative to these risks and opportunities. Where a higher risk is expected a higher rate of return would be required.

These risks will likely vary considerably across Europe and even within Member States.³¹ NRAs are best placed to set the correct economic incentives for efficient investments and promotion of competition depending on national circumstances. Notwithstanding, the ERG believes that market forces and private investments should remain the driving force of the deployment of broadband networks.³²

The determination of the risk of an investment generally requires two steps:

- calculating the risk of an investment from the perspective of an investor;
- reflecting the risk in the reasonable rate of return in a regulated environment.

Determining the risk of an investment from an investor's perspective

Any investment – whether regulated or not – is risky by nature. When deciding on taking the risk inevitably associated with an investment project, each investor (operator) will therefore assess the risk by calculating the “hurdle rate” he requires for making the investment. The following factors influence (inter alia) the riskiness of an investment project:

- Uncertainty of demand (will consumers take up new services?);

³¹ Cf. ERG NGA CP, p. VI and pp. 14.

³² See ERG Statement on the development of NGN Access, ERG (08) 68, December 2008

- Uncertainty regarding the ARPU (willingness to pay for new services; if customers are simply migrated from the existing copper to the fibre network, there would be only limited demand-side risk, but still a risk of getting enough additional ARPU of new services);
- Uncertainty of technological progress (will there be a new technology that would compete with fibre?);
- Uncertainty regarding the market dynamics, i.e. competitive situation (will there be actual or potential competitors taking away demand, will there be inter-modal competition, how is the general market environment developing?);
- Uncertainty regarding the general development of the whole economy (macro-economic evolution, i.e. will the economy grow and have a general need for more communications services?);
- Uncertainty of deployment (incl. civil engineering) costs.

These factors will take different values in different countries and the overall effect will vary across countries depending on the market situation.

Not all risks are exogenous. The investor can (partly) reduce risks of new infrastructure investment by e.g.:

- recouping investment costs partly via an one-off fee. Recouping the investment early on translates into a lower capital requirement over time and a decrease in the investment risk. This also means that the supplier of new infrastructure access does not bear the whole risk of the investment;
- bundling of demand. The investor can postpone the roll out till a certain penetration rate is secured by pre-subscription of end-users;
- planned migration of the installed base of an existing network;
- rolling out project by project, while only proceeding if the last project was successful;
- incorporating incentive schemes in pricing of wholesale products;
- Build-and-share projects where the incumbent and alternative operators agree to share e.g. civil engineering works for joint roll-out;
- Commitment from alternative operators before rolling out new infrastructure reducing capacity utilisation risk.

Investors use various models to calculate the rate of return on equity which includes a risk premium to cover the above mentioned demand and supply side factors (uncertainties), the most common of which are the Capital Asset Pricing Model (CAPM) and the Discounted Cash Flow (DCF) Method. Depending on the factors the parameters will have different values. The final outcome is a result of the cumulative effects of all factors.

Reflecting the risk in the reasonable rate of return in a regulated environment

In a regulated environment, it needs to be assessed whether and in which way the risk is (can be) influenced by regulation bearing in mind that the influence of regulation is limited as the main factors result from the commercial strategy of the investor. In order not to distort the investment decisions, the regulator has to try to be as “risk-neutral” as possible and should not distort the expected rate of return relative to the outcome of a competitive market.

Regulation cannot shield the investor from commercial risks as this would distort the investment decision (over-investment) and also value the investment goal in a non-proportionate way over the competition goal, which would lead to inefficient investment and anti-competitive effects promoting monopoly infrastructure, both contradicting the objectives of promoting *efficient* investment and *effective* competition. Furthermore, it would be to the detriment of consumers who would have to bear the risks without receiving the benefits while the profit is kept by the investor.

ERG points out that in order to incentivise efficient investment it is important to calculate a reasonable rate of return that adequately reflects the risks as this is done now when regulating access prices ex-ante. However, the ERG does not agree with the presumption that a higher risk premium applies only because new infrastructure is rolled-out or because it is a large investment. Fibre in itself does not presume a greater risk, rather it is the uncertainties as outlined above. In some cases fibre investment can be an upgrade of existing networks.

These risks must be carefully assessed using analytical tools such as CAPM or DCF before any definite statement is made which may pre-empt the result. Moreover, the results will likely differ across Europe depending on, among other things, the competitive situation in the Member States. The risk is born solely by the SMP operator and is already adequately reflected in the reasonable rate of return included in the regulated access price.

Risk premium

The concept of a “risk premium” is related to a regulated access price and thus an SMP remedy according to Art. 12 and 13 of the AD. A risk premium is part of the rate of return (cost of capital) and rewards the risk an investor takes. It should be stressed that the case of risk-sharing is a separate issue which is addressed below.

The ERG considers that for the purpose of calculating the rate of return existing practices remain valid in an NGA environment. Specifically, the investor will be rewarded with a premium reflecting the risks of the investment. When determining the regulated access price which includes a reasonable rate of return (r) a regulator will reproduce (simulate) the calculation of an investor and assess the weighted average cost of capital (WACC) including a risk premium to reward the investor for taking the risk associated with making the investment. The risk premium is part of the rate of return on equity. As now the rate of return³³ includes a risk pre-

³³ In formal terms: $r = WACC = r_e \cdot E/E+D + r_d \cdot D/E+D$, with E=equity and D=debt

mium, which reflects the risk associated with the investment born by shareholders, it is thus taken into account when calculating the rate of return on equity (r_e).

Providing regulatory certainty

Providing regulatory predictability will have a positive effect as it reduces uncertainty through the announcement of e.g. regulatory guidelines.

An NRA can provide regulatory predictability by announcing under which conditions a possible (price) intervention will occur and what type of intervention is to be expected. More specifically, a NRA can specify in advance the principles of tariff regulation that will apply to new infrastructure access by an SMP operator.³⁴ This removes uncertainty about the way the industry is to be (price)regulated. These principles of tariff regulation will, in themselves, act as a constraint on the risk on investments in new infrastructure because the NRA has set out in this document the manner in which it will regulate the tariffs for new infrastructure access.

Certainty vs. flexibility

There is a trade-off between certainty and flexibility. A regulator may choose to vest the greatest possible certainty in its conduct during a specified period or a regulator may choose not to provide such certainty in advance. The crucial point here is whether the regulator's provision of certainty takes place *before* an investment is made or *after* an investment is made.

Where regulatory certainty is given before an investment is made, there arises the possibility of error. On the other hand, it may be stated that uncertainty about the regulator's conduct may lead to an investment being delayed.

These arguments point in contrary directions. The risk of erroneously intervening in advance leads to the conclusion that it is better not to intervene in advance while lack of regulatory transparency about possible future intervention may remove investment incentives. Advance specification of the framework governing how *potential* future intervention will take place, without setting out the precise details of that regulation, reduces the risk of erroneous intervention. At the same time investment incentives will not be prejudiced.

There are different designs of price regulation balancing this trade-off in different ways. The following main regulatory regimes can be distinguished:

1. Rate of return – guaranteed income stream;
2. Revenue cap or price cap with cost pass-through;
3. Incentive regulation: Price-cap based on an efficient cost-base, operator can keep the extra revenue if he realizes more efficiency gains than assumed, starting level to be ad-

³⁴ See OPTA “Draft policy rules – Tariff regulation for unbundled fibre access”, in particular Section 4.2, <http://www2.opta.nl/asp/en/publications/document.asp?id=2787>

justed for 2nd regulatory period in order to pass-through efficiency gains to consumers as a competitive market would force operators to pass efficiency gains onto consumers too – more risky compared to 1 and 2 – depends on design of 2nd period;

4. A combination of regimes 1 – 3.

Length of regulatory period

One of the important features to consider when trading off certainty vs. flexibility is the length of the period of the price calculation.

By drawing up principles of tariff regulation, an NRA has the possibility of providing greater clarity about the manner in which it will give substance to remedies in a particular market if the NRA contemplates the imposition of such remedies.

On the one hand, multi-year tariff regulation instead of single-year tariff regulation lowers uncertainty because buyers find tariffs more foreseeable and because the SMP operator has an additional reason for improving efficiency. Tariff predictability provides market parties purchasing unbundled access with greater certainty when drawing up their business plans. This puts alternative suppliers in a better position to make a choice between, on the one hand, investing in their own infrastructure and, on the other hand, using access services. Furthermore, multi-year tariff regulation incentivises the SMP operator to maximise operational efficiency. Under a multi-year tariff regulatory regime the SMP party may hold onto efficiency improvements made in the course of the regulatory period.

On the other hand, the fixing of the length of the regulatory period must be realistic taking into account technological and market developments., i.e. the regulator cannot commit himself for an unreasonably long duration in a market as dynamic as electronic communications and must therefore be reviewed regularly (as any investor is forced to do in a competitive environment to adjust his business plans according to changes of the market dynamics).

The influence of the different regimes of regulation may have on the risk of the regulated company rather than the project's calculated with the CAPM may influence the parameters in both directions – increasing or reducing the risk as compared to that faced by an unregulated firm:³⁵ Due to interdependence of risk-increasing and risk-decreasing effects the overall effect cannot easily be determined quantitatively and effects of regulation cannot be isolated from many other effects influencing the risk of an investment (e.g. financial markets).

35 Increase or decrease of covariance of the cash flow distribution with a market portfolio, systematic risk captured in β of CAPM:

- Regulation may absorb shocks – buffering effect of regulation:
 - Perfect regulation in being cost oriented to achieve a targeted rate of return could guarantee the firm a fixed income vs.
 - restriction in pricing flexibility to react to unforeseen changes, indexation can help;
 - exposure to discretionary behaviour – continuity in regulatory track record vital;
 - whether buffering or reinforcing risk effect prevails can only be answered empirically.
- Reduces scope of reaction of firm.

The assessment of the price control measures (including risk assessment) has shown that the current European Regulatory Frameworks remains fit for purpose³⁶ as it allows to incentivise competition and investment, e.g. by recognising a premium reflecting adequately the risk of NGA investment. Regulators can facilitate investment planning by providing regulatory predictability and stability through announcement of their regulatory strategy and the length of the regulatory period balancing certainty and flexibility.

D.3.3 Co-investment and risk-sharing arrangements

Co-investment and risk sharing arrangements have as purpose to limit the risks of investment and as a result lower the cost of capital for investments. They can take different forms:

- Cooperation models resp. build and share models (narrow definition - joint ownership) reducing risk;
- Furthermore, the investing operator may also require a commitment from 3rd parties before undertaking the investment (broader definition) and granting an indefeasible right of use.

Build and share projects

Build-and-share projects are projects where at least two partners (e.g. the incumbent and an alternative operator) roll-out and own jointly the NGA infrastructure. They will, in some countries, be subject to cartel control and will have to go through approval by NCAs for exemption to the general prohibition of cartels. This exemption may likely be granted only under the condition of open (non-discriminatory) access for third parties. Other scenarios are also envisaged: e.g. in case one of the operators has SMP (on the national market), it might be that an obligation will be (or has already been) imposed on him to grant access to the new infrastructure to third parties. It might also be envisaged that an obligation to grant access to any third party is imposed irrespective of whether an operator has SMP or not (symmetric obligation acc. to Art. 12 Framework Directive [FD], cf. also new French law).

Joint-ventures and other forms of co-operation between firms in this context are welcome and can indeed provide appropriate ways to bring together the sharing of investment and create synergies. However, they should be in conformity with competition rules and should not undermine the aims of the EU Regulatory Framework. For instance, when there is a joint venture that is jointly controlled by an incumbent and a new entrant, access conditions to the NGA infrastructure should follow the same principles spelled out above.

Additional questions with regard to joint projects are addressed in the next Section D.4

Commitments in advance of roll-out

³⁶ See also ERG Statement on the development of NGN Access, ERG (08) 68, December 2008.

A second form of risk-sharing can be envisaged if the SMP operator requires a commitment from alternative operators before rolling-out new infrastructure. In this case, no risk-sharing in the sense of co-ownership is involved, but the alternative operator acquires an indefeasible right of use for which he has to pay a price which may or may not be regulated. This allows the alternative operator to account for it as CAPEX. In this case the overall risk is lowered as all parties would have less capacity utilisation risk for their networks.

D.4 Regulatory/competition law treatment of joint projects

Country case studies show that a variety of players are involved in NGA roll-out strategies. There are incumbents investing in FttH/FttCab, cable operators upgrading to DOCSIS 3.0 and public and/or public-private local initiatives investing in FttH. In some countries projects solely publicly funded (e.g. Portugal, Sweden, UK) can be seen, while in others there are joint projects between private operators (e.g. Germany, The Netherlands). In case of a merger or a joint venture, and especially when an SMP player is involved, there is a risk of 'significant lessening of competition' and approval by the NCAs may be required. It is important for NRAs and NCAs to work close together in these circumstances.

Since the principles of the European Regulatory Framework are based on the principles of European competition law there is generally no difference between the finding of SMP by the NRA and the finding of a dominant position by the NCA. However, the approval of a merger or joint venture by the NCA without any conditions or remedies may imply that the NRA is not in a position to intervene itself with regard to the non SMP party. However the NRA must ensure that there is no regulatory gap with regard to the SMP party. On the other hand, a disapproval by the NCA (because of the risk of a significant lessening of competition) may harm innovation if valuated that the cooperation benefits to (the speed of) investment in NGA. In this latter situations, the cooperation can be welfare improving as long as the risk of anti-competitive behavior is prevented. Competition authorities have a unique and one-time opportunity in this by accepting remedies that prevent the possible abuse of a dominant position (e.g. by adopting structural remedies or conduct remedies) in the future. If the NRA and NCA work closely together here this can benefit innovation as well as competition.

D.5 Symmetric regulation

The "vertical barrier" is identified in the ERG CP NGA as one of the key potential issues that operators deploying an NGA will have to face, as there would be a risk that the first operator that reaches a building pre-empts this facility, thus preventing its competitors from having access to the end users living in the building: the in-building wiring represents a structural barrier for all competitors.

Consequently, it recommends strengthening the legal powers of the NRAs stemming from Art. 12 Framework Directive (FD) to assist in facilities sharing, where this is practical and justified. As stated in the ERG CP NGA, this could be applied not only to in-house wiring but also to ducts (the "horizontal barrier") and NRAs could then impose symmetrical obligations to op-

erators to negotiate sharing of facilities (like ducts or in-house wiring) under reasonable requests from third parties.

In a context where all operators on the market should be able to develop their own investment strategies with autonomy, access by all operators to passive infrastructure has a growing importance, considering that the costs for building ducts and other passive infrastructure are a considerable part of investment on NGA. It should be noted that, in this respect, the scale (of infrastructure) continues to be a critical factor for return on investment, both for the incumbents and for other operators, particularly in light of the future development of NGAs.

Accordingly, access to existing infrastructure is a way of dealing with these concerns, reducing the overall amount of investment that each company needs to bear. One of the main tasks when applying the ladder of investment concept is the identification of the lowest possible level for efficient replication of infrastructure. In this sense, some NRAs have imposed asymmetric access to ducts (France, Portugal, Germany, Spain), implying that the civil works is considered to be a not easily replicated infrastructure and thus an economic bottleneck.

Another approach, currently being explored by Portugal, is the symmetric (and thus not based on an SMP position) imposition of duct access to all telecommunications operators and also to other undertakings with duct infrastructure (“horizontal barrier”). Other countries (France, Spain) have imposed symmetric obligations in order to share the in-building optical wiring (“vertical barrier”).

In this context, asymmetric measures can be (and have been) imposed with the current Regulatory Framework, for both the horizontal and the vertical barrier. However, the imposition of symmetrical measures is limited by the current Art. 12 FD, which is the reason why the ERG CP NGA recommended its strengthening. For this reason, it can be seen that the countries having imposed or planning these kind of measures resort to specific national laws, either existing (Spain), newly created (France) or planned (Portugal).

The possible consequence of that limitation is the presence of strong differences in the legal powers and tools of NRAs to deal with the competitive challenges posed by NGA, with two effects: firstly, not all NRAs have the possibility of imposing symmetric measures, and secondly, not all NRAs have the same legal powers, as national laws differ (for example, in France, the NRA can determine in which case the concentration point can be in/outside the building).

The mentioned effects do not favour a homogeneous common market within the European Union; even though – as stated in the ERG CP NGA – there is no “one size fits all” solution, there should however be a common framework and a common pool of symmetric remedies for NRAs to use them according to their national circumstances.

It is important to note that there are currently constraints of a legal nature, which are not included within the scope of sector specific legislation in most Member States. For this reason, harmonisation needs a modification of Art. 12 FD, as proposed in the ERG CP NGA.³⁷

³⁷ Such a modification could further strengthen the powers of NRAs, see ERG (07) 16rev2, p. XII.

D.6 Procedural issues during the migration period

The ERG CP NGA identifies key issues to be considered by the NRA in their decision regarding migration to NGA, such as the allocation of costs of elements no longer needed by the SMP party, conditions allowing the phasing out of a network element (e.g. phase-out period), or the possible offering of alternative wholesale services over the NGA which might be preferable (according to Art. 8 FD).

Given the current deployment of NGA and the first concrete measures taken by NRAs, it becomes important to: (i), see whether the issues identified in the ERG CP NGA have been taken into account by NRAs; (ii) analyse the comments of the EC to the draft measures; and, finally, (iii) reassess or question the validity of the principles expressed in the ERG CP NGA.

So far, 5 NRAs have published market analysis decisions which include measures relating to migration to NGA: Belgium, Denmark, The Netherlands, Norway and Spain. A brief overview follows:

- 1) In the Belgian case, in an addendum to the January 2008 market analysis decision, BIPT set on 12th November 2008 additional remedies relating to migration to NGA: (i) the incumbent is obliged to publish at least every year information about the evolution of the network in the next 5 years; (ii) a location can only be phased out after an announcement period of 5 years³⁸; (iii) when phasing out MDFs, MDF-tariffs have to be stable during the transition phase; and (iv) a reasonable alternative has to be available. Since the current SLU offer is in a large part of the country not a reasonable alternative, BIPT gave some guidance to the incumbent about the minimum requirements of a future SLU and bit-stream offer. There were no comments from the EC in this respect.
- 2) In the Danish case, NITA adopted on 1st May 2009 its final decision regarding Market 4 and related remedies, which oblige TDC to preserve the access to the original copper loops in areas where the company itself implements VDSL2 and thereby shortens the copper loop. According to the decision this is required in a transitional period of 4 years starting from the announcement of the phase-out of a given copper stretch. Further TDC is obliged to give access to backhaul ducts or dark fibre from the remote exchange to an exchange where other operators are present. Finally, TDC must announce its roll-out plans, so that information relevant for alternative operators, e.g. number of connections in a remote exchange, is given at least six month before the establishment of the remote exchange.
- 3) In the Dutch case, OPTA adopted on 19th December 2008 its final decision regarding Markets 4 and 5, which includes some general guidance to the market under which circumstances a withdrawal of access to the copper network that has already been granted could be reasonable: First, phasing out of MDF-access services –OPTA identifies the exchange/location as the smallest unit that can be phased out– is only allowed after a rea-

³⁸ One year if there is no other altnet in the exchange

reasonable announcement period of at least 2 years. Second, MDF-access customers need a reasonable period to determine to which alternative they want to migrate, this alternative having to be available³⁹. Third, there also needs to be a reasonable overlay period. Additionally, for the phasing out, the incumbent is not allowed to discriminate between itself and other MDF-access customers. This non-discrimination obligations also relates to the quality aspects of migration and to time periods, and means that the incumbent can only withdraw access if it does no longer use the copper pairs on that location for its own services. Finally, the incumbent is obliged to publish at least every 3 months a planning overview of the SDF⁴⁰- and ODF-locations that will become available and the MDF-locations that will be phased out.

There were no comments from the EC in this respect.

- 4) In the Norwegian case, NPT adopted on 3rd April 2009 its final decision regarding Market 4 and related remedies, which includes certain obligations regarding substantial changes in Telenor's copper network and phase-out of copper lines and/or local exchanges. In case of substantial changes in their copper network (e.g. re-location of nodes), Telenor is obliged to notify affected operators immediately after such decisions have been made, and in any case at least six months in advance. Furthermore, NPT has imposed on Telenor an obligation to include in their reference offer a notification deadline regarding phase-out of copper lines and/or local exchanges. NPT presupposes that Telenor and their wholesale customers can come to an agreement on a reasonable notification deadline. In case such an agreement can not be reached, the parties can request NPT to mediate or if necessary make a decision.

In its response to NPT's draft decision, EFTA Surveillance Authority (ESA) argued that the six months notice for substantial changes is insufficient. Regarding closure of access to the network, ESA referred to suggestions by the EC, indicating that a five year transitional term is appropriate.

- 5) In the Spanish case, CMT adopted on 22nd January 2009 its final decision regarding Markets 4 and 5 and related remedies, which includes certain obligations regarding the phase out of local exchanges. CMT identifies the exchange as the smallest element that can be phased out and sets out a number of rules: (i) a LLU-capable exchange⁴¹ can be phased-out at least 5 years after the announcement, and that announcement can only be made after at least 25% of the customers (retail and wholesale of Telefónica) in that exchange are connected via NGA; (ii) the phase-out is only allowed if, at the end of the transition period, the incumbent no longer makes use of the copper pairs of that exchange for its own services; and, additionally, (iii) an obligation to publish NGA deployment plans (location of nodes, FttH exchanges) six months in advance was imposed.

39 A regulated alternative, like SDF-access, ODF-access or WBA or a non-regulated alternative if the incumbent and MDF-access customers can commercially agree on that alternative.

40 Sub-loop distribution frame.

41 There is a list with such exchanges. For other exchanges, the transition period is 1 year.

There were no comments from the EC in this respect.

After considering these practical cases, it is relevant to distinguish between phasing out of MDF-access services and phasing out of MDF-locations. Regarding migration, when moving to NGA, although the incumbent may be allowed to cease the provision of MDF-access services at a MDF-location, this does not directly imply that this MDF-location needs to be dismantled (as this location could still serve e.g. as an NGN exchange⁴²). However, it implies that MDF-access phasing out should only be allowed when the copper pairs of that MDF are not longer used, as MDF-access remedies (unbundling and collocation) are related to the access obligation to the copper pairs imposed in Markets 4 (2007 Recommendation, ex 11 in the 2003 Recommendation), as a non replicable facility⁴³

The mentioned practical cases are specially relevant, as they cover countries with FttCab as the main deployment strategy as well as countries where FttH is the main option. This aspect can be relevant⁴⁴ when determining the granularity of the smallest unit that can be phased out: whereas the Danish case (FttCab) allows for phasing out the set of copper pairs from a node to the exchange, the Spanish (mainly FttH), Dutch (FttCab and FttH) and Belgian case (FttCab) identify the exchange as the smallest network unit to be phased out.

Although the ERG CP NGA makes no explicit recommendation on this point; phasing out single sets of copper lines might turn out to be operationally awkward as different copper lines frequently merge up to the exchange, so that maintenance tasks cannot be singled out.

Regarding the phase out timing, both the EC and the ERG CP NGA recommend a reasonable transitional period before the cease of access obligations. NRAs should strike a balance between promoting innovation and providing legal certainty to alternative operators that have invested in LLU and co-location in a certain MDF to enable them to obtain a return on the investment.

While the length of the period will have to be determined by each NRA taking into account local circumstances, it should not be zero. NRAs should consider the usual investment period of the different elements (e.g., DSLAM, different backhaul options) and their relative usage weight when calculating the period. It seems also reasonable to take into account whether the alternative operator at the time of investment could know that the economic lifespan of the investment would be shorter than the technical lifespan of the investment, which is at least the case if a certain exchange has entered into the transitional period.

The lifespan of an asset is, among other things, determined by market developments. Changes in demand caused by changes in end-user preferences and by the competitive pres-

⁴² For example in the Netherlands some MDF-locations will serve as multi access locations MCLs in the incumbent's NGN (e.g. for collocation backhaul, WBA and leased lines services)

⁴³ Also, co-location may be used for PSTN, bitstream and leased lines interconnection (between the SMP and the co-located operators' networks).

⁴⁴ This is because in an FttCab deployment, single nodes/cabinets could be thought of as being candidates for phase-out. On the other hand, in an FttH deployment, fibre does not necessarily follow the topology of copper.

sure exerted by cable companies are important drivers for NGA investment by incumbents. It seems reasonable that incumbents have, under certain conditions, freedom on the investment timing in NGA, the migration of its customers and the phasing out of the legacy network. If in a certain area the incumbent migrates its customers to the NGA-network, the usage of the legacy network will certainly decrease, making it economically inefficient to have a too long overlay period. On the other hand, a too short period could, as mentioned, harm the promoted efficient investment in infrastructure from alternative operators.

Additionally, NRAs should take care that phase out announcements do not have the unwanted effect of refraining the growth of the LLU-based competition. Asymmetric information between the incumbent and MDF-customers about the timing of NGA investment and the phasing out of legacy services/locations can lead to underinvestment by (potential) MDF customers. So, while the incumbent's right to modify and improve the network is fully recognised, this process should not be misused to make investment in further LLU unattractive, as could be the case if a phase out announcement turns out not to happen on time or takes much longer than announced. NRAs should set the incentives so that the incumbent will, in its own interest, avoid this undesired effect, e.g. by defining an adequate transitional period, by imposing adequate preconditions to the announcement, as well as by, additionally, defining transparent information obligations regarding the network transformation (key issue identified by the NGA CP). While the latter would allow alternative operators to monitor the real advance of network transformation in a certain area, NRAs should strike the balance between that right and the incumbent's right not to disclose commercially relevant information. The availability of proper information is also key when considering the additional implications of phasing out elements (e.g. impact on the interconnection for telephony services).

A key question during the rollout of NGA's and transition from traditional copper access networks is how the pricing and cost allocation of legacy products may be affected by the treatment and valuation of underlying costs. The application of the cost causality principle together with current cost valuations based on the modern equivalent asset concept suggest that switching technologies on its own should not increase the prices of traditional products. However, NRAs need to decide on the appropriate principles to follow when considering the potential for significant sunk costs or volume effects during the transition phase.

This is a decision still to be taken by many other NRAs and harmonisation on this point could be an important issue. Indeed, the Belgian regulator already formulated the principle that MDF-tariffs cannot increase during the transition phase. In the Netherlands the incumbent is not allowed to pass on costs as a result of stranded assets and declining volumes to the wholesale tariffs of altnets on the legacy network.

Finally, an important condition for phasing out MDF-access services is the availability of an alternative wholesale product which allows for the continuation of sustainable competition. According to the ladder of investment, a passive wholesale product is preferred over an active wholesale product. In this sense, duct access – imposed by some NRAs and also considered in the draft NGA EC Recommendation – is, like unbundling, a remedy that encourages infrastructure-based competition. However, in situations/areas where passive remedies (alone) do

not represent a viable alternative and are not enough to address the competition problems, they should be complemented with active remedies such as enhanced bitstream services that provide additional functionality.

E. Overall Assessment

Overall, neither the factual developments nor the theoretical studies require a change of the conclusions of the ERG CP NGA. Rather, the main conclusions are confirmed.

Country Case Studies

Overall, the country cases support the result of the ERG CP NGA that there are significant differences between and within countries, which reflect differences in the economics of NGA networks, resulting from e.g. different densities or loop length but also from the relevance of competitive pressure from cable networks. Furthermore it can be concluded that the scenarios as discussed in the ERG CP NGA still hold. However, in some countries emphasis has shifted from Scenario 1 (FttCab) to Scenario 2 (FttH/B).

Economic analysis in the light of Factual NGA Developments

In terms of economic implication, the ERG concluded that such rollouts were likely to reinforce the importance of economies of scale and scope, reducing replicability and reinforcing enduring economic bottlenecks. Since the publication of the ERG CP NGA, a number of further studies have been undertaken examining the business case for different types of NGA rollout in a number of Member States, as summarised above. These additional studies have confirmed the ERG's previously identified conclusions.

Analysis of Regulatory Decision and Principles

The distinction between Market (4) (→ layer 1) and Market 5 (→ layer 2, 3) as defined in the ERG CP NGA is considered clear and still valid even with the emergence of new bitstream products with more functionalities offering greater scope for innovation. As long as the substitutability gap remains these market should not be blurred in an NGA environment.

As concluded in the ERG CP NGA the principle of the ladder of investment remains valid in an NGA environment. As stated in the ERG CP NGA, the expected result is a more sophisticated ladder, with changes in the relative importance of their rungs and, in general, different dynamics, as a consequence of a shift in the economic bottlenecks. In any case the principle of promoting competition to the deepest level possible is still appropriate. In the NGA environment this level may change due to the increasing economies of scale or the change of the possible access points. In the NGA environment the lesser importance of LLU may imply both a stepping back to the Bitstream Access (BSA) rung (which means that BSA is likely to become more important and sophisticated) or stepping up to street cabinet/duct access/own deployment. The specific dynamics will be determined by the operator's choice.

Competition, in particular infrastructure competition, promotes investment as can be seen in countries with high cable penetration. Regulation should set the framework in such a way that it promotes competition.

Furthermore, it is important to have a consistent application of costing methodologies and pricing principles across different wholesale products as otherwise margin squeeze situations or inefficient entry may occur. This applies equally between wholesale product as well as between wholesale and retail products.

New pricing models as suggested by some incumbents operators foresee different long-term vs. short-term access arrangements for NGA networks. Regulators have to check the implications for competition and how to ensure non-discrimination for different access seekers. Any margin squeeze has to be prevented. This needs particular care in analysing new pricing models with differentiating elements such as contract duration, fixed and variable pricing elements (e.g. upfront-payments) or volume, which might imply price discrimination of different access seekers. In particular it has to be assessed whether any suggested pricing elements are anti-competitive per se.

The ERG considers that NRAs should follow established principles of regulatory accounting that do not risk to distort investment decisions and the earlier guidance of the EC on cost accounting and accounting separation. Therefore, the ERG reiterates that NRAs should have the necessary flexibility with regard to the application of regulatory accounting principles.

As with every investment there are opportunities and risks associated with uncertainties attached to investments in new infrastructure. In a regulated environment, it needs to be assessed whether and in which way the risk is (can be) influenced by regulation bearing in mind that the influence of regulation is limited as the main factors result from the commercial strategy of the investor. In order not to distort the investment decisions, the regulator has to try to be as “risk-neutral” as possible and should not distort the expected rate of return relative to the outcome of a competitive market.

ERG points out that in order to incentivise efficient investment it is important to calculate a reasonable rate of return that adequately reflects the risks as this is done now when regulating access prices ex-ante. Thus, the concept of a “risk-premium” is related to a regulated access price and thus an SMP remedy according to Art. 12 and 13 of the AD. The ERG considers that for the purpose of calculating the rate of return existing practices remain valid with an NGA environment.

Providing regulatory predictability will have a positive effect as it reduces uncertainty through the announcement of regulatory guidelines. One of the important features to consider when trading off certainty vs. flexibility is the length of the period of the price regulation.

The assessment of the price control measures (including risk assessment) has shown that the current European Regulatory Framework remains fit for purpose as it allows to incentivise competition and investment, e.g. by recognising a premium reflecting adequately the risk of NGA investment. Regulators can facilitate investment planning by providing regulatory predictability and stability through announcement of their regulatory strategy and the length of the regulatory period balancing certainty and flexibility.

Co-investment and risk sharing arrangements have as purpose to limit the risk of investment and as a result lower the cost of capital for investments.

The imposition of symmetrical measures is limited by the current Art. 12 FD, which is the reason why the ERG CP NGA recommended its strengthening. For this reason, it can be seen that the countries having imposed or planning these kind of measures resort to specific national laws, either existing (Spain), newly created (France) or planned (Portugal).

The possible consequence of that limitation is the presence of strong differences in the legal powers and tools of NRAs to deal with the competitive challenges posed by NGA, with two effects: firstly, not all NRAs have the possibility of imposing symmetric measures, and secondly, not all NRAs have the same legal powers, as national laws differ (for example, in France, the NRA can determine in which case the concentration point can be in/outside the building).

The mentioned effects do not favour a homogeneous common market within the European Union; even though – as stated in the ERG CP NGA – there is no “one size fits all” solution, there should however be a common framework and a common pool of symmetric remedies for NRAs to use them according to their national circumstances. For this reason, harmonisation needs a modification of Art. 12 FD, as proposed in the NGA CP.

Regarding migration, when moving to NGA, although the incumbent may be allowed to cease the provision of MDF-access services at a MDF-location, this does not directly imply that this MDF-location needs to be dismantled (as this location could still serve e.g. as an NGN exchange). However, it implies that MDF-access phasing out should only be allowed when the copper pairs of that MDF are not longer used, as MDF-access remedies (unbundling and collocation) are related to the access obligation to the copper pairs imposed in Markets 4 (2007 Recommendation, ex 11 in the 2003 Recommendation), as a non replicable facility.

Regarding the phase out timing, both the EC and the ERG CP NGA recommend a reasonable transitional period before the cease of access obligations. NRAs should strike a balance between promoting innovation and providing legal certainty to alternative operators that have invested in LLU and co-location in a certain MDF to enable them to obtain a return on the investment.

Additionally, NRAs should take care that phase out announcements do not have the unwanted effect of refraining the growth of the LLU-based competition. Asymmetric information between the incumbent and MDF-customers about the timing of NGA investment and the phasing out of legacy services/locations can lead to underinvestment by (potential) MDF customers. So, while the incumbent’s right to modify and improve the network is fully recognised, this process should not be misused to make investment in further LLU unattractive, as could be the case if a phase out announcement turns out not to happen on time or takes much longer than announced. NRAs should set the incentives so that the incumbent will, in its own interest, avoid this undesired effect, e.g. by defining an adequate transitional period, by imposing adequate preconditions to the announcement, as well as by, additionally, defining transparent

information obligations regarding the network transformation (key issue identified by the NGA CP). While the latter would allow alternative operators to monitor the real advance of network transformation in a certain area, NRAs should strike the balance between that right and the incumbent's right not to disclose commercially relevant information. The availability of proper information is also key when considering the additional implications of phasing out elements (e.g. impact on the interconnection for telephony services).

Finally, an important condition for phasing out MDF-access services is the availability of an alternative wholesale product which allows for the continuation of sustainable competition.

ERG's overall assessment also confirmed that the European regulatory framework's principles remain suitable to deal with the challenges of NGA deployment. It is important to note that with the increasing economies of scale reducing replicability there is an increased need to keep market entry open with pro-competitive regulation effectively implemented and complemented, where necessary, with competition law interventions by NCAs. NRAs and NCAs should cooperate closely where cooperative investment takes place.

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Austria

1. Market developments

The regulatory discussion with regard to NGN has advanced in 2007 mainly caused by two developments. Firstly, the incumbent started rolling out a TV service in urban areas in order to improve its ability to compete with CATV triple play offers (voice/BB/TV). And secondly, the NRA itself started a discussion process by launching 3 papers for public consultation covering the topics "Separation", "Next Generation Regulation" and "NGN Accounting". The paper on "Next Generation Regulation" discusses the consequences of the deployment of Next Generation Networks for regulatory access obligations, investment incentives for communication service providers in next generation networks, future interconnection billing models, migration issues with regard to points of interconnection etc. The responses to this consultation paper have been subject to a public discussion during a regulatory workshop for operators and other stakeholders in October 2007 leading to the establishment of an industry working group on NGA/NGN matters starting work in early 2008. Monthly meetings of that industry working group (initiated and moderated by the NRA) provided the opportunity of addressing crucial questions regarding the (possible) migration to NGA and NGN in Austria. The process was accompanied by expert workshops on related issues also organised by the Austrian NRA. In early 2009 Telekom Austria announced a first large-scale VDSL2 field trial in the Carinthia region in Southern Austria, which will probably further increase the tension regarding NGA roll out strategies in Austria.

A further dialogue initiated by the NRA covers the issue of future billing methods to be used when settling interconnection costs between next generation networks and the question whether "Bill and Keep" might be a preferable billing method within an NGN environment compared to the existing system of "Calling Party's Network Pays". Both initiatives will be carried on in 2009.

A new initiative just recently introduced by the NRA focuses on development and cooperation models for access infrastructures, and respective models for financing next generation access deployments. A successful kick-off conference in mid-April will be followed by further workshops and meetings addressing the issue from different points of view and offering a platform for cooperation to the various stake holders.

1.1 Incumbent (Telekom Austria)

1.1.1 Actual roll-out

Until now there has been no official announcement of the incumbent operator Telekom Austria with regard to a major migration of its current networks to a next generation network, although the technical and commercial importance of such a migration has been underlined several

times in official company statements. Telekom Austria uses the term “All-IP network” to describe a future network, though not mentioning any details with regard to technology or time-frame of implementation.

In early 2009 Telekom Austria announced a large-scale VDSL2 field trial in Villach, a town with a population of around 60.000. Telekom Austria plans to roll out a FTTC network comprising about 120 street cabinets in the Villach region. From these street cabinets customers will be reached using VDSL2 technology utilising Telekom Austria’s existing last mile copper infrastructure. The nearby regional capital Klagenfurt with a population of around 90.000 will be next on the VDSL2 agenda according to plans of Telekom Austria.

1.1.1.1. Applied technology (e.g. FTTH GPON, FTTH P2P, FTTB, VDSL, Cable)

As mentioned above Telekom Austria has not announced any concrete plans for rolling out NGN infrastructure in its core or access networks yet. However, in 2008 Telekom Austria introduced VDSL2 technology in parts of its access network. The FTTC/VDSL2 scenario chosen allows Telekom Austria to increase the reach of its xDSL services in (mainly) remote areas and to enlarge its broadband footprint. Until the end of 2008 Telekom Austria has installed VDSL2 at about 70 street cabinet locations. For the time being Telekom Austria does not use VDSL2 deployed at these about 70 street cabinet locations to offer broadband products with a higher speed than today’s offers based on ADSL2+ (deployed at main distribution frame locations). In fact, VDSL2 has been deployed in order to reduce interference between transmission systems deployed at the street cabinet and the main distribution frame, respectively, by using spectrum shaping methods.

The Villach field trial mentioned above follows a different approach as Telekom Austria is creating a test region for a FTTC/VDSL2 deployment, with a clear focus on identifying and evaluating the main technical and commercial criteria of an NGA roll out.

1.1.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

Telekom Austria’s retail services based on VDSL2 are not distinguishable from their ADSL2+ retail services. As stated above, Telekom Austria currently uses VDSL2 solely to enlarge its broadband footprint without interfering with systems deployed at the main distribution frame location. Therefore the corresponding products, types of service, bandwidth profiles and pricing structure are the same as for ADSL2+ products offered by Telekom Austria. For the time being, Telekom Austria does not specifically promote their VDSL2 products.

Technical (e.g. bandwidth profiles) and commercial (e.g. prices, bundles) details of the planned retail services based on the described FTTC/VDSL2 field trial in Villach have not been announced so far by Telekom Austria.

1.1.1.3 Coverage

VDSL2 (at ADSL2+ speeds) is currently deployed at about 70 street cabinet locations only. There are no coverage figures available by now.

VDSL2 as a part of the FTTC/VDSL2 field trial is expected to be available in the town of Villach in about Q3/2009. The regional capital Klagenfurt will be next on the agenda.

1.1.2 Announced roll-out plans (e.g. by 20XX ...)

See 1.1.1.3.

1.1.2.1-1.1.2.3 (see structure "actual roll-out" above)

1.2 Competitors (other telcos, cable)

1.2.1 Actual roll-out

1.2.1.1 UPC Austria

UPC Austria is the largest cable operator in Austria, offering services based on their own CATV network infrastructure. In addition, UPC has a large basis of unbundled lines since they acquired the former largest unbundling operator in Austria some years ago.

In 2008 UPC announced field trials with DOCSIS 3.0 technology and is expected to roll out the new technology in 2009. This will allow a significantly increased bandwidth for UPC's broadband products now ranging up to a download speed of 25,6 Mbit/s. Regarding deployment of VDSL2 technology in LLU served areas or deployment of FTTx scenarios there has been no official announcement from UPC Austria so far. However, UPC actively participates in the aforementioned industry working group mainly dealing with VDSL2 issues in the incumbent's access network.

1.2.1.2 Tele2 Austria

Tele2 is the largest operator offering broadband services based on LLU. Currently, Tele2 Austria offers services based on ADSL2+, but is currently involved in a VDSL2 field trial. There has been no official announcement from Tele2 Austria regarding migration to NGA or deployment of FTTx scenarios. Tele2 Austria also participates actively in the industry working group dealing with NGA issues.

1.2.1.3 Local Utility Operators

In several areas local utility operators have already rolled out FTTH on a small scale basis. Examples are Wien Energie in Vienna, Liwest in Linz, IKB in Innsbruck, 24entertainment in

Graz. Typically, the products offered are only available in certain small areas of a town or even only to residents of some buildings.

1.2.1.4 Other local initiatives

Another deployment driver are local initiatives starting early with the local deployment of fibre and extending their existing networks into business and residential premises. One such example is the town of Ried im Innkreis, where the operator Infotech now has FTTH offers in its portfolio. Other examples are municipalities which deployed FTTH networks serviced by local ISPs (see <http://www.arge-glasfaser.at/>).

1.2.1.5 1.2.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

There are no NGA based retail services on the market on a large scale basis. The FTTx services on the market are only offered on a small scale in geographically restricted areas (see 1.2.1.3 and 1.2.1.4).

1.2.1.6 1.2.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

There are no coverage figures for NGA based services available, but have to be estimated as being very small.

1.2.2 Announced roll-out plans (e.g. by 20XX ...)

There have been no official announcements regarding roll-out plans so far.

2. Wholesale access products available

2.1 Dark fibre

a) Included in Market number X

Not included in any market to be analysed at the time being.

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

Neither included in any market to be analysed nor used as a remedy.

b2) planned / under discussion

In discussion as a remedy on market 4 (unbundling).

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

No costing decision so far.

d) Availability of reference offer

No reference offer available at the time being.

e) Current usage in practice (e.g. available since ..., still under discussion)

Still under discussion (see 2.1 b2).

2.2 Duct Access

a) Included in Market number X

Not included in any market to be analysed at the time being.

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

Neither included in any market to be analysed nor used as a remedy.

b2) planned / under discussion

In discussion as a remedy on market 4 (unbundling).

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

No costing decision so far.

d) Availability of reference offer

No reference offer available at the time being.

e) Current usage in practice (e.g. available since ..., still under discussion)

Still under discussion (see 2.2 b2).

2.3 Unbundling / Sub-loop unbundling

a) Included in Market number X

Included in market 4.

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

Access obligation with regard to fully unbundled loops, shared loops and sub-loops

Non-discrimination obligation

Obligation to publish reference unbundling offer

Cost-orientation obligation (FL-LRAIC)

Obligation to make available ancillary services (co-location)

Separated accounts

Cost-accounting system

b2) planned / under discussion

Access to ducts and dark fibre under discussion.

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

Cost-orientation obligation (FL-LRAIC); however, the latest decision on unbundling charges provided for a monthly rental below FL-LRAIC to avoid price squeeze

d) Availability of reference offer

Reference offer available.

e) Current usage in practice (e.g. available since ..., still under discussion)

Available since 1999.

2.4 Bitstream

a) Included in Market number X

Included in market 5.

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

Access obligation with regard to wholesale bitstream services including ATM/IP back-haul

Obligation to publish reference offer

Cost-orientation obligation (retail minus)

Separated accounts

Cost-accounting system

b2) planned / under discussion

a new market analysis decision of July 4, 2008 which provided for a deregulation in areas with a certain degree of retail competition and additional remedies like the introduction of an obligation to make available a VoB service was repealed by the High Administrative Court on Dec. 16, 2008

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

Cost-oriented charges (retail-minus)

d) Availability of reference offer

Reference offer available.

e) Current usage in practice (e.g. available since ..., still under discussion)

Reference offer based on SMP decision available as a remedy since 2006, but wholesale bitstream access product has already been on the market since 2000 based on commercial negotiations.

2.5 In-house cabling

a) Included in Market number X

Included in market 4 (unbundling).

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

Access to in-house distribution frame; other remedies see point 2.3.b(1) above

b2) planned / under discussion

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

Cost-orientation (FL-LRAIC); rental for unbundled access to house cabling amounts to zero (excluding maintenance and fault repair) since access has been paid for by subscriber

d) Availability of reference offer

Reference offer available.

e) Current usage in practice (e.g. available since ..., still under discussion)

Available since 1999.

2.6 Backhaul

a) Included in Market number X

Included in market 6 (terminating segments).

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

Access obligation with regard to terminating segments > 155 MBit/s / >= 34 MBit/s in regional capitals

Obligation to publish reference offer

Cost-orientation obligation (cost of efficient service provision)

Separated accounts

Cost-accounting system

b2) planned / under discussion

Access to Ethernet links

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

Cost-oriented charges (cost of efficient service provision)

d) Availability of reference offer

Reference offer available.

e) Current usage in practice (e.g. available since ..., still under discussion)

Available since 2004.

2.7 Other

a) Included in Market number X

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

b2) planned / under discussion

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

d) Availability of reference offer

e) Current usage in practice (e.g. available since ..., still under discussion)

Belgium

1. Market developments

1.1 Incumbent

1.1.1 Actual roll-out

Belgacom has launched a VDSL2 retail offer in April 2008 after stopping deployment of VDSL in 2006 due to spectral interference with ADSL technologies.

The driver of the deployment is the competition with television services of cable companies, because VDSL2 makes it possible to offer at least one HD and one SD channel at the same time.

Field trial of FTTH is ongoing.

1.1.1.1 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

A lot of different products in terms of bandwidth and in terms of bundles exist (including bundles with mobiles). The standard bandwidth is now 12 Mbps

The bundles do not have a name, for triple play (Internet – telephone – television/VOD) the price is 60€/month, 67€/month with unlimited fix national calls

1.1.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

Present coverage VDSL + VDSL2 is 60% of home passed.

1.1.2 Announced roll-out plans (e.g. by 20XX ...)

The objective is 80% in 2011 including replacement of VDSL by VDSL2.

1.2 Competitors (other telcos, cable)

1.2.1 Actual roll-out

1.2.1.1 Name of company and applied technology, applied wholesale service (e.g. ULL) or own infrastructure

Telenet, Cable Television Company covering Flanders (north of the country) and a part of Brussels

1.2.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

A lot of different products in terms of bandwidth and in terms of bundles exist. The standard bandwidth is from 6 to 25 Mbps

Triple play bundles (analogue television connection not included in the price of the pack):

Goldshake: Internet 12 Mbps + telephone unlimited fix calls to Europe + Television/VOD – 62,73€/month

Diamondshake: Internet 20 Mbps + telephone unlimited fix calls to Europe + Television/VOD – 70,73€/month

(no name): Internet 25 Mbps (volume 100 GB) + telephone unlimited fix calls to Europe + Television/VOD – 87,73€/month

(no name): Internet 4 Mbps (volume 5 GB) + telephone unlimited fix calls to Europe + Television/VOD – 52,73€/month

1.2.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

Starting of deployment of Eurodocsis 3 announced for this year

1.2.2 Announced roll-out plans (e.g. by 20XX ...)

Not available

- 1.2.2.1 Name of company and applied technology, applied wholesale service (e.g. ULL) or own infrastructure

Numericable Belgium (previously Coditel), Cable Television Company covering a part of Brussels

- 1.2.2.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

A lot of different products in terms of bandwidth and in terms of bundles (no mobile services) exist. The standard bandwidth is 30 Mbps

Triple play bundles (including analogue television):

(no name): Internet 100 Mbps (30 Mbps in case of Eurodocsis 2)+ telephone unlimited fix calls + Television/VOD – 39.90€/month

(no name): Internet 100 Mbps (30 Mbps in case of Eurodocsis 2)+ telephone unlimited fix calls to 42 foreign countries + Television Premium/VOD – 59,90€/month

- 1.2.2.3 Coverage (e.g. 25% homes passed, number of actual access lines)

Deployment of Eurodocsis 3 started in December 2008

- 1.2.3 Announced roll-out plans (e.g. by 20XX ...)

Not available

- 1.2.3.1 Other DSL operators will launch VDSL2 services with double play end 2009, begin 2010 in function of the upgrading of their internal process to support VDSL2. These services will be based on bitstream.

Offering of triple play services needs a change of the Market Analysis to enrich bitstream reference offer with multicast functionality.

2. Wholesale access products available

2.1 Dark fibre

(the following sub-items apply correspondingly to the other wholesale services)

a) Included in Market number 4 as ancillary service for backhauling to street cabinet

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

Backhauling between MDF and street cabinet has to be offered on non-discriminatory base.

b2) planned / under discussion

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

cost oriented

d) Availability of reference offer

No reference offer imposed

e) Current usage in practice (e.g. available since ..., still under discussion)

Measure recently approved

2.2 Duct Access

a) Included in Market number 4 as ancillary service for backhauling to street cabinet

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

Backhauling between MDF and street cabinet to be offered on non-discriminatory base.

b2) planned / under discussion

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

cost oriented

d) Availability of reference offer

No reference offer imposed

e) Current usage in practice (e.g. available since ..., still under discussion)

measure recently approved

2.3 Unbundling / Sub-loop unbundling

a) Included in Market number 4. Maintaining existing obligation.

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

Available in all MDF and street cabinets

b2) planned / under discussion

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

cost oriented, LRIC bottom up model

d) Availability of reference offer

Reference offer, changes to be approved by NRA

e) Current usage in practice (e.g. available since ..., still under discussion)

Both available since 2000, but LLU only in use in MDFs covering 60% of home passed.

2.4 Bitstream

a) Included in Market number 5. Maintaining existing obligation

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

Available for all DSLAM ADSL, ADSL2 and SDSL at parent and distant nodes with ATM transport VP switching and choice of QoS and PCR/SCR ratio

b2) planned / under discussion

VDSL2 under public consultation

Ethernet transport (for VDSL2 and replacement of ATM transport) under discussion on base of VLAN services with QoS

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

cost oriented, LRIC bottom up model

d) Availability of reference offer

Reference offer, changes to be approved by NRA

e) Current usage in practice (e.g. available since ..., still under discussion)

Bitstream ADSL, ADSL2 and SDSL operational

VDSL2 probably operational in S2 2009

2.5 In-house cabling

a) – e)

Under study, a letter has been sent to European Commission about this question.

2.6 Backhaul

a) Included in Market number 13 with all types of terminating segment of leased lines

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

Wholesale leased line service

b2) planned / under discussion

Under study: Ethernet VLAN services in respect with the phase out of leased lines services

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

cost oriented, LRIC bottom up model

d) Availability of reference offer

Reference offer, changes to be approved by NRA

e) Current usage in practice (e.g. available since ..., still under discussion)

Available since 2000.

2.7 Other

a) – e)

2.8 NGA decision

The BIPT has created an addendum to market analysis decision of January 10th 2008 with additional remedies taking into account the effects of Next Generation Technologies: closing of MDF, move from ATM to Ethernet and the move from the MDF to the street cabinet (VDSL2).

A study by Analysys Mason showed that subloop unbundling isn't a worthy alternative for LLU due to its limited viability in Belgium. Only a small amount of street cabinets can be unbundled when ancillary services are available, OLOs have a large market share of at least 18% and there is an ARPU increase of 10 to 15 euro.

With the additional remedies in the NGA decision of November 12th 2008 the BIPT wanted to increase the visibility for all market players, prevent the exit of market players due to uncertainty and prevent the end of broadband competition.

The additional remedies are as follows:

- Give more transparency about network evolution over 5 years
- Stable tariffs during transition period (while closing MDF's)
- Set conditions for closing the central offices
 - 5 years where COLO present
 - 1 year where no COLO
- Give incentive to invest in subloop unbundling
 - Possibility to deploy together
 - All ancillary services (no reference offer, cost orientation)
 - Access to remote optical platform
- Create bitstream offer that is worthy alternative
 - Comparable quality diversifications as current bitstream offer
 - Comparable functionality options as with BRUO to create product competition. Freedom to use every functionality available in the DSLAM even when BGC doesn't use them for their retail services

- Different levels to connect with the Ethernet network
- possibility for OLO to use their existing fiber network for collection and transport of backhaul traffic

3. National next generation broadband initiatives or measures

Broadband initiatives are being investigated by the minister.

Czech Republic

1 Market developments

1.1 Incumbent (Telefónica O2 Czech Republic, a.s.)

1.1.1 Actual roll-out

Until now there has been no official announcement of the incumbent operator Telefónica O2 Czech Republic with regard to a migration of its current networks to a next generation network, although the technical and commercial importance of such a migration has been underlined several times in official company statements.

1.1.1.1 Applied technology (e.g. FTTH GPON, FTTH P2P, FTTB, VDSL, Cable)

As mentioned above Telefónica O2 Czech Republic has not announced any concrete plans for rolling out NGN infrastructure in its core or access networks yet.

1.1.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

Bundled products (triple play): O2 Duo mobil, O2 Trio

1.1.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

Very small, some household trials

1.1.2 Announced roll-out plans (e.g. by 20XX ...)

There has been no official announcement by Telefónica O2 Czech Republic regarding roll-out plans so far.

1.1.2.1 -1.1.2.3 (see structure "actual roll-out" above)

1.2 Competitors (other telcos, cable)

1.2.1 Actual roll-out

1.2.1.1 Name of company and applied technology, applied wholesale service (e.g. ULL) or own infrastructure

Smartcomp, CL-Net, Mattes – FTTH

UPC – Cable

1.2.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

There are no NGA based retail services on the market on a large scale basis

1.2.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

There are no coverage figures for NGA based services available, but have to be estimated as being very small.

1.2.2 Announced roll-out plans (e.g. by 20XX ...)

There have been no official announcements regarding roll-out plans so far.

1.2.2.1 – 1.2.2.3 (see structure “actual roll-out” above)

2 Wholesale access products available

2.1 Dark fibre

Not provided on fibre NGA

(the following sub-items apply correspondingly to the other wholesale services)

a) Included in Market number X

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

b2) planned / under discussion

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

d) Availability of reference offer

e) Current usage in practice (e.g. available since ..., still under discussion)

2.2 Duct Access

Not provided on fibre NGA

a) – e)

2.3 Unbundling / Sub-loop unbundling

Not provided on fibre NGA

a) – e)

2.4 Bitstream

Not provided on fibre NGA

a) – e)

2.5 In-house cabling

Not provided on fibre NGA

a) – e)

2.6 Backhaul

Not provided on fibre NGA

a) – e)

2.7 Other

a) – e)

Below: Additional aspect to be added to you respective national country case

3 National next generation broadband initiatives or measures

Please add here main aspects of – existing, new or planned – national next generation broadband initiatives or measures (e.g. tax deduction for inhouse cabling) in your country case studies if applicable. Text should be rather short. Note: Aspects like universal service, any government roll-out plans, targets or aspirations shall not be addressed here).

A public co-funding project for the deployment of a FTTH, “open access” network in several major cities and towns in Czech Republic.

Denmark

1.1.1.1 Applied technology

The incumbents' NGA roll-out is based on VDSL (FTTN).

Further NITA finds that the incumbents' upgrade of its cable TV network to DOCSIS 3 is also a sort of NGA roll-out. However this is not announced by the incumbent, TDC.

1.1.1.2 Available retail services

The market share of downloads in Denmark are as illustrated below.

Download Bandwidth	Per cent
< 2 Mbit/s	17
Between 2 Mbit/s and 4 Mbit/s	28
Between 4 Mbit/s and 10 Mbit/s	44
> 10 Mbit/s	10

We have therefore focused on three groups; 4 Mbit/s, 10 Mbit/s and 20 Mbit/s download bandwidth. See table below for the results.

Incumbent						
	Name	Teknologi	type of Servie	bandwidth	pricelevel	pricestructure
	TDC Bredbånd 4096/128 kbit/s	ADSL	No bundle Tripleplay	4096	199	Flatrate
	TDC Bredbånd 10240/1024 kbit/s	ADSL	No bundle Tripleplay	10240	399	Flatrate
	TDC Bredbånd 20480/1024 kbit/s	ADSL	No bundle Tripleplay	20480	423	Flatrate
	TDC HomeTrio	ADSL	Tripleplay Bundles	10240	399	Flatrate
	TDC HomeTrio	ADSL	Tripleplay Bundles	20480	449	Flatrate
	Yousee Bredbånd 4096/256 kbit/s	Coax	No bundle Tripleplay	4096	189	Flatrate
	Yousee Bredbånd 12/1 Mbit/s	Coax	No bundle Tripleplay	12288	299	Flatrate
	Yousee Bredbånd 20/2 Mbit/s	Coax	No bundle Tripleplay	20480	349	Flatrate

1.1.1.3 Coverage

The Incumbent (TDC) has coverage on 99 % via xDSL.

1.1.2 Announced roll-out plans

No up to date roll-out plans is available to NITA

1.2.1.1 Name of company and applied technology, applied wholesale service

We have taken the three largest competitors: Cybercity, Telia and A+. We have also included the power utility company Midtvest Bredbånd as an example of a Fiber Company.

1.2.1.2

See 1.1.1.2 and table below.

Competitors						
Name	Teknologi	type of Servie	bandwidth	pricelevel	pricestructure	
Cybercity Bredbånd 4096/512 kbit/s	ADSL	No bundle Tripleplay	4096	199	Flatrate	
Cybercity Solo Bredbånd 10240/1024 kbit/s	ADSL	No bundle Tripleplay	10240	249	Flatrate	
Cybercity Solo Bredbånd 20480/1024 kbit/s	ADSL	No bundle Tripleplay	20480	299	Flatrate	
Telia Bredbånd 2048/512 kbit/s	ADSL	No bundle Tripleplay	2048	189	Flatrate	
Telia Bredbånd 10240/512 kbit/s	ADSL	No bundle Tripleplay	10240	299	Flatrate	
Telia Bredbånd 20480/1024 kbit/s	ADSL	No bundle Tripleplay	20480	359	Flatrate	
A+ Telcom ADSL 4096/512 kbit/s	ADSL	No bundle Tripleplay	4096	289	Flatrate	
A+ Telcom ADSL 8064/512 kbit/s	ADSL	No bundle Tripleplay	8064	389	Flatrate	
A+ Telcom ADSL 20480/512 kbit/s	ADSL	No bundle Tripleplay	20480	429	Flatrate	
Telia Flatrate - 4096/384 kbit/s	Coax	No bundle Tripleplay	4096	239	Flatrate	
Telia Supersize - 10240/512 kbit/s	Coax	No bundle Tripleplay	10240	309	Flatrate	
Telia Supersize - 25600/1024 kbit/s	Coax	No bundle Tripleplay	20480	369	Flatrate	
A+Arrownet 4096/512 kbit/s	Coax/Fiber	No bundle Tripleplay	4096	255,25	Flatrate	
A+Arrownet 10240/512 kbit/s	Coax/Fiber	No bundle Tripleplay	10240	330,25	Flatrate	

1.2.1.3 Coverage

The Coverage from competitors is not available at this time, due to the fact that the competitors are distribute on different technologies.

1.2.2 Announced roll-out plans

No up to date roll-out plans is available to NITA.

2.1 Dark fibre:

a) Not included in a regulated market, however included in decision on market number 4 as backhaul service (not access)

b1) Ancillary service (actual – however the commencement of decision is 1 July 2009)

c) LRIC (LRAIC)

d) Yes

e) Available under the old regulatory regime

2.2 Duct Access

a) Not included in a regulated market, however included in decision on market number 4 as backhaul service (not access)

b1) Ancillary service (actual – however the commencement of decision is 1 July 2009)

c) LRIC (LRAIC)

d) Yes

e) No current usage (not available prior to new decision on market 4)

2.3 Unbundling / sub-loop unbundling

a) Currently included in market number 11 and will resist due to final decision on market number 4 (made 1 May 2009 with date of commencement 1 July).

b1) Access obligation, co-location, non-discrimination, price regulation, cost accounting, accounting separation, reference offer, transparency

b2) Same as b1) In addition obligations related to the NGN roll-out (Based on VDSL): backhaul services (see 2.1 and 2.2 above), notification about the roll-out, quality requirements for LLU and SLA/KPI requirements. Also a transitional period of 4 years when incumbent announces close down of a given part of the copper-network has been implemented.

c) LRIC (LRAIC)

d) Available since 1998. However individual sub-loop price has been in place since 2007.

2.4 Bitstream

a) Currently included in market number 12. Final decision on market 5 is currently under preparation.

b1) Access obligation, co-location, non-discrimination, price regulation, cost accounting, accounting separation, reference offer, transparency

b2) Same as b1) In addition SLA/KPI requirements. Access obligation on the incumbents cable TV network is under consideration.

c) LRIC (LRAIC)

d) Available since 2002.

2.5 In-house cabling

a) Part of co-location obligation imposed on all regulated markets

c) Historical costs

2.6 Backhaul

See 2.1 and 2.2 above

3. National next generation broadband initiatives or measures

The Danish government has recently set up a committee to look into possibilities for expanding the digital infrastructure in Denmark. High speed Committee seeks to recommend the Danish initiatives to promote broadband development.

Estonia

1. Market developments

1.1 Incumbent

1.1.1 Actual roll-out

We do not have the data

1.1.1.1 Applied technology (e.g. FTTH GPON, FTTH P2P, FTTB, VDSL, Cable)

This information is confidential.

1.1.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

Retail services are not differentiated by technology. It is difficult to say when the incumbent uses its PSTN network or where FTTx network or a mix of those two to provide services. What can be said is that the incumbent is quite heavily investing into broadband networks (€16,7 mln q1-q3 2008). According to the incumbent most of the investments were made to improve its network capacities (IP-core and optical network) to increase the availability and to further improve the quality of triple play services. The triple play offer from the incumbent includes IPTV, Broadband up to 12Mbit/s and voice and is quite popular. The prices vary from €22 to €29. For business customers download speeds up to 16 Mbit/s is available.

1.1.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

This information is confidential.

1.1.2 Announced roll-out plans (e.g. by 20XX ...)

1.1.2.1 -1.1.2.3 (see structure "actual roll-out" above)

We do not have the data

1.2 Competitors (other telcos, cable)

1.2.1 Actual roll-out

We do not have the data.

1.2.1.1 Name of company and applied technology, applied wholesale service (e.g. ULL) or own infrastructure

The main competitors are Elisa Eesti AS who uses its own optical core network and the incumbent's ULL to provide broadband services, AS Starman and AS STV who are cable operators with their own infrastructure and a few wireless service providers (WiMax and CDMA).

1.2.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

Cable operators AS Starman and AS STV provide Cable and Digital TV, voice and broadband services up to 10 Mbit/s. Services are provided both separately and in bundles. The price of triple play offers varies from €14,6 to €24,4. Elisa Eesti AS provides broadband up to 15 Mbit/s and IP-telephony. WiMax operators provide data and IP-telephony.

1.2.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

This information is confidential.

1.2.2 Announced roll-out plans (e.g. by 20XX ...)

1.2.2.1 – 1.2.2.3 (see structure "actual roll-out" above)

We do not have the data.

Comment: Unfortunately some of the data concerning specific undertakings is confidential. We can however provide some data concerning the whole market: The prevailing applied technology so far in FTTx has been FTTB or FTTN. FTTH is deployment has so far been quite limited (only in a few new residential areas). Mixed solutions of PSTN and FTTx are quite widely used to provide retail services, where the communications undertaking has replaced some of the old PSTN network or built new optical networks. 21% of end users using broadband services were connected via FTTx network solutions at the end of Q3 2008.

2. Wholesale access products available

2.1 Dark fibre

- a) Not included
- b) No obligations
- c) –
- d) yes, on a commercial basis
- e) available for a few years

2.2 Duct Access

- a) included in markets 11 and 12
- b1) obligation to provide access to ducts if related and necessary to the provision of LLU or bitstream services
- b2) currently under discussion to improve access to ducts regulation with the ongoing markets analyses on new markets 4 and 5 since access to ducts has become one of the main issues on those markets.
- c) -
- d) yes
- e) available since 2007 (also before, but only according to the rules in the general competition law)

2.3 Unbundling / Sub-loop unbundling

- a) Included in market 11
- b1) access, non-discrimination, transparency, price and cost-accounting obligation
- b2) analysis on new market 4 under way. No principal changes planned, FTTx solutions will probably be included (was not so far)
- c) HCFDC
- d) yes

e) available since 2001

2.4 Bitstream

a) Included in Market 12

b1) access, non-discrimination, transparency, price and cost-accounting obligation

b2) analysis on new market 5 under way. No principal changes planned

c) Retail minus

d) yes

e) available since 2007

2.5 In-house cabling

a) Not regulated at all, in-house cabling is not owned by communications undertakings

2.6 Backhaul

a) Not included in relevant markets

b1) none

b2) inclusion to market 5 under discussion

c) –

d) no

e) not available

2.7 Other

a) – e)

3. National next generation broadband initiatives or measures

There are no such NGN initiatives or measures neither existing or new

France

1. Market developments

1.1 Incumbent

1.1.1 Actual roll-out

France Telecom announced its FttH plan based on GPON in mid 2006.

Today, France Telecom's roll out concerns the 10 main cities (Paris, Lyon, Marseille, Lille...).

1.1.1.1 Applied technology (e.g. FTTH GPON, FTTH P2P, FTTB, VDSL, Cable)

France Telecom has only announced GPON. No FttCab/VDSL2.

1.1.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

One offer: "la fibre" : 100Mbps, IP TV, VOD, unlimited call, with option

=> 44,90€/month

1.1.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

France Telecom rolls out its network in two main steps:

1) roll out of fibre cables in its ducts along the main roads/streets

2) roll out of fibre cables building per building + vertical in-house wiring once agreement is obtained with the building manager or landlord

On October 2008 (non public figures):

- the footprint of France Télécom's 1st step fibre deployment was about 2.5M homes (fibre in the street)

- 500 000 homes were passed (fibre in the building)

- 20 000 homes were connected (signed clients)

1.1.2 Announced roll-out plans (e.g. by 20XX ...)

France Telecom has announced an investment of about 4 billions € until 2012.

1.1.2.1 -1.1.2.3 (see structure “actual roll-out” above)

1.2 Competitors (other telcos, cable)

1.2.1 Actual roll-out

1.2.1.1 Name of company and applied technology, applied wholesale service (e.g. ULL) or own infrastructure

SFR:

- FttH plan announced in mid 2006
- mainly GPON (5-6 main cities) / Point-to-Point in Paris (in the sewers system)

Free:

- FttH plan announced in mid 2006
- only Point-to-Point
- in Paris (sewers system) + a few cities (Montpellier, Valenciennes...)

Numericable:

- plan announced in 2006 = upgrade of the cable network
- FttLA based on DOCSIS 3.0
- 2M homes passed at the end of 2008

1.2.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

SFR : 50 Mb/s / IPTV/ Unlimited national and international call

=> 29,90 €/M (Paris) – 34,90 €/M (Province)

Free : 50 Mb/s(option 100 Mbp/s), VOD, IPTV, free call on fixed line and for some abroad destination

=> 29,90 €/m

Numericable : 100 Mb/s price

=> 29,90 € /m or Triple play : 39,90 €/m

1.2.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

(cf. above)

1.2.2 Announced roll-out plans (e.g. by 20XX ...)

1.2.2.1 – 1.2.2.3 (see structure “actual roll-out” above)

SFR : end 2009 : 1 million homes passed

Free : end 2012 : 4 millions homes passed

Numericable : end 2011 : 8 millions homes passed

2. Wholesale access products available

In France, no operator has opted for FttCab/VDSL2 at the SC. Except the cable operator, all operators which have announced their NGA plans have opted for FttH. Based on this statement, ARCEP has worked since 2006 to put in place a regulation of NGA in order to promote competition in investments where it's feasible while permitting several operators to roll out their own fibre networks in parallel.

Actually, a new framework has been in place in France concerning the regulation of NGA since summer 2008, which gives two tools to ARCEP:

- SMP regulation of the access to ducts: with its decision of market analysis n°4, adopted 24th July 2008, ARCEP has put in place the regulation of access to civil works infrastructures. France Telecom has to provide access to its ducts in a transparent and non discriminatory way, with cost oriented tariffs.
- symmetrical regulation of the sharing of the last part of the fiber loop: since the adoption of the LME (Law of Modernisation of the Economy) this summer, each operator which rolls out fiber within a building has to give access to its fibre network to the other operators. ARCEP has been given the power of symmetrical regulation of such access offers. For the moment, the subject is under discussion between the operators under the supervision of ARCEP and pilots are about to be launched.

ARCEP has, for the moment, adopted a rather progressive approach regarding NGA:

SMP obligation with strong regulation only on ducts through market 4 analysis

no SMP obligation on the dark fibre rolled out by France Telecom for the moment, but fibre access is nevertheless included in market 4

inclusion of fibre bitstream in market 5, but no obligation either of fibre bitstream offers.

=> with this approach, if the conditions of market need it, it would be possible for ARCEP re-consider its approach before the end of the present cycle by only modifying the obligations imposed to France Telecom.

2.1 Dark fibre

a) cf above

2.2 Duct Access

a) Included in the definition of market 4. (Market 4 includes copper, fibre and ducts)

b) Access obligation, non-discrimination, transparency, reference offer, cost accounting obligation

c) Cost oriented / cost methodology under study

d) France Telecom has published its reference offer on 15th September 2008: actually, pilots were done during the first part of 2008 with SFR and Free to improve the operational process of the offer.

e) pilots phase was over at the end of 2008. Agreements are about to be signed between France Telecom and the operators.

2.3 Unbundling / Sub-loop unbundling

For Unbundling.

=> the market analysis decision adopted in July 2008 maintained the same framework that was in place regarding local loop unbundling in the previous market analysis cycle. No specific obligations was adopted for NGA/FttCab/VDSL2 at the SC.

a) Included in the definition of market 4

b) access obligation, non-discrimination, transparency, reference offer, cost accounting obligation

c-) Cost oriented / Current Cost

d) A reference offer is available for the ULL and for the SLU (but no operational in practical for SLU)

e) The LLU is widely used (more than 6M unbundled access) while there is no particular demand for the SLU.

2.4 Bitstream

=> the market analysis decision adopted in July 2008 maintained the same framework that was in place regarding DSL bitstream in the previous market analysis cycle. No specific obligations was adopted for fibre bitstream or bitstream offers based on FttCab/VDSL2. Nevertheless, fibre bitstream is included in the market.

a) Included in definition of market 5

b) access obligation, non-discrimination, transparency, reference offer, cost accounting obligation

c) Cost oriented / no eviction price.

d) A reference offers is available for DSL bitstream with different options: DSL access or naked DSL access / IP or ATM or Ethernet backhaul /

2.5 In-house cabling

As explained above, symmetrical regulation of the sharing of the last part of the fiber loop was put in place by the French law.

A balanced approach has been put in place, consisting of rights and duties for the first operator which reaches a building with its fiber network:

- a "right to fiber" has been established, which means that the building manager cannot refuse the roll out of in-house fiber by an operator if there is no existing fiber within the building
- in counterpart, the operator has to give access to its fiber network for the other operators so that they can also provide their own services to the inhabitants of the building.

The first operator gives access to its fiber network at a point of sharing. The law says that the point of sharing cannot be within the private property excepted in the cases specified by

ARCEP. The issues of the localisation and the specifications of the point of sharing raise a lot of debates among the operators because each operator has its own proposal based on its technology and topology choices.

ARCEP has been charged by the French government to discuss these issues with the operators and to perform trials so that conclusions could be drawn in mid 2009.

2.6 Backhaul

=> the market analysis decision adopted in July 2008 maintained the same framework that was in place regarding fiber optical backhaul as an ancillary service to LLU.

Since 2005, France Telecom has to provide, on commercial agreement, an access to its dark fibre between MDFs in order to permit the alternative operators to unbundle new MDFs and thus to promote the extension of the footprint of LLU.

There is only a modification in the 2008 market analysis: France Telecom is now obliged to make its offer publicly available.

Germany

1 Market developments

1.1 Incumbent

1.1.1. Actual roll-out

1.1.1.1 Applied technology (e.g. FTTH GPON, FTTH P2P, FTTB, VDSL, Cable)

1.1.1.2. Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

1.1.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

1.1.2 Announced roll-out plans

1.1.2.1 -1.1.2.3 (see structure "actual roll-out" above)

Deutsche Telekom

In September 2005 Deutsche Telekom had announced its plans to extend its fibre infrastructure to the street cabinet in order to offer VDSL products. At the end of 2008 VDSL infrastructure was deployed in 50 cities (but not area-wide in these cities) enabling access to VDSL for 8 million (out of 11 million) households. Furthermore, ADSL2+ is available in another 750 cities, enabling 9 million further households to use IPTV based on DSL. This amounts to 17 million potential ADSL2+ or VDSL households.

It is targeted to deploy ADSL2+ in approximately 1000 cities.¹ According to Deutsche Telekom this would enable IPTV for 20 million households (either via ADSL2+ or VDSL).²

By the end of 2008, approximately 500.000 households (out of potential 17 million households) use VDSL- or ADSL2+-access-lines enabling high bandwidths.³

¹ Deutsche Telekom, press release as of 25.6.2008
<http://www.telekom.com/dtag/cms/content/dt/de/561886;jsessionid=03FF6718598F3E1024B60AB6E8692A1F?archivArticleID=541412>

² www.dsl-magazin.de as of 3.3.2008

Deutsche Telekom offers its VDSL and ADSL2+ retail products under the name “*Entertain*”⁴. VDSL provides bandwidths of up to 50 Mbit/s and ADSL2+ bandwidths up to 16 Mbit/s.

Table: Deutsche Telekom retail products

	Entertain Comfort	Entertain Comfort Plus	Entertain Premium
ADSL2+, ≤16Mbit/s	49,95€/m	59,95€/m	69,95€/m
VDSL, ≤25 Mbit/s	59,95€/m	69,95€/m	79,95€/m
VDSL, ≤50 Mbit/s	64,95€/m	74,95€/m	84,95€/m

Cooperation projects between DTAG and competitors

According to press news,⁵ DTAG plans to cooperate with some competitors in order to roll-out high-speed networks in areas not yet deployed. A pilot project was started in the cities of Würzburg and Heilbronn.⁶ In Würzburg⁷ DTAG has rolled out VDSL. Vodafone intends to enable VDSL for 50.000 access lines using access to DTAG’s ducts and access to street cabinets. BNetzA had imposed these wholesale products in June 2007 without having received an application by a competitor in a specific proceeding. In Heilbronn Vodafone plans to roll-out VDSL and DTAG will get access to Vodafone’s street cabinets.

Furthermore, DTAG and EWE TEL intend to cooperate on VDSL deployment in northern Germany. DTAG will deploy VDSL in 4 cities and EWE TEL in 5 cities. They will allow mutual access to their networks.⁸ Similar projects are envisaged in Augsburg⁹ between DTAG and M-Net and in Aachen¹⁰ between DTAG and NetCologne.

According to press news, DTAG has announced to provide its competitors on a voluntary basis access to its VDSL network.¹¹ So far, physical network access (bitstream access) to these high-speed networks is not mandated.

³ Deutsche Telekom, press release as of 29.1.2009,

<http://www.telekom.com/dtag/cms/content/dt/de/82408?archivArticleID=613750>

⁴ <http://entertain.eki.t-home.de/>

⁵ <http://www.handelsblatt.com/unternehmen/it-medien/telekom-forciert-einigung-mit-wettbewerbern;2124088>

⁶ http://www.vodafone.de/unternehmen/presse/97943_140030.html

⁷ Würzburg is one of the 50 cities where DTAG deployed VDSL infrastructure.

⁸ <http://www.ewe.com/english/investor-relations/financial-news-906.php>

⁹ http://www.m-net.de/ueber_m_net/presse/pressemitteilungen/pressemitteilung/article/placeholder-ws1-74.html

¹⁰ <http://www.boerse-go.de/nachricht/Telekom-will-bei-Glasfaser-Ausbau-kooperieren-Deutsche,a1014415.html>

¹¹ <http://www.handelsblatt.com/unternehmen/it-medien/telekom-forciert-einigung-mit-wettbewerbern;2124088>

1.2 Competitors (other telcos, cable)

1.2.1 Actual roll-out

1.2.1.1 Name of company and applied technology, applied wholesale service (e.g. ULL) or own infrastructure

1.2.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

1.2.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

1.2.2 Announced roll-out plans (e.g. by 20XX ...)

1.2.2.1 – 1.2.2.3 (see structure “actual roll-out” above)

General developments:

Some regional competitors or local utilities are deploying fibre networks (FTTB / FTTH) in certain local spots (e.g. M-Net, NetCologne, wilhelm.tel, EWE TEL, Stadtwerke Schwerte, Stadtwerke Sindelfingen). Generally, whereas regional telecommunications operators rather deploy FTTB, local utilities rather deploy FTTH.

Current FTTH roll-out enables between 100.000 and 200.000 high-speed access lines.

Examples

a) M-Net

M-Net is rolling out FTTB networks in Munich and Augsburg.¹² For the future such networks are also envisaged for further cities in Bavaria.

For 2008 M-Net intended to deploy its FTTB infrastructure for 10.000 buildings in Munich covering 110.000 flats and by 2011 60 % of all flats shall be deployed.¹³

¹² See also above on cooperation projects between DTAG and competitors.

¹³ http://www.m-net.de/ueber_m_net/presse/pressemitteilungen/pressemitteilung/article/placeholder-ws1-39.html

Table: M-Net retail products

Maxi Deluxe Pur	Maxi Deluxe Starter	Maxi Deluxe Komplett 50000	Maxi Deluxe Komplett 100000
≤50.000/5.000 Mbit/s downstream/upstream (without telephone access) 26,90€/m	≤25/2Mbit/s downstream/upstream (incl. analogue telephone access) 26,90€/m	≤50/5Mbit/s downstream/upstream (incl. analogue telephone access) 39,90€/m*	≤100/10Mbit/s downstream/upstream (incl. analogue telephone access) 44,90€/m*

* Introductory prices: -5€/m

b) NetCologne ¹⁴

In July 2006 Netcologne began constructing a FTTB network in Cologne. Based on this network Netcologne offers Internet access with up to 100 Mbit/s. Offers are available since December 2006. The first phase of the infrastructure roll-out covered an area in the city of centre of Cologne.

By May 2009, 10.000 buildings are connected to the fibre network. For the end of 2009 14.500 buildings are envisaged which amount to approximately 116.000 households.¹⁵

Making investments in its own fibre access network enables Netcologne to save charges to Deutsche Telekom for the the local loop. According to press articles these costs amount to approx. € 30 million p.a. It is assumed that Netcologne which is owned by an energy utility may use the pipes owned by this utility to run fibre through thus saving substantial costs of digging its own trenches.

Furthermore, in April 2009 NetAachen was established, which is a joint venture between NetCologne and Accom, a local carrier based in Aachen.^{16,17} They are said to invest up to €25 million for a fibre roll-out in the area of Aachen in the next 4-5 years.¹⁸

¹⁴ Netcologne is a city network operator providing services over its own infrastructure in Cologne and surroundings.

¹⁵ http://www.netcologne.de/unternehmen/presse/pressemitteilung.html?tx_ttnews%5Btt_news%5D=335&tx_ttnews%5BbackPid%5D=374

¹⁶ http://www.netcologne.de/unternehmen/presse/pressemitteilung.html?tx_ttnews%5Btt_news%5D=333&tx_ttnews%5BbackPid%5D=374

¹⁷ See also above on cooperation projects between DTAG and competitors.

¹⁸ <http://www.teltarif.de/arch/2009/kw02/s32534.html>

Table: NetCologne retail products

Starter	Phone-Flat	Surf-Flat	Doppel-Flat
≤25 Mbit/s: 9,90€/m	≤25 Mbit/s: 19,90€/m*	≤25 Mbit/s: 19,90€/m*	≤25 Mbit/s: 29,90€/m*
(telephony: 2,5ct/min;		≤100 Mbit/s: 29,90 €/m*	≤100 Mbit/s: 34,90 €/m*
Internet: 1,9ct/min)	(Internet: 1,9ct/min)	(telephony: 2,5ct/min)	

* First 6 months: 14,90€/m

c) Stadtwerke Schwerte

Stadtwerke Schwerte, a local utility in the city of Schwerte, has rolled-out a FTTH network.¹⁹ By the end of 2008 24.000 households could be reached with this network.

Prices for a bundle consisting of fibre access, Internet (flat) and telephony (flat) start at 25€/m.

Table: Stadtwerke Schwerte retail products

Fibre access line: 10€/m
Internet flat rate (at 5 Mbit/s): 5€/m*
Telephony flat rate: 5€/m

* scalable, per additional 1Mbi/s: + 1€/m

d) Stadtwerke Sindelfingen

Stadtwerke Sindelfingen is the local utility in the city of Sindelfingen. At the end of 2008 its FTTH network (GPON) allowed to access 1.600 flats and some business properties in an development area (operational start in January 2009).²⁰ Bandwidths of up to 100 Mbit/s for private customers and up to 1.000 Mbit/s are envisaged.

d) Cable operators

Unitymedia provides Internet access with speeds up to 32 Mbit/s. KabelBW²¹ and Kabel Deutschland²², who provide their services in other areas of Germany, also offer speeds of up

¹⁹ <http://www.zukunft-beginnt.de>

²⁰ See also press release as of 18.11.2008,

<http://www.stadtwerke-sindelfingen.de/Telekommunikationsnetz-Flugfel.702.0.html>

²¹ <http://www.kabelbw.de>

to 32 Mbit/s.²³ KabelDeutschland announced to implement DOCSIS 3.0 in its networks in 2009, enabling speeds of up to 200 Mbit/s.²⁴

At the end of 2007 there were almost 1 million customers using Internet via cable infrastructure with 3 out of 10 customers having bandwidth of +10Mbit/s.²⁵

Table: Unitymedia retail products

2play (including tele- phone flat rate)	3play (including tele- phone flat rate + digital TV)
≤10 Mbit/s 25€/m	≤10 Mbit/s 25€/m
≤20 Mbit/s 25€/m*	≤20 Mbit/s 25€/m*
≤32 Mbit/s 55€/m*	≤32 Mbit/s 55€/m

* promotional offer, regular price 30€/m

2 Wholesale access products available

2.1 Dark fibre

(the following sub-items apply correspondingly to the other wholesale services)

a) Included in Market number X

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

b2) planned / under discussion

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

²² <http://www.kabeldeutschland.de/home/index.html>, KabelDeutschland operates in 13 out of 16 federal states.

²³ Other cable operators offering high-speed Internet with maximum bandwidth between 10 and 25 Mbit/s are: NetCologne, primacom, telecolumbus.

²⁴ www.kabeldeutschland.com/fileadmin/redaktionselemente/presse/dokumente/Downloads/Fachbeitrag_VoC.pdf

²⁵ www.bnetza.de, Annual Report 2007, p. 75.

d) Availability of reference offer

e) Current usage in practice (e.g. available since ..., still under discussion)

In its regulatory order as of 27.6.2007 for access to the local loops Deutsche Telekom was obliged to provide access to dark fibre only in those cases where access to the cable ducts is not possible either due to technical reasons or lack of capacity.

2.2 Duct Access

a) – e)

Deutsche Telekom is obliged to provide its competitors access to its cable ducts as an ancillary service to access at the street cabinet (regulatory order as of 27.6.2007 for access to the local loops).²⁶ No company has filed an application with Deutsche Telekom so far. Competitors are currently negotiating with Deutsche Telekom. Prices are not yet decided upon.

2.3 Unbundling / Sub-loop unbundling

a) – e)

Deutsche Telekom is obliged to provide unbundled access at the MDF and at the street cabinet.²⁷ Ex-ante regulation applies. In 3Q 2008 there were approx. 7,9 million unbundled local loops.

2.4 Bitstream

a) –e)

IP bitstream²⁸ is regulated ex ante based on the costs of efficient service provision (decision as of 13 June 2006). Access to IP-bitstream (bundled and/or stand alone) on a regional Basis (national coverage via access over 73 Broadband PoP) must be granted on non-discriminatory terms. The rates for IP bitstream access were approved on 13 May 2008.²⁹

26 http://www.bundesnetzagentur.de/enid/6ee311825385180c9627b65c80384843,0/Archive/2__7_-_April-June_45p.html#11400

27 Ibid. Market 4 is being revisited in early 2009.

28 http://www.bundesnetzagentur.de/enid/3fe83bd301fc561b073ab98b81b1472a,0/Archive/2__6_-_Sept-Oct_32b.html#9085

29 http://www.bundesnetzagentur.de/enid/7b28a5d3572237a905f502c0f6ebd7cd,0/Archive/2__8_-_April-June_4o4.html#13889. For example, a basic rate of € 19,05 applies for the standalone variant for which the retail customer no longer requires a separate telephone connection in addition to the DSL line. This rates includes an average bandwidth of 50kbit/s per access during main traffic hours.

Furthermore, Deutsche Telekom is ordered to provide ATM bitstream (decision as of 7 March 2007).³⁰ This order imposes upon DT AG an obligation to grant ATM bitstream access on non-discriminatory conditions, to perform separate accounting and to publish a reference offer. The rates are subject to ex post regulation.

2.5 In-house cabling

a) – e)

Access to the in-house cabling is regulated ex-ante in the context of the LLU decision, but it is not contained in a reference offer.

3 National next generation broadband initiatives or measures

In February 2009 the German federal government has published its national broadband strategy³¹. The first target is to ensure that all German households will have access to broadband Internet at the end of 2010 at latest. The second target is to bring broadband access of or above 50 Mbps to 75% of the households by 2014. The strategy is based on four pillars.

The first pillar aims at exploiting synergies in infrastructure deployments, this includes optimised shared use of existing infrastructures and facilities (e.g. partial pooling of existing infrastructure as present in business areas of e.g. the transport ministry, on condition that fibre optic cables or transmission facilities are not involved). Furthermore, the Federal Network Agency will start work soon on an infrastructure atlas identifying only those infrastructure components that are actually suitable for pooling. Also, a database providing information on construction sites shall be compiled enabling telecommunication companies to include their new infrastructure projects as part of road construction works already planned. In future, tax concessions will be applicable to any installations connecting broadband to building and distributing the broadband connections within the house or apartment units.

Second, in order to ensure that mobile technologies improve broadband services in rural areas in the short to medium term, parts of the frequency spectrum currently used for analogue radio and the military forces will be available in future (“digital dividend”). Furthermore, it will be possible in future to apply the frequency bands of 900 MHz used to date for the GSM networks for all types of wireless network access.

Third, the government wants to secure *growth- and innovation-gearred regulation* aiming at providing the right incentives and greater predictability for operators. It is considered whether it

³⁰ http://www.bundesnetzagentur.de/enid/005e8466339f063d00efc71ca0f33e05,0/Archive/2__7_-_January-March_3qx.html#10218

³¹ <http://www.bmwi.de/English/Navigation/Service/publications,did=294718.html>

is feasible in the short term to extend the existing validity period for market analyses from two to three years.

Fourth, to promote access to high-speed broadband by 2010, especially in areas neglected by the market the government will provide incentives in these areas through support programmes amounting to a total of over 150 million euros. This includes programmes providing maximum subsidies of 200,000 euros per project where the operator selected must guarantee equal, non-discriminatory access on its network. To further incentivise business to invest in broadband development other programmes provide loans to the value of half the project size for broadband projects.

On May 13 2009 the Federal Network Agency published “*Key elements for progressing modern telecommunications networks and creating powerful broadband infrastructures*” for consultation. They were foreseen as one of the measures in the Federal Government’s Broadband Strategy.

The key elements are based on four core elements: reducing risks, securing the investment and innovation power, providing planning certainty and transparency.

The key elements expressly encourage regional companies and public providers to set up powerful telecommunications infrastructures. Furthermore, the Agency welcomes cooperation between telecommunications companies with the aim of contributing the provision of ubiquitous high-speed broadband while enabling non-discriminatory and transparent access for third parties. The principle of *open access* plays an important role in this context. Operators can also enhance transparency by actively communicating their roll-out plans and by contributing to BNetzA’s infrastructure atlas project. Furthermore, BNetzA intends to establish a high-level NGA forum thereby promoting the dialogue among all stakeholders and improving transparency. Where appropriate and legally permissible long regulatory periods may improve planning security. Moreover, the role of wholesale regulation and of new tariff structures is addressed in the key elements. Further topics are the rate of return on equity, termination in FttB networks as well as the issue of regional markets.

Together with the key elements, the Agency also published as a consultation document “*Notes on consistent regulation of rates as required under section 27 (2) of the Telecommunications Act*”. The notes focus on the relation between different regulated wholesale rates which should ensure not only adequate incentives for network rollout but also sustainable and fair competition.

Greece

1. Market developments

1.1 Incumbent

1.1.1 Actual roll-out

1.1.1.1 The deployment of the OTE's NGA network is on a trial stage and it is based on a FTTC/B architecture and VDSL

1.1.1.2 Until now there is not any official retail product based on NGA

1.1.1.3 There is not any official information related to a specific coverage. Since the project is on a trial stage, we expect that the current coverage is limited to specific regions.

1.1.2 Announced roll-out plans (e.g. by 20XX ...)

OTE has announced that is intended to invest on FTTC/B and VDSL architecture.

1.2 Competitors (other telcos, cable)

There is no official information regarding OLO's NGA developmnets

1.3 Public Funding Announcements

Within the general framework of the strategic policy for electronic communications, a public co-funding project has been approved and is being designed. Its main scope is the deployment of a fibre to the home access network in several major cities and towns in Greece capable of providing access speed up to 100Mbps per user. The proposed network (dark fibre), which will be developed by network providers, is based on an "open access" approach and it will be available to every electronic communications service provider. The funding mechanism is based on a Public Private Partnership (PPP) approach with pay back period of 30 years for the network provider.

2. Wholesale access products available

2.1 Dark fibre

a) Included in the remedies of market 4. (Market 4 includes only copper)

b1) No current obligation.

b2) Market 4 is currently under National Consultation. It is expected to be notified in April'09. Dark fibre is considered an ancillary service in the case of sub-loop unbundling: the SMP operator is obliged to provide access to dark fibre from the outdoor cabinet to the MDF in case no duct is available.

c) Cost oriented / LRIC CCA

d) Not yet

e) Not yet

2.2 Duct Access

a) Included in the definition of market 4. (Market 4 includes copper, fibre and ducts)

b1) No current obligation.

b2) Market 4 is currently under National Consultation. It is expected to be notified in April'09. Access to ducts is considered as an ancillary service for sub-loop unbundling: the SMP operator is obliged to provide access to existing ducts from the outdoor cabinet to the MDF. In addition the SMP operator should satisfy all reasonable requests for accessing its ducts in order to facilitate the deployment on fibre access networks by the alternative operators.

c) Cost oriented / LRIC CCA

d) Not yet

e) Not yet

2.3 Unbundling / Sub-loop unbundling

a) Included in the definition of market 4.

b) Access obligation, non-discrimination, transparency, reference offer, cost accounting obligation. The definition, analysis and remedies for Market 4 are under National consultation and are not notified yet.

c) Cost oriented / LRIC CCA

d) Reference offer is available for both LLU and sub-loop unbundling as a remedy of the previous Market analysis cycle (previously Market 11).

e) In Greece we have 650.000 LLU lines in approximate from a total of 1,5 million broadband cooper lines. Until today there is no demand for sub-loop unbundling from the local operators. Both the SMP and the OLOs are active on the ADSL 2+ technology and provide access speeds up to 24Mbps from the MDF.

2.4 Bitstream

a) Included in the definition of market 5.

b) The definition, analysis and remedies for Market 5 are under National consultation and are not notified yet. There is no specific obligation for naked DSL, VDSL or fibre bitstream.

c) Proposed in the 2nd round analysis: Cost oriented / LRIC, CCA, economic space (eviction price). Currently: Retail minus

d) Reference offer is available as a remedy of the previous Market analysis procedure (previously Market 12).

e) The SMP operator is active on ADSL 2+ technology and provides access speeds up to 24Mbps.

2.5 In-house cabling

There is under public consultation, a proposed decision from the ministry of transport and communications for the technical specification of the in house electronic communications cabling. The aim of the proposed decision is to oblige rules for the deployment and operation of the in-house cabling.

2.6 Backhaul

Backhaul is provided as an ancillary service to LLU at cost oriented price. In addition to fibre optical backhaul the obligation has been extended to cover also Fixed Wireless Access backhaul.

2.7 Other

3. National next generation broadband initiatives / measures

In September 2008, the Ministry of Transport and Communications announced its national FTTH strategy with aim to connect 2m households (approx. 50% total Greek households) within 7 years starting from end 2009 with deployment scheduled to begin in 2010. The Government has drawn up a €2.1 billion plan which is subject to European Commission state aid rules. The Greek government is also hopeful that further sources of funds, such as the European Investment Bank, might be able to provide part of the investment and there is the possibility that the European Commission might also provide some funding via the planned EU recovery plan for 2009 and 2010, earmarked to "extend and upgrade high-speed Internet in rural communities" where broadband rollout might otherwise not be planned by commercial operators.

Greece was, until recently, at the bottom of the EU's broadband penetration table, with just 1 per cent in 2005. That situation has improved during the past few years with 1.2 million households now connected to a broadband service i.e. a broadband penetration rate of only 14 percent, which is still below the EU average.

Within the general framework of the strategic policy for electronic communications, a public co-funding project has been approved and is being designed. Its main scope is the deployment of a fibre to the home access network in several major cities and towns in Greece capable of providing access speed up to 100Mbps per user. The proposed network (dark fibre), which will be developed by network providers, is based on an open access basis and it will be available to every communications provider. The funding mechanism is based on a Public Private Partnership (PPP) with the Greek Government the right to utilise the network for 30 years to each infrastructure provider. The tender for selecting the private investor is expected in the second half of 2009.

Passive infrastructure:

- The investment in passive infrastructure will be made by 3 private investors who will be awarded PPP (Public Private Partnership) contracts via international tender. The project will be separated into 3 parts, each part covering a distinct geographical area of the country by a different PPP.
- Management of the passive network will be granted to the PPP contractors for 30 years in order to recoup investment.
- Only passive components will be built by the PPP contractors (ducts, fibre, ODFs, COs, collocation facilities, etc). End-user connections will be at least 100 Mbps.
- The project will include Athens, Thessaloniki and 50 other of Greece's largest towns and cities.

Downstream services:

- The 3 PPP contractors will each sell dark fibre services to communications providers (CPs) in their respective geographical areas.
- CPs will deploy their own active equipment using the collocation facilities in the new FTTH COs. In principle, each CP will be able to connect any customer living in the homes passed by the new infrastructure.
- Although the fibre deployed will be "home run" (P2P), CPs will have flexibility to provide any type of optical network (P2P, GPON, etc).
- CPs will sell retail services to end-customers plus also wholesale "active" bitstream services to ISPs.

The Greek government will also introduce legislation covering the shared use of ducts and in-building networking capabilities, and says it will ease any regulation necessary to help further the network's construction.

Hungary

1. Market developments

1.1 Incumbent

1.1.1 Actual roll-out

1.1.1.1 Applied technology (e.g. FTTH GPON, FTTH P2P, FTTB, VDSL, Cable)

Incumbent: Magyar Telekom: VDSL and marginal FTTH; and its cable company (T-Kabel) mainly with DOCSIS 2.0; and also its mobile branch (T-Mobile) with 3G - HSDPA

1.1.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

25 Mbit/s broadband access with triple play availability, 33 EUR (HUF 9890)

1.1.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

Marginal (limited areas of some bigger cities, and some capitals districts).

1.1.2 Announced roll-out plans (e.g. by 20XX ...)

1.1.2.1 - 1.1.2.3 (see structure "actual roll-out" above)

Plans of Magyar Telekom:

FTTH-GPON: 780.000 homes passed by 2013.

DOCSIS 3.0: 380.000 homes passed by 2013.

1.2 Competitors (other telcos, cable)

1.2.1 Actual roll-out

1.2.1.1. Name of company and applied technology, applied wholesale service (e.g. ULL) or own infrastructure

UPC Magyarország Kft., FTTB, own infrastructure

Pannon Zrt. 3G - HSDPA, own infrastructure

Vodafone Zrt. 3G - HSDPA, own infrastructure

Fibernet Zrt. FTTB, own infrastructure

Invitel Zrt. ADSL own infrastructure

Digi Kft, FTTB, own infrastructure.

And many other smaller cable network operators FTTB, own infrastructure

1.2.1.2 Available retail services (e.g. product name, type of service (e.g triple play), bandwidth, price level, price structure)

Triple play services are available both separately and in bundles.

Bandwidth: 20 Mbit/s, 30 Mbit/s,

1.2.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

Some densely populated urban areas are covered.

1.2.2 Announced roll-out plans (e.g. by 20XX ...)

1.2.2.1 – 1.2.2.3 (see structure “actual roll-out” above)

There is no announced roll-out plans from fix network operators. Mobile HSDPAs plans reaches the country-wide coverage by the end of 2009, but this perhaps means only the urban areas.

2 Wholesale access products available

2.1 Dark fibre

(the following sub-items apply correspondingly to the other wholesale services)

a) Included in Market number X

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

b2) planned / under discussion

Discussions have started in 2008.

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

d) Availability of reference offer

e) Current usage in practice (e.g. available since ..., still under discussion)

There is no actual or planned obligation yet.

2.2 Duct Access

There is no actual or planned obligation yet.

2.3 Unbundling / Sub-loop unbundling

a) Included in Market number X

Market 4

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

access obligation: fully unbundled loops, shared loops and sub-loops,

transparency (reference offer),

non-discrimination,

cost-orientation,

accounting separation.

b2) planned / under discussion

c) Costing

LRIC

d) Availability of reference offer

Available.

e) Current usage in practice

Not significant.

2.4 Bitstream

a) Included in Market number X

Market 5

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

transparency (reference offer),

non-discrimination,

access obligation: DSLAM and IP level access,

Cost-orientation,

accounting separation.

b2) planned / under discussion

c) Costing

DSLAM-level: LRIC, IP level: retail minus.

d) Availability of reference offer

Available.

e) Current usage in practice

IP level bitstream access: 25% of xDSL lines, LLU: 2,7% of xDSL lines

2.5 In-house cabling

There is no actual or planned obligation yet.

2.6 Backhaul

There is no actual or planned obligation yet.

2.7 Other

a) – e)

3 National next generation broadband initiatives or measures

There is not yet such initiatives.

Ireland

1. Market developments

1.1 Incumbent

Announced roll-out plans (e.g. by 20XX ...)

The incumbent Eircom is still continuing with VDSL2 cabinet trial in 2 exchange areas in Dublin. The trial was due to end December 2007 in original announcement. There is no indication of when this roll-out will take place. Business case for a major urban expansion will be predicated on outcome of this trial however the decision has been continually delayed

1.2 Competitors (other telcos, cable)

1.2.1 Actual roll-out

1.2.1.1 Magnet Telecom (ULL & FTTH)

50Mb/s triple play (limited to FTTH deployments) @ €95.36 pm

24Mb/s double play (LLU) @ €65.35 inc line rental pm

10Mb/s double play (LLU) @ €55.35 inc line rental pm

1.2.1.2 Smart Telecom (ULL & FTTH)

24Mb/s double play (LLU) @ €70.65 inc line rental pm

10Mb/s double play (LLU) @ €60.60 inc line rental pm

8Mb/s double play (LLU) @ €50.56 inc line rental pm

6Mb/s double play (LLU) @ €45.54 inc line rental pm

4Mb/s double play (LLU) @ €40.52 inc line rental pm

1Mb/s double play (LLU) @ €38.15 inc line rental pm (include call bundle)

1.2.1.3 UPC (Cable operator)

20Mb/s triple play @ €77.00 pm

10Mb/s triple play @ €62.00 pm

3Mb/s triple play @ €47.00 pm

1Mb/s triple play @ €44.00 pm

1.2.1.4 Government & Local Authority

There are currently 28 regional fibre Metropolitan Area Networks (MANS) which were built with state subsidy which provide a very limited coverage in these regional towns and cities. This was an initiative by the Government Department in an effort to encourage broadband rollout to the regions. These MANS which are owned by the Government, are operated by a Government appointed company to offer services on a non-discriminatory basis to Wholesale operators. Backhaul or inter-MAN connections are provided by other operators

Product offering is unlit fibre or managed bandwidth services (traditional SDH and Ethernet).

1.2.2 Announced roll-out plans (e.g. by 20XX ...)

1.2.2.1 – 1.2.2.3 (see structure “actual roll-out” above)

1.3 Other issues:

The National Broadband Scheme is a Government subsidised initiative to provide broadband to rural areas which currently have no or very little broadband access. 10% of the population and 33% of geographical area of the country will be covered in the next 18 months.

Mobile operator “3” has been appointed to provide the service using their 3G network

Minimum service is 1.2Mb/s which will be upgraded to provide 1.6Mb/s by Mid-2010 and 2.3Mb/s by Mid-2012

2 Wholesale access products available

2.1 Dark fibre

Not currently required as SMP regulation under any market. Fibre unbundling is proposed in the Market 4 Draft Direction (published).

(the following sub-items apply correspondingly to the other wholesale services)

- a) Included in Market number X
- b) Regulatory obligation (main features, e.g. location of access point along the value chain)
 - b1) actual
 - b2) planned / under discussion
- c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)
- d) Availability of reference offer
- e) Current usage in practice (e.g. available since ..., still under discussion)

2.2 Duct Access

a) Implicitly included in current LLU market review (Mkt 11) as related facility. Not currently imposed as a remedy and there have been no requests for such a facility. However, ComReg has explicitly proposed this as a remedy in the Mkt 4 review, which is currently ongoing.

2.3 Unbundling / Sub-loop unbundling

a) LLU currently regulated under (old) Mkt 11. SLU is proposed as a remedy in the aforementioned (new) Mkt 4 review. LLU currently accounts for approximately 21k access paths. Details are available in the Access Reference Offer (see this link for further details). Costing is based on FL-LRIC using a bottom-up model.

2.4 Bitstream

a) Currently regulated under the (old) Mkt 12. ComReg is currently starting a review of (new) Mkt 5.

Wholesale Bitstream currently accounts for over 625k subscribers. Costing is currently based on a Retail Minus model, but as mentioned this will come under review in the next iteration of the market analysis. The Bitstream Access Reference Offer is available at this link.

2.5 In-house cabling

In-house cabling is not required under any of the current market reviews.

2.6 Backhaul

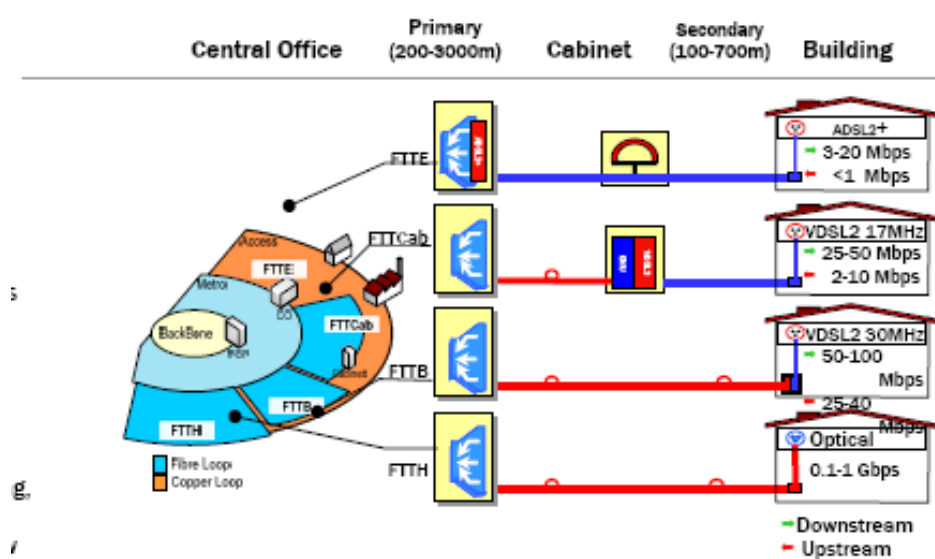
a) Included implicitly in Mkt 6 (recently completed market review), where eircom is considered to have SMP in the market for terminating segments of leased lines. (The market for trunk segments of leased lines was found to be competitive, but is narrowly defined.) Partial Private Circuits (PPCs) and Wholesale Leased Lines (WLLs) are the current mandated products. PPCs are priced using FL-LRIC, while WLLs are currently priced using a Retail Minus mechanism. However, the pricing of both products will soon undergo a further review.

Italy

Telecom Italia case study

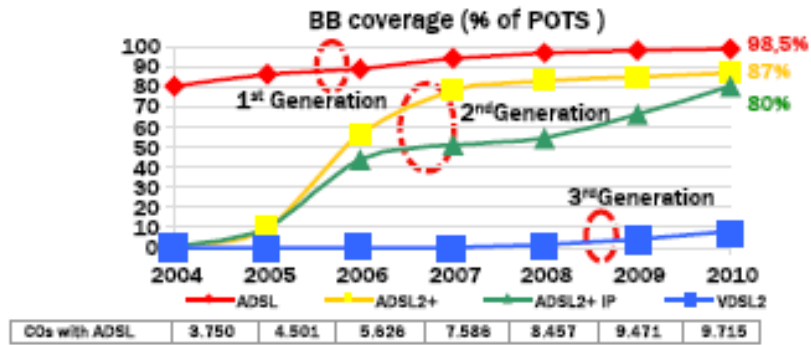
During the meeting with the financial community held on March 7th, 2008, Telecom Italia has confirmed the plan for the deployment of “All IP” NGN2 Platform.

The NGN2 Platform is based on FTTx deployment for ultra-broadband access in main metropolitan areas.

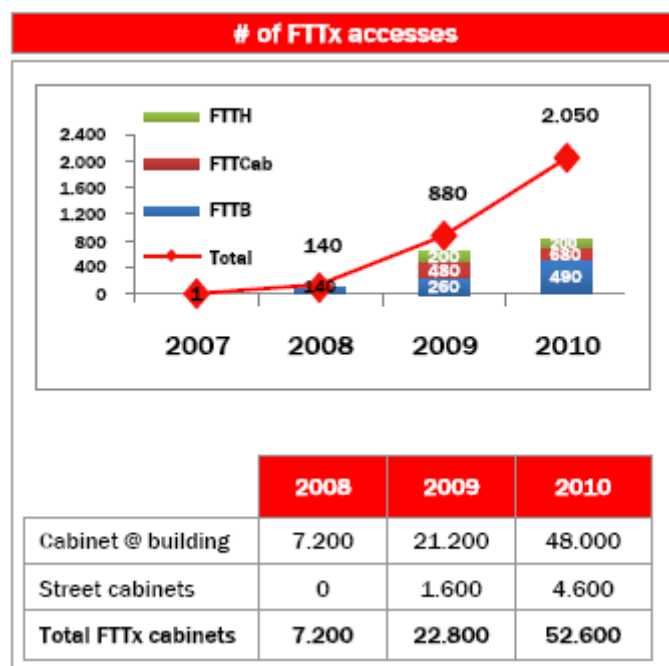


The main points of such a plan can be summarized as follows:

- Introduction of FTTB or FTTC architecture, based on G-PON technology and VDSL2 from the Cabinet to the home. The above mentioned network innovation should be carried out gradually: the coverage will pass from 0,2% in 2007 to 5% in 2009, corresponding to 20 main cities. The coverage should reach 65%, corresponding to 1140 cities, in the long term;
- Adoption of FTTH in specific cases;
- Extension of ADSL2+ IP (3-play) coverage from 51% in 2007 to 80% in 2010. The ADSL2+ coverage should reach a value close to 100% in the long term, with the introduction of about 8000 IP DSLAM;
- Implementation of a full IP network;
- Costs/Capex reduction thanks to efficiency of network (migration towards a single IP platform and reduction of the number of local exchanges).



Other Key Project Figures:



FASTWEB case study

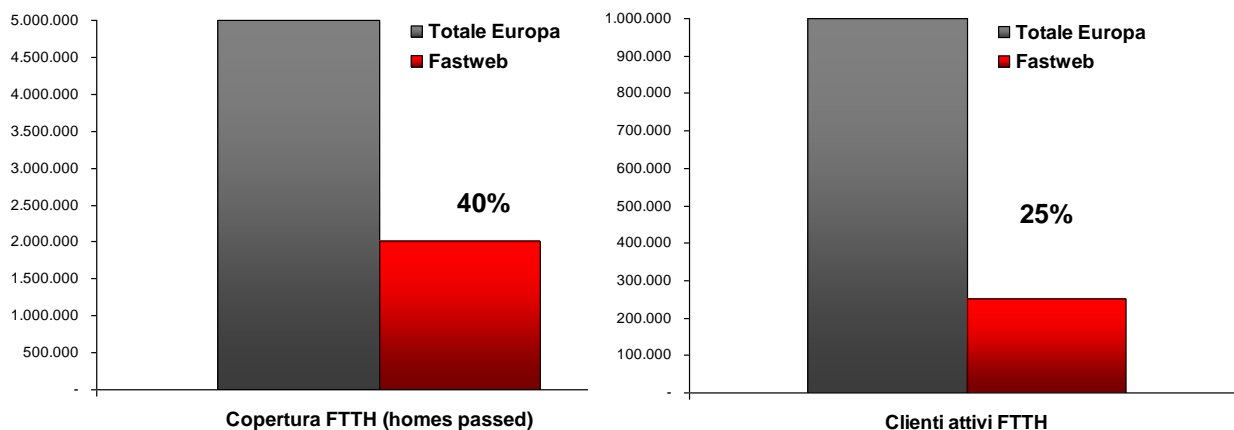
Fastweb has invested, since 2000, more than 4 Mld euro for the development of a NGA network, based on FTTH architecture, in the Italian main cities below showed.



Current coverage of the above mentioned NGA network corresponds to about 2 millions homes passed (the table below shows how such 2 million homes are distributed amongst the main cities reached by the FTTH network).

		copertura FTTH	
		potenziale collegabile [000]	[% sulla copertura FTTH]
NORD	BOLOGNA	148	7%
	GENOVA	121	6%
	MILANO	1.144	57%
	TORINO	284	14%
CENTRO	ROMA	170	9%
SUD	NAPOLI	108	5%
	BARI	25	1%
Totale Italia		2.000	

As far as FTTH network development is concerned, Fastweb investments on FTTH networks provide Italy with an important role, at European level (40% of FTTH homes passed in Europe, 25% in terms of active customers reached by the FTTH connection, see graph below).



During December 2008 FASTWEB has launched a retail access service at 100 Mbit/s, based on FTTH.

3 National next generation broadband initiatives or measures

In September 2008, the Undersecretary for Economic Development, Paolo Romani announced that the Italian Government will invest around €1 billion for the development of broadband services. Government commissioned studies have found that Speaking that the implementation of NGN will lead to an annual increase of the GDP of 1.5 to 2 percentage points. Romani said that a national NGN network would cost an estimated €10 billion, with the Government financing around 10 percent of the necessary capital as part of a public-private partnership. The Government expects that by 2013 the entire country will have the possibility of connecting to high-speed internet.

As part of the proposals the Government also announced:

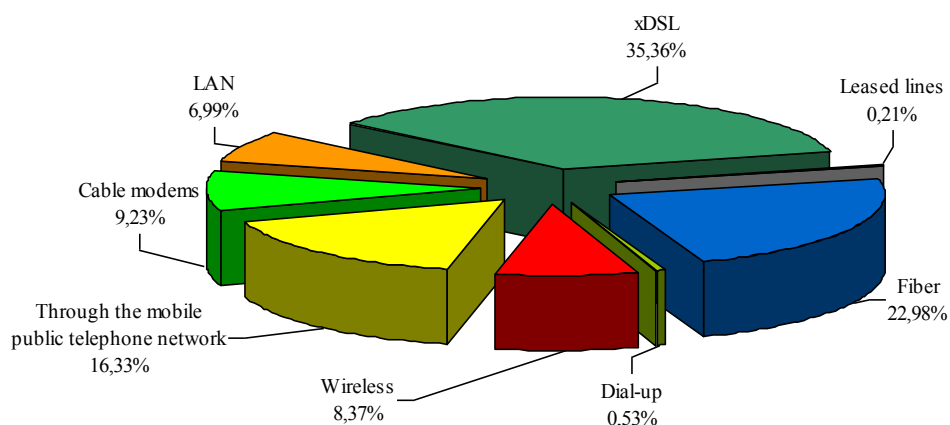
- A Several regional plans supporting investments in local projects;
- B New legislative provisions (L.133/08) aiming at simplifying the administrative regime for networks roll out (relaxation of authorisation regime; promotion of infrastructure sharing under AGCOM regulation); and
- C An institutional debate ongoing on policy tools to promote broadband development in including consideration of possible demand and supply side support and the promotion of public uses of ICT

Lithuania

1. Market developments and actual roll-out

According to Fibre Systems organization and FTTH Council Europe¹, at the end of 2008 Lithuania took 11th place out of 25 in line of FTTH penetration rates. Also in February 2009 FTTH Council Europe announced that Lithuania is one of 20 countries actively using FTTH/B technologies and that it took 15th place surpassing China, Italy, Estonia, Russia and Latvia².

Figure 1: Distribution of the number of the Internet access subscribers by the manner of connection (total number of subscribers is 709,8 thousand)



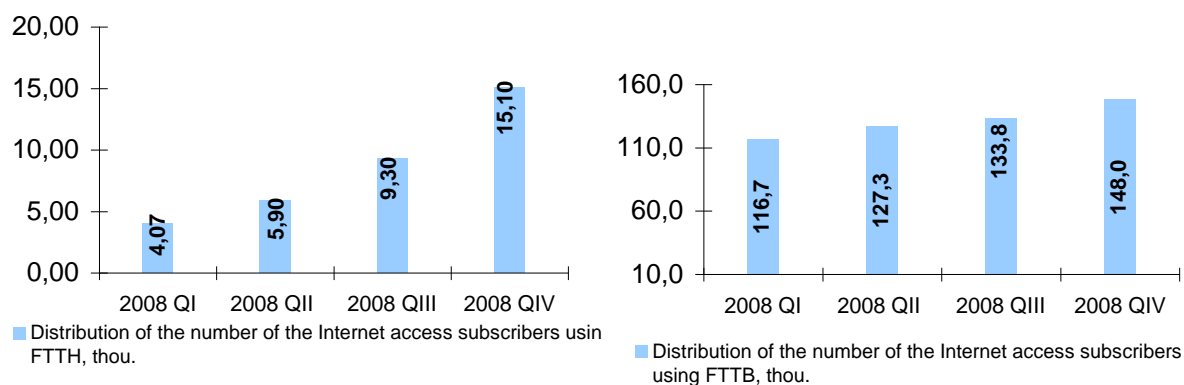
Source: RRT, 4Q 2008

In the 4Q of 2008:

- 10 companies were engaged in the activities of provision of physical optical fibre (dark fibre). The number of physical optical fibre lines, provided to others (rented), was 1,848. In comparison with previous quarter, this number increased by 13.3%. The revenues from these activities in the 4Q 2008 constituted 4.99 million LTL.
- 8 companies provided Internet access services using FTTH. Total number of subscribers of the Internet access services using FTTH is applied by 2.13% of all internet access subscribers, of which incumbent (TEO LT, AB) have 98.2% connections.
- 38 companies provided Internet access services using FTTB. 20.8% of all internet access subscribers were using FTTB, of which TEO LT, AB have 6.3 % connections.

¹ <http://fibresystems.org/cws/article/tech/37063>

² <http://fibresystems.org/cws/article/newsfeed/37790/1/image1>



Source: RRT

1.1.1.1 INCUMBENT (TEO LT, AB)

TEO LT, AB provides voice telephony, Internet services and digital TV services³ (over its IP and DVB-T networks) and has started to provide the Video-On-Demand (VOD) service to its digital TV users in 2007. As was shown above TEO LT, AB deploys both FTTB and FTTH infrastructures. Nevertheless, there have been no official announcements regarding roll-out plans so far. Thus RRT have no official information on NGA deployment projects implemented.

1.1.1.2 APPLIED TECHNOLOGY (E.G. FTTH GPON, FTTH P2P, FTTB, VDSL, CABLE)

1.1.1.3 ADSL, ADSL 2+, CABLE, FTTH (no data on particular architectures deployed), FTTB.

1.1.1.4 AVAILABLE RETAIL SERVICES (E.G. PRODUCT NAME, TYPE OF SERVICE (E.G. TRIPLE PLAY)), BANDWIDTH, PRICE LEVEL, PRICE STRUCTURE)

Services are provided both separately and in bundles. There were 94.7% of users of double play services and 5.3% of users of triple play services at the end of 2008 in Lithuania. Information about retail service price level and price structure is not available.

Table 1: Statistical information is available from ECTA Broadband scorecard (end of March 2008)

Total broadband connections retailed or resaled by incumbent or its ISP:	284,312
--	---------

³ TEO LT, AB provides the digital television services all over Lithuania by the same lines, which are used for the provision of TEO LT, AB voice telephony and Internet services. A basic package of TV programs costs 35 LTL per month.

- of which lines offering VoB:	1,779
- of which lines offering TV:	32,777
- of which >2Mbit/s:	66,990
- of which >10Mbit/s:	3,895
Total broadband connections retailed by competitive xDSL and FTTH/B operators:	12,7229
- of which lines offering VoB:	326
- of which lines offering TV:	441
- of which >2Mbit/s:	39,858
- of which >10Mbit/s:	65,219

Table 2: Distribution of the Internet access subscribers, using different connection to the Internet technologies by downstream speed, shown in table below (Incumbent + Competitors).

Internet downstream speed	Number of subscribers	Distribution of the number of the Internet access subscribers using different connection to the Internet technologies
More than 10 Mb/s	104,026	87.4% - FTTB; 8.9% - FTTH;
From 2 Mb/s to 10 Mb/s	148,629	29.9% - FTTB; 3.8% - FTTH; 29% - xDSL;
From 512 Kb/s to 2 Mb/s	181,395	4.2% - FTTB; 0.1% - FTTH; 63.7% - xDSL;
From 144 to 512 Kb/s	123,925	1.1% - FTTB; 0.02% - FTTH; 74.1% - xDSL;
Up to 144 Kb/s	35,923	10.1% - FTTB; 0.06% - FTTH; 1.3% - xDSL.

Source: RRT

1.1.1.5 COVERAGE

1.1.1.6

On 31 December 2008 the number of telephone lines, whereby the high-speed service of subscriber lines (hereinafter referred to as xDSL) is provided, totalled 250.8 thousand (36.1% of the total number of metallic twisted pair lines). During the fourth quarter it increased by 1.1%, during the year – by 8.1%. By using 99.1% of the lines TEO LT, AB provided the Internet access services to its customers and 2,217 xDSL access units were whole-sold to other Internet access service providers. Besides TEO LT, AB, 9 more providers provide xDSL services.

1.2 COMPETITORS (OTHER ELECTRONIC COMMUNICATION PROVIDERS, CABLE)

38 companies provide Internet access services using FTTB. TEO LT, AB has 6.3 % of all connections. Other companies deployed FTTB (mostly CaTV operators) are: "Dokeda" Ltd. – 19.9%, "Penkių kontinentų komunikacijų centras" Ltd. – 17.7%, "Mikrovisatos TV" Ltd. – 10.8%, "Telerena" Ltd. – 9.4%, "Viginta" Ltd. – 7.8%, "Balticum TV" Ltd. – 5.9%, "Elekta" Ltd. – 5.0%, others – less than 3%.

1.2.1.1 APPLIED TECHNOLOGY (E.G. FTTH GPON, FTTH P2P, FTTB, VDSL, CABLE)

1.2.2 ADSL, ADSL 2+, FTTH (no data on particular architecture deployed), FTTB, CABLE

1.2.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

See Table 2 above.

1.2.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

See above.

1.2.3 ANNOUNCED ROLL-OUT PLANS

There have been no official announcements regarding roll-out plans so far.

2. WHOLESALE ACCESS PRODUCTS AVAILABLE

2.1 DARK FIBRE

a) Will be included in Market number 4:

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

N/A (4 market analysis is still in process, there is no any obligations set).

b2) planned / under discussion

Possible remedies are under discussion.

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

No costing decisions so far.

d) Availability of reference offer

Reference offer is available.

e) Current usage in practice (e.g. available since ..., still under discussion).

Dark fibre access service is provided at commercial basis. Number of dark fibre networks is provided by alternative operators. The service was launched to provide at the end 2006. Comparing with 2006, in 2008 number of dark fibres rented grew 3.8 times from 489 to 1,848. At the end of 2008 dark fibre was rolled out by 10 undertakings. Analyzing the market shares in accordance with the number of Dark Fibres – at the end of 2008 the market share of Lithuanian historical incumbent was 41%, other part was shared by alternative undertakings.

2.2 DUCT ACCESS

a) Included in Market number 4

Access to ducts is included in Market 4 as a passive infrastructure.

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

Service is available under the symmetrical facility sharing obligation (Framework directive, 12 Article). Market 4 analysis is still in process, there are no additional obligations set yet.

b2) planned / under discussion

Possible remedies are under discussion.

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

No costing decision is so far taken under Market 4 analysis. Under the symmetrical facility sharing obligation all persons are obliged to provide access to its infrastructure (that could be used in order to construct electronic communications network) at cost oriented prices (cost orientation is not further elaborated).

d) Availability of reference offer

Reference offer (from TEO LT, AB) is available since 2004. Other operators do not publish RO.

e) Current usage in practice (e.g. available since ..., still under discussion)

Service is in use since 2004 under symmetrical facility sharing obligation (Framework directive, 12 Article). Service is widely used by various service providers. Significant number of ducts was rented. RRT received few disputes and complains relating to incumbent's abuse of its dominant position while providing access to its ducts. RRT will examine those cases during the Market 4 analysis.

2.3 UNBUNDLING / SUB-LOOP UNBUNDLING

a) Included in Market number 4.

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

Obligations (on Market 11): to provide access; non-discrimination; transparency; Price control and cost accounting (according to Fully Distributed Costs (FDC) methodology); Accounting separation.

b2) planned / under discussion

Possible remedies are under discussion.

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

Price control and cost accounting (according to Fully Distributed Costs (FDC) methodology).

d) Availability of reference offer

Reference offer (RO) is available.

e) Current usage in practice (e.g. available since ..., still under discussion)

Service is available since 2003. Comparing with 2006, in 2008 number of unbundled lines grew for 6.5% (at 2006 the number of unbundled access was 292, at 2008 – 478). Service is not popular and very rarely used.

2.4 BITSTREAM

a) Included in Market number X

Included in Market 5.

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

Obligations (on Market 12): N/A due to the Case lost (in the Supreme Administrative Court of Lithuania).

b2) planned / under discussion

Possible remedies are under discussion.

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

Obligations (on Market 12): N/A due to the Case lost (in the Supreme Administrative Court of Lithuania).

d) Availability of reference offer

Reference offer available.

e) Current usage in practice (e.g. available since ..., still under discussion)

Service is available since 2004.

2.5 IN-HOUSE CABLING

a) Included in Market number X

Not considered yet.

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

Service is available under the symmetrical facility sharing obligation (Framework directive, 12 Article). Market 4 analysis is still in process, there are no additional obligations set yet.

b2) planned / under discussion

Possible remedies are under discussion.

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

No costing decision is so far taken under Market 4 analysis. Under the symmetrical facility sharing obligation all persons are obliged to provide access to its infrastructure (that could be used in order to construct electronic communications network) at cost oriented prices (cost orientation is not further elaborated).

d) Availability of reference offer

Reference offer not available.

e) Current usage in practice (e.g. available since ..., still under discussion)

No data.

2.6BACKHAUL

a) Included in Market number X

Included in Market 6 (terminating segments).

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

Obligation to provide access;

Obligation of non-discrimination;

Obligation of transparency;

Price control and cost accounting;

Account separation.

b2) planned / under discussion

Access to Ethernet links.

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

Price control and cost accounting (according to Fully Distributed Cost (FDC) methodology).

d) Availability of reference offer

Reference offer available.

e) Current usage in practice (e.g. available since ..., still under discussion)

There is no data.

Netherlands

1. Market developments

Market overview

High Network Density:

- Cable networks cover 94% of households
- Incumbent network KPN covers 99% of households
- Networks alternative DSL operators cover 50-70% of households, based on LLU
- Over 40 local FttH/FttB initiatives (1-2% of households) High Broadband Penetration:
- 5,7 million broadband connections (Q2 2008), 78% of households
- 60% DSL (10% non-KPN), 38% Cable, 2% other
- Among the leaders of the world (EU Implementation Report, OECD)

KPN (incumbent): NGA roll-out (1)

Applied NGA-Technologies for KPN's "All-IP" network:

- FttH P2P (note: 2 fibres per home: separate fibres for IP-based digital services and analogue television)
- FttC / VDSL2

Retail offers:

- FttH:
 - Several triple play offers (including analogue TV)
 - Broadband speeds vary from 30/3 to 60/6 Mbps
 - Price-range: € 65-110
- FttC:
 - Will most likely be multiplay-offers including IPTV
 - No public retail-offer available yet

KPN (incumbent): NGA roll-out (2)

- Current coverage
 - KPN's copper network covers ~ 99% of the households (ADSL2+ coverage max. 50-60% of households)
 - VDSL2-coverage: until recently limited number to pilot-areas
 - FttH-coverage by KPN (2008): less than 1% of households
- Planned coverage
 - 2009: roll-out will focus primarily on 5 FttH-areas and 5 VDSL2-areas. Planning includes upscaling to 12 FttH-areas en 21 VDSL2-areas (up to around 700.000 homes passed)
 - FttH-passive infrastructure is to be built by a KPNReggefiber joint venture
 - Decisions by KPN on future (large scale) roll-out plans will be dependent on KPN's evaluation of its 2009 NGA-rollouts

Cable: current roll-out

- Applied Technologies:
 - EuroDocsis for IP-based services (mostly Euro-Docsis 2.0, migration to 3.0 in its early stages)
 - DVB-C and Analogue transmission for TV-services
- Retail offers:
 - All offers include at least television services (around € 16 per month)
 - Triple play offers starting at around € 40
 - High speed broadband access (60-120 Mbps) available since Q4-2008 in a limited coverage area; price range for this so-called "Fiber-power" broadband offer: € 60-80
- Total coverage of all cable operators together around 94%
- Consolidation of the market: two largest cable operators (UPC, Ziggo) cover around 70% of the consumer market

Cable: future plans

- Applied technology:
 - Upgrade from EuroDocsis 2.0 to 3.0 will be deployed on much larger scale in 2009
- Retail offers with high download speeds will become more widely available. Details on future offers not available
- No changes in coverage-area to be expected. Cableoperators will upgrade bandwidths of their current hybrid-fibre coaxial network by rolling out EuroDocsis 3 equipment.

Local fibre initiatives

- Over 40 local FttH initiatives (Telecompaper 2008)
- 170.000 homes connected/passed, but only 70.000 activated
- Homes passed (plan) 600.000 end 2011
- Initiatives involving housing corporations, municipalities, but also 100% commercial
- Increasing involvement of a single party (Reggefiber) in local initiatives:
 - Acquisition by Reggefiber of local FttH-networks that were initially independent (e.g. Nu-
enen)
 - Participating in or even control of new initiatives
- Increasing focus of incumbent on FttH as part of All-IP plans

II. Wholesale access products

Wholesale products: Dark fibre

- Dark fibre as such is considered not to be part of any market.
- However fibre that is part of (star-based) access networks is not considered to be dark fibre
- Physical unbundling of fibre-based access-networks is included in market 4 (see also “Unbundling”)

Duct access

- Common obligations with regard to duct sharing are already in place (article 5.12 of the Telecommunications Act).
- Although this duct-regulation is being used for links in backbone and core-networks, it is not used for access networks. The reason is that traditionally cabling in Dutch access networks is laid directly in the ground instead of using ducts
- Therefore it is logical that there is no demand by market parties for duct access with regard to access networks

Wholesale products: Unbundling / SLU (1)

- Physical unbundling of access networks (both copper and fibre) is included in market 4
- The regulatory obligations apply to the following products (regulatory period 2009-2011):
 - Unbundling of copper lines (both fully unbundled as well as line sharing) with access at MDF-level
 - Sub-loop unbundling (both fully unbundled as well as line sharing) with access at SDF-level
 - Physical unbundling of fibre loops (both FttH and FttO) with access at the ODF

Wholesale products: Unbundling / SLU (2)

- Tariff-regulation:
 - LLU/SLU/FttO: embedded direct cost (EDC)based
 - FttH: specific tariff policy rules including price cap
- Reference offer
 - LLU/SLU: Currently available (updated 2009-version under development)
 - Fibre-unbundling: under development
- Usage:
 - LLU: since 2001
 - SLU: since 2007 (mainly pilots)
 - Fibre-unbundling: under development

Wholesale products: Bitstream (1)

- Wholesale broadband access (WBA) including bitstream is regulated under market 5.
- The regulatory obligations apply to the following products (regulatory period 2009-2011):
 - Fibre-based WBA high quality (overbooking 1:20 and better): will be mainly used in the business market
 - WBA over copper: both high quality and low quality (overbooking ratio less than 1:20)
 - Remedies apply to access at regional level or metro level where available

Wholesale products: Bitstream (2)

- Tariff-regulation:
 - WBA High quality: embedded direct cost (EDC) based
 - WBA Low quality over copper: no tariff regulation
- Reference offer
 - under development (during regulatory period 2006-2008 only “light-touch” regulation applied to only WBA high quality over copper)
- Usage:
 - since 2002
 - WBA is mainly used in addition to LLU in areas where the other operator has no physical access

Wholesale products: Backhaul

- MDF-backhaul and ODF-backhaul (partly; backbone side) are included in market 6 (as part of trunkmarket: competitive, no regulation)
- SDF-backhaul and the lower part of the ODFbackhaul are considered to be ancillary facilities to physical unbundling and are included in market 4 (see unbundling for tariff regulation). Reference offer / usage: under discussion.

Norway

1. Market developments

1.1 Incumbent

1.1.1 Actual roll-out

The Norwegian incumbent (Telenor) has started offering fibre accesses, but so far the actual roll-out is still in an early phase. The fully owned subsidiary CanalDigital is offering CATV-broadband access.

1.1.1.1 Applied technology (e.g. FTTH GPON, FTTH P2P, FTTB, VDSL, Cable)

FTTH GPON, Cable

1.1.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

FTTH GPON

- "Broadband Medium"; Internet connection, 8 Mb/s download/5 Mb/s upload, price: NOK 399/month (~ EUR 42/month)
- "Broadband Premium"; Internet connection, 25 Mb/s download/10 Mb/s upload, price: NOK 499/month (~ EUR 53/month)
- "Broadband Max"; Internet connection, 50 Mb/s download/10 Mb/s upload, price: NOK 1390/month (~ EUR 146/month)

Cable

- "Mini"; Internet connection, 0,9 Mb/s download/0,9 Mb/s upload, price: NOK 197/month (~EUR 21/month)
- "Midi"; Internet connection, 5 Mb/s download/0,9 Mb/s upload, price: NOK 347/month (~EUR 37/month)
- "Maxi"; Internet connection, 10 Mb/s download/1,8 Mb/s upload, price: NOK 447/month (~EUR 47/month)

- “Mega”; Internet connection, 20 Mb/s download/1,8 Mb/s upload, price: NOK 547/month (~EUR 58/month)

1.1.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

No data yet available concerning Telenor’s fibre rollout. CanalDigital has approximately 130 000 broadband customers, but no data on coverage.

1.1.2 Announced roll-out plans (e.g. by 20XX ...)

The incumbent aims to be a market leader on fibre accesses by the end of 2010.

1.1.2.1 -1.1.2.3 (see structure “actual roll-out” above)

1.2 Competitors (other telcos, cable)

1.2.1 Actual roll-out

There are several operators in Norway rolling out NGAs, but the two mentioned below are the biggest competitors to the incumbent.

1.2.1.1.Name of company and applied technology, applied wholesale service (e.g. ULL) or own infrastructure

- Lyse Tele and their 33 partners; applied technology: FTTH P2P. Own infrastructure.
- Get; applied technology: Cable. Own infrastructure.

1.2.1.2 Available retail services (e.g.product name, type of service (e.g triple play), bandwidth, price level, price structure)

Lyse Tele and partners

- “Altibox Family”: Triple play, 10 Mb/s download/10 Mb/s upload, price: NOK 838/month (~EUR 88/month)
- “Altibox Express”: Triple play, 30 Mb/s download/30 Mb/s upload, price: NOK 1088/month (~EUR 115/month)

- “Altibox Super”: Triple play, 50 Mb/s download/50 Mb/s upload, price: NOK 1899/month (~EUR 200/month)

Get

- “Get trippel L”: Triple play, 7 Mb/s download/2 Mb/s upload, price: NOK 768/month (~EUR 81/month)
- “Get trippel XL”: Triple play, 17,5 Mb/s download/2 Mb/s upload, price: NOK 868/month (~EUR 92/month)
- “Get trippel Extreme”: Triple play, 26 Mb/s download/2 Mb/s upload, price: NOK 1088/month (~EUR 115/month)

1.2.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

No data available concerning coverage. Lyse Tele and partners has slightly above 100 000 customers (FTTH P2P), while Get has approximately 115 000 broadband customers (Cable)

1.2.2 Announced roll-out plans (e.g. by 20XX ...)

1.2.2.1 – 1.2.2.3 (see structure “actual roll-out” above)

No data available.

2 Wholesale access products available

2.1 Dark fibre

(the following sub-items apply correspondingly to the other wholesale services)

a) Included in Market number 14

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual: access obligation, non-discrimination, reference offer, accounting separation

b2) planned / under discussion

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues) No price regulation

d) Availability of reference offer: Yes

e) Current usage in practice (e.g. available since ..., still under discussion)

2.2 Duct Access

a) Included in market 4 (former market 11)

b1) access obligation, price regulation, non-discrimination, reference offer, cost accounting obligation

c) Cost orientation

d) Yes

e)

2.3 Unbundling / Sub-loop unbundling

a) Included in Market 4 (former market 11)

b1) access obligation, price control and cost accounting obligation, non-discrimination, reference offer

c) Price-cap, based on historical costs

d) Yes

e) 2000

2.4 Bitstream

a) Included in Market 5 (former market 12)

b1) access obligation, non-discrimination, reference offer, accounting separation

c) No price regulation

d) Yes

e) 2000-2001

2.5 In-house cabling

Not included in any markets.

2.6 Backhaul

a) Included in markets 13 and 14 (in Norway, the demarcation between these two markets is based on capacity; market 13 = capacities up to and including 8 Mb/s, market 14 = capacities above 8 Mb/s + dark fibre)

b1) Market 13: access obligation, price control and cost accounting obligation, non-discrimination, reference offer, accounting separation. Market 14: access obligation, non-discrimination, reference offer, accounting separation

c) Market 13: Cost orientation, based on historical costs. Market 14: No price regulation.

2.7 Other

3 National next generation broadband initiatives or measures

No national next generation broadband initiatives or measures have been decided in Norway.

Poland

1 Market developments

1.1. Incumbent

1.1.1 Actual roll-out

It is expected that the Polish incumbent, Telekomunikacja Polska [further referred to as TP] is to start the process of migration of its network towards NGN, following the example of other operators. In a most optimistic scenario, after development of NGN, each household would have direct access to optical fiber. Network of this kind can reach the capacity for end user of even 100 Mb/s. TP has already got ready to build the network. A pilot project is being carried out in Warsaw, probably next ones will soon follow in other cities. Initial evaluation has showed that the estimated value of necessary capital investment related to the above mentioned migration with regard to domestic operators of wire networks would range from ca PLN 18.3 billion to ca PLN 25.7 billion. The analysis of cost proved that the biggest share of capital will be needed for investment related to modernization of access networks, as ca 80% of estimated costs is related to the modernization of this element of operators' network.

However, according to information transmitted by TP, specific actions aiming at building networks of XXI century will be undertaken only after the amendments to the Polish law, so that the return on investment be guaranteed for the operator.

1.1.1.1 Applied technology (e.g. FTTH GPON, FTTH P2P, FTTB, VDSL, Cable)

Applied technology will be provided with a short period after we get demanded information from TP.

1.1.1.2. Available retail services (e.g product name, type of service (e.g triple play), bandwidth, price level, price structure)

We don't have information about available retail services based on NGN infrastructure, but we provide you information about number of subscribers of double and triple play in Poland.

	DOUBLE PLAY (number of subscribers)						
	Fixed telephony and			Cable TV access and broadband access	Mobile telephony and		Number of subscribers of double play service (total)
	Broadband access	Cable TV access	Mobile telephony		Broadband access	Cable TV access	
Incumbent	84	0	0	0	0	0	84
Alternative operators	150 509	14 415	0	146 127	7 037	0	318 088
Cable operators	4 764	9 045	0	86 846	1	0	100 656

	TRIPLE PLAY (number of subscribers)				
	Fixed telephony and			Mobile telephony/ Broadband access/cable TV access	Number of subscribers of Triple Play service (total)
	Broadband access/cable TV access	Mobile telephony/Broadband access	Cable TV access/Mobile telephony		
Incumbent	52 878	0	0	0	52 878
Alternative operators	63 977	0	0	0	63 977
Cable operators	47 963	1	1	2	47 67

1.2 Competitors (other telcos, cable)

1.2.1 Actual roll-out

Alternative operators and cable operators also make plans for rolling out next generation network. In order to complement and broaden its offer for business customers the Netia Company (further referred to as Netia) introduced in 2006 a Next Generation type of service under the name of IntegralNet. IntegralNet is a communications platform ensuring the provision of integrated services known so far for their modern subscribers' exchanges and for separately performed IT applications. The service was intended for users with IP access through Access network of Netia or [through the network of] any other operator providing Internet access services. In IntegralNet service users of phones are not bound to specific geographical location. When using IP protocol and Internet Access, the employee of the company may benefit from

the access to IntegralNet resources at any location. Subscribers' terminals (IP telephones) or ab adapters (IAD – VoIP gates) are connected in internal LAN network of costumer. The number of connected terminals which have status of IntegralNet users depends on the purchased package of telephones numbers which are in conformity with National Numbering Plan. The IntegralNet platform offers several new functions facilitating the administration of one's own part of subscribers. The administrator of virtual Exchange IntegralNet, i.e. costumer of Netia, is able to shape the communications in his/her company in a very easy way by means of Internet interface, for example: to attribute names to subscribers, to restrict the possibility to dial certain numbers, to activate new services for internal numbers, for example voicemail. By using Internet engine it is possible in a fast and simple manner to access the company's resources (for example telephone directory of the system). Messaging, i.e. a function integrating both electronic mail and the possibility to use contacts from one's own address book enables full and unlimited access to information

In 2005 the Company Telefonía Dialog S.A. [further referred to as Telefonía Dialog] decided to use Cisco Internet Protocol Next Generation Network (IP NGN) technology to build its own multiservice backbone network. The Next Generation backbone network based on Cisco routers enables the provision of new multimedia services triple play (video, voice, data) as well as provision of IP communications services to 450 000 residential and business subscribers in Poland.

According to Telefonía Dialog' strategy for the years 2009 – 2015 the operator plans to replace its existing network by PON – Passive Optical Network, which supplies to the socket of each subscriber a separate optical fiber. Thanks to PON subscribers of Telefonía Dialog will enjoy the highest quality with very high parameters of transmission, the possibility to use the most advanced HDTV, VoD services, interactive games or videoconferences. Telefonía Dialog has already carried out a comprehensive test of PON. Optical network has been installed in one of housing estate In Lublin (a city In the eastern part of Poland) and covers up to 5000 of subscribers. Optical fiber is conducted to nodes located in `stairwells and in the nearest future will be supplied to individual subscribers. A dozen of costumers have already tested successfully a TV offer of Dialog in this system. The company decided to use FTTH (Fiber to the Home) solution which consists in supplying optical fiber to the very premises of customer. The new optical network will enable to carry out integrated Triple Play services. The investment capital defined in the strategy for the development of the network amounts to PLN 420 million. Most of investment works has been planned for the years 2009 – 2012.

Moreover, the most recent information indicates that also the INEA Company – a TV cable operator, plans to start in 2009 building of NGN, widening the range of services provided by including an offer addressed to business and corporate costumers and implementing on demand service. In addition to that the Company, undertakes important investments in backbone networks connecting different locations in the region of Wielkopolska.

1.2.1.1 Name of company and applied technology, applied wholesale service (e.g. ULL) or own infrastructure

Some detailed information of applied technology are given at point 1.2.1

1.2.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

We don't have information about available retail services based on NGN infrastructure, but we provide you information about number of subscribers of double and triple play in Poland at point 1.1.1.2

2 Wholesale access products available

2.1 Dark fibre

a) Included in Market number X - NO

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual - NONE

b2) planned / under discussion

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues) – UNDER DISCUSSION

d) Availability of reference offer – PLANNED

e) Current usage in practice (e.g. available since ..., still under discussion) - NO

The same answers concern other wholesale access products (duct access, unbundling/sub-loop unbundling, bitstream, in-house cabling, backhaul).

3 National next generation broadband initiatives or measures

On 12 March the Minister of Infrastructure signed an ordinance amending the Ordinance on technical conditions for buildings and their location. The Ordinance, in addition to location and detailed technical conditions for buildings, also regulates the principles for telecommunications installations in buildings. The most important change introduced under this Ordinance is the obligation for an investor to equip the building with telecommunications installation covering the whole distance from connection to the public telecommunications network to end user's

premises. Until now it was not necessary for the building to be equipped with telecommunications installation, but only to be adapted for this purpose.

Portugal

1) Market developments

The evolution in the access network is starting on the first steps¹, especially with regard to the offer of IP-TV services² and recent developments involving fibre deployments. With respect to the traditional copper network of the incumbent operator, different xDSL technologies have been used on the copper access network.

In Portugal, broadband access infrastructure and the main retail offers of broadband, voice and IP-TV are supported on the current architectures of (CATV and) copper network, with the use of ADSL(2+) from MDFs and with a potential coverage for nearly 100% of the lines. Up until now, VDSL was not deployed in Portugal and no VDSL deployment plans have been announced so far.

The Portuguese electronic communications markets, in particular the broadband market, is being positively affected by the spin-off of the incumbent's former cable subsidiary (now ZON Multimédia), which has brought more infrastructure competition to the market³. On the other hand, during some quarters of 2007 and 2008, the alternative operators' share of new broadband costumers topped 50%; also, alternative operators launched (fibre based) offers of 30 Mbps up to 100 Mbps, independently of the spin-off.

The number of wireline and wireless broadband subscribers is increasing, totalling currently about 1.6 million fixed broadband subscribers (PSTN and cable) and around 2.13 million users with mobile broadband Internet access in Portugal as at the end of the 3rd quarter of 2008⁴. In the same quarter, the penetration rate of broadband Internet access reached 15.1% of the inhabitants for fixed access and 19.8% of the inhabitants for mobile access.

Regulatory and policy developments

ANACOM has started the second round of market reviews and, in January 2009, approved the final decision on the analysis of markets for physical network infrastructure access and wholesale broadband access (markets 4 and 5 of the Commission Recommendation), introducing geographic segmentation in market 5 and fibre loops within market 4 (possible future access

1 Although several operators – copper network, cable and mobile – have already developed switching and transport (core) networks based on IP protocol, either replacing or complementing the PSTN network.

2 For instance, in the Lisbon, Alentejo and Algarve regions one in ten subscription TV subscribers already use IP based services.

3 In addition, increasing competition in the TV distribution market has become an important driver for a more competitive landscape in the Portuguese electronic communications markets. In 3Q08, Portugal Telecom increased its share in the subscription television service (with its IP-TV service, “meo”), coming close to 10 per cent.

4 See ANACOM statistics in: <http://www.anacom.pt/render.jsp?categoryId=277786&languageId=1>.

obligations)⁵. These two markets are the most affected by the above-mentioned spin-off of the incumbent's cable subsidiary.

The public debate about NGA networks has already started, also with a more active role from ANACOM. The NRA has launched in June 2008 a public consultation on the regulatory approach to next generation access networks (NGA)⁶.

The NGA consultation intended to launch the discussion and gather contributions from all parties, with the aim to formulate an appropriate, transparent and consistent regulatory approach to NGA and identify possible adaptations in the regulation of current wholesale products in the light of the expected evolution in access networks. The forthcoming publication of the correspondent report and guidance is expected to further contribute to enhance regulatory certainty.

NGA developments

In Portugal, a higher level of competition, government broadband goals, and an effective duct-sharing policy have helped set off NGA deployments.

In January 2009, the Government announced an agreement between the major operators (Portugal Telecom - PT, ZON Multimedia, Sonaecom and ONI⁷) on the roll-out of fibre networks⁸, aiming the connection of 1.5 million homes and businesses to the new fibre networks. The Government will also work to promote broadband and develop new services for business and social improvements.

The government has no preference regarding how the networks are implemented, leaving to the operators that decision on whether single or multiple networks are constructed. The Portuguese government had set a goal of 50% home broadband penetration by 2010, and this agreement and future investment should allow the operators to reach this target.

On the other hand, fibre is already on the way, especially in urban areas of major cities, stimulated by competition between the historic operator and cable operators and also by the beginning of fibre deployments of alternative (fixed and cable) operators.

Offers of up to 100 Mbps have been launched in the market, following FTTH deployments in limited areas by some alternative operators and the recent upgrade of the main cable operator's network. There are two commercial triple-play offers fully supported in fibre by alternative

5 See <http://www.anacom.pt/render.jsp?contentId=814541>. See also the draft consultation document (in English) in <http://www.anacom.pt/render.jsp?contentId=611898> and the Commission press release in <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/09/36&format=HTML&aged=0&language=EN>.

6 Consultation available (in English) in:

http://www.anacom.pt/streaming/nga_determination18062008.pdf?contentId=598607&field=ATTACHED_FILE.

7 Vodafone, one of the main alternative operators in the broadband market has not signed the agreement but may do so in the future, having requested more time to conduct further market studies.

8 The government has also announced an 800 million Euro credit line for the roll-out of the networks, hoping the country's main operators would invest 1.000 million Euro to build NGNs during 2009.

operators (one cable competitor and the main fixed competitor). Most operators, including the incumbent, are planning to invest in NGA in the short to medium term.

1.1.Incumbent

PT has embarked on some evolution on the network access, with a greater dissemination of new access nodes – “remote network points”, a FTTCab/FTTN solution with ADSL2+ DSLAMs⁹ – and the “remotization” of loops from the local exchanges¹⁰. According to PT, few access areas (MDFs and copper loops) are affected by these migration plans.

Moreover, PT has initiated tests regarding FTTH in specific zones (dedicated city centres). This could suggest a mixed architecture strategy for the incumbent. However, no NGA deployment plan has been published so far.

1.1.1.Actual roll-out

The incumbent is currently expanding, in a very small scale, its broadband network through FTTCab solutions (with ADSL2+) and FTTx pilot(s).

1.1.1.1Applied technology (e.g. FTTH GPON, FTTH P2P, FTTB, VDSL, Cable)

FTTCab with ADSL2+ and FTTH GPON pilot(s).

1.1.1.2.Available retail services (e.g. product name, type of service (e.g triple play), bandwidth, price level, price structure).

Triple-play offer (currently based on ADSL2+), *meo*¹¹:

6) Installation and activation – €100,00 (free for early adopters);

7) Monthly fees

- TV+NET16+VOZ: 16M + telephony (free calls to fixed networks) + 45 (+2 packs) TV Channels – €49,54;
- TV+NET6+VOZ: 6M + telephony (free calls to PT at night) + 45 (+2 packs) TV Channels – €44,9;

⁹ Although this has been viewed by some operators as part of a VDSL preparation.

¹⁰ This problem could be aggravated in the case of PTC, intending to introduce advanced xDSL technologies (e.g. VDSL2) across the territory, install or upgrade hundreds or even thousand street (or building) cabinets, i.e., dislocating the first aggregation node closer to the final user. In these conditions, it may be not feasible for the operators to offer similar coverage, i.e., be co-located in all the access points/cabinets.

¹¹ In Portuguese: <http://www.meo.pt/Meo/QuantoCusta/Pages/ServicosPacotes.aspx>.

- There are other dual-play offers, TV + telephony and Internet + TV (from €44,9 for 16M);
- Set-top box – €4,96 (for the 1st, €2,48 for the 2nd).

1.1.1.3. Coverage (e.g. 25% homes passed, number of actual access lines)

No detailed information available, but the current number of optical and hybrid (copper/fibre) loops is reduced face to the universe of loops: inferior to 5% in total.

1.1.2 Announced roll-out plans (e.g. by 20XX ...)

According to PT, its access network¹² will evolve to be "future proof", with strong optical-fibre dissemination, foreseeing that in the medium-long period will be constituted by 50% fibre and 50% copper.

Thus, according to PT, a restructuring of the architecture of the access networks will occur, with the gradual disappearance of the TDM and SDH access and with the adoption of new multi-service units (new generation DSLAM and/or MSAN) and the introduction of FTTx (GPON) solutions, with a predominance of Ethernet and IP/MPLS technologies and with a centralized control. Hence, the gradual use of fibre optic in the access will be extended to the house (or building) of the customers, when, in the future, the requested (symmetrical¹³) bandwidth could not be satisfied with xDSL.

Until January, PT has not announced FTTH plans, but has told IDATE and other consulting firms that it expects to pass 1 million households by 2009.

Under the above-mentioned (government backed) plan, the operators (including the incumbent) have agreed to roll out fibre networks to 1.5 million homes this year.

1.1.2.1 Applied technology (e.g. FTTH GPON, FTTH P2P, FTTB, VDSL, Cable)

As mentioned above, PT preferred FTTH GPON technologies. However, FTTB solutions should not be discarded, mainly for the older buildings (pre-ITED¹⁴), where it maybe more complex to install fibre optic cables and free copper pairs are available.

12 Currently, PT's access network is constituted by 90% copper and 10% fibre, where it exists: i) Predominance of the copper for residential access; ii) Low levels of optic access and wireless use; iii) Several units for specialized services (MUX for voice PSTN and for TDM data, DSLAM, VoIP and IP Data); iv) ATM aggregation.

13 PT also mentioned that the average traffic for customer has increased, derived from the increased number and requirements of applications and services used by the consumers and that there is also a bigger pressure on the upstream traffic (for P2P, backup, etc.), foreseeing in the future a more symmetrical use of the networks and with multiple applications and users in simultaneous in each site/home.

14 Regulation of the installation of telecommunications infrastructure in buildings and their connection to public networks is governed by the ITED regime (which came in force in 2004).

1.1.2.2 Available retail services (e.g. product name, type of service (e.g triple play), bandwidth, price level, price structure)

No information is available. In principle, for triple-play offers (including broadband at 100 Mbps).

1.1.2.3 Coverage (e.g. 25% homes passed, number of actual access lines)

PT has not yet announced specific FTTH plans, but has told consulting firms that it expected to pass 1 million households by 2009.

The operators (including PT) have agreed to roll out fibre networks to pass 1.5 million homes and businesses in 2009, which corresponds to around 1/3 of total premises (including secondary premises, e.g., vacation/weekend houses) and around 50% of principal homes passed.

1.2 Competitors (other telcos, cable)

1.2.1 Actual roll-out

The main cable operator, ZON¹⁵, is upgrading its network to start offering 100 Mbps access in selected areas (first accesses planned for end of 2008).

Two regional cable-TV operators recently acquired by ZON have passed more than 100,000 homes with FTTH, one being TVTEL¹⁶, a cable-television operator that launched Portugal's first FTTH networks, although in a restricted area¹⁷.

Sonaecom, a leading alternative operator¹⁸, began deploying FTTH networks early 2008. There is already an offer of broadband access at up to 100 Mbit/s, VoIP services, and IPTV (which it has already launched on its existing DSL network).

Onitelecom provides voice, data, broadband internet and managed services in the corporate and the wholesale markets and owns an extensive fibre optic network, including direct fibre access. The core network of Onitelecom is already a full-NGN.

¹⁵ ZON alone has around 3 million homes passed with a hybrid fibre/coax (HFC) network and circa 1 million TV subscribers in Portugal's major cities. These networks have been upgraded to deliver broadband services (with speeds up to 30 Mbps, currently). In rural areas, it serves another 500,000 subscribers with satellite.

¹⁶ A regional cable operator, focused on HFC networks in Porto, that passed more than 200,000 homes, and which runs a satellite operation.

¹⁷ In the municipality of Oeiras, on the outskirts of Lisbon.

¹⁸ Alternative operator in direct broadband access, with over 15 percent market share; currently has about 800,000 wholesale and retail wireline customers and about 300,000 DSL/ULL customers.

1.2.1.1. Name of company and applied technology, applied wholesale service (e.g. ULL) or own infrastructure

TVTEL has implemented GEPON technology for FTTH to offer a bundled service package of high-speed data, voice, and both analog and digital QAM television to its subscribers¹⁹. It is building its own infrastructure.

Sonaecom is also (planning) using GPON technology and it is building its own infrastructure.

ZON currently installs DOCSIS 3.0 technology and, in the short term, is favouring FTTLA (Fibre to the Last Amplifier), extending fibre through the primary cable network and removing (cable) amplifiers, using its infrastructure.

1.2.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

TVTEL Internet access offer (over fibre)²⁰:

- Activation (installation) – €75,00;
- Monthly fees
 - JETSONIC 30M/3M, with 50 GB traffic limit, 10 e-mails, etc. – €29,75;
 - JETSONIC 60M/5M, with 120 GB traffic limit, 10 e-mails, etc. – €50,00;
 - Modem – €2;
 - 50 TV channels – €20,5;
 - Telephony – €5,95 or €9,95 (free calls to fixed networks).

Sonaecom²¹:

- Activation (installation) – €100,00 (free for early adopters);
- Monthly fees
 - Pack L: 30M/3M + telephony + 20 (free) TV Channels – €39,9;
 - Pack XL: 50M/5M + telephony (free calls at night) + 80 TV Channels – €49,9;
 - Pack XXL: 100M/10M + telephony (free calls to fixed networks) + 100 TV Channels – €64,9;
 - There are other dual play (fibre) offers, TV + telephony and Internet + Telephony (from €29,9 for 30M/3M).

¹⁹ See <http://investorrelations.utstar.com/ReleaseDetail.cfm?releaseid=249950>.

²⁰ In Portuguese: http://www.tvtel.pt/fibra_internet.html.

²¹ Clix (retail brand of Sonaecom), in Portuguese: http://fibra.clix.pt/packs_fibra.html.

1.2.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

At the end of July 2008, TVTEL had passed 100,000 households.

Several FTTH pilots are in place, but covering few thousand homes. No detailed information is available.

1.2.2 Announced roll-out plans (e.g. by 20XX ...)

In February 2008, Sonaecom has announced a €240 million investment focusing on the deployment of FTTH in the next three years. The objective is to reach 1 million homes passed (roughly 25% of Portugal's population of around 10.6 million). The operator, which plans to spread the capital expenditure equally across the three years of investment, believes it can reach breakeven from its FTTH operations within five years and cover the cost of its investment in nine. Sonaecom plans this network to be an open access network.

ZON aims at deploying FTTH infrastructure by 2010. It announced investment outlays of €140 - 180 million for the next 3 years (2008-2010) regarding DOCSIS 3.0 covering 3.1 million houses.

TVTEL has announced a €7 million investment in fibre deployment in the Lisbon Metropolitan area. TVTEL's future FTTH rollouts in Lisbon and other cities will depend partly on ZON (FTTH) plans.

1.2.2.1 Name of company and applied technology, applied wholesale service (e.g. ULL) or own infrastructure

TVTEL and Sonaecom's network will be based on GPON technology and ZON will continue to expand the coverage of DOCSIS 3.0 (cable technology).

There is no information of operators planning to use wholesale services to develop its own NGAs.

1.2.2.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

No detailed information is available. In principle, for triple-play offers (including broadband at 100 Mbps).

1.2.2.3 Coverage (e.g. 25% homes passed, number of actual access lines)

According to Sonaecom, its NGA will allow the coverage of over 1 million homes and approximately 1/3 of the Portuguese population within a period of 3 years.

As mentioned above, the main operators (including Sonaecom, ZON and Onitelecom) have agreed to roll out fibre networks to pass 1.5 million homes and businesses in 2009, which is equivalent of around 50% of principal homes passed (or population).

2 Wholesale access products available

2.1 Dark fibre

a) Included in Market number X

Fibre is included in the Market 4 (2008).

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

There are no obligations.

b2) planned / under discussion

ANACOM is currently examining the issues related to the evolution to NGA and will consider in this context, the possibility of imposing, in addition to the obligation of access to ducts, access to dark fibre, particularly in situations where access to ducts is not possible for reasons of capacity or other reasons.

Having analysed the Market 4, ANACOM concluded that new obligations should be imposed to the SMP party, namely within the "Access to and use of specific resources networks" obligation – Possibility of imposing access to dark fibre where access to ducts is not possible and Possibility of imposing obligations on access to fibre optic, following the evolution to next generation access networks, by way of specific decision.

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

N/A.

d) Availability of reference offer

In Portugal there is no local loop dark fibre offered by the incumbent through regulatory obligations. According to PT, dark fibre is commercially available, in a case-by-case basis, e.g. for backbone purposes of alternative operators.

e) Current usage in practice (e.g. available since ..., still under discussion)

No information is available. Dark fibre is commercially available, in a case-by-case basis.

2.2 Duct Access

a) Included in Market number X

Portugal has an active reference offer for duct access and related infrastructure (ORAC), mandatory for PT and not based on SMP, rather, there is a direct obligation for PT to provide this access by the Portuguese National Law.

However, having analysed the Market 4 in 2008, ANACOM concluded that new obligations should be imposed to the SMP party, namely duct access.

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

ANACOM has ordered, in July 2004, PT Comunicações (PTC) to make available the reference offer²².

The ORAC rules must result in efficient and effective procedures. In particular, includes a procedures handbook and technical specifications (namely for cable installation, intervention and removal), which need to be followed by beneficiary entities.

b2) planned / under discussion

Access to ducts in Portugal does not include access to poles, but PT, recently, has provided alternative operators with the possibility to use such infrastructures. ANACOM is analysing the possibility of extending the access obligations to poles and other passive infrastructure.

Having analysed the market 4, ANACOM concluded that several obligations should be imposed to the SMP party, namely "Access to and use of specific resources networks" (access to ducts) and "Transparency in the publication of information, including reference offers" (publication of the ORAC, clear identification of the amendments made to the offer, prior notice of 30 days of changes in supply, provision and publication of indicators and performance levels

²² In ANACOM's decision of 17.07.2004 the minimum elements to be integrated in a Reference Offer for Access to PTC ducts (ORAC) were defined (see <http://www.anacom.pt/render.jsp?categoryId=211482&languageId=1>).

in respect of quality of service in wholesaler offers and provision to operators of detailed and timely information on developments in the access network).

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

ANACOM's assessment of ducts and associated infra-structure prices was based on cost estimations, derived from the PTC's Cost Accounting System (a top-down, historic costs, FDC and ABC-type model). Costs for new services, which were not available at the cost accounting system, were estimated based on current costs, taking into consideration equipment and manpower costs and, when applicable, mark-ups for operating, maintenance and common costs were added²³.

A price list is publicly available, and ducts' (und subducts') price is quoted in €/m/cm² and month. In August 2008, ANACOM defined the price for access to the duct database²⁴.

d) Availability of reference offer

An effective reference offer is in force since July 2006²⁵.

e) Current usage in practice (e.g. available since ..., still under discussion)

The ORAC is currently used by 16 undertakings. Since the introduction of ducts access reference offer more than 4,800 information requests and more than 10,000 viability requests were made.

2.3 Unbundling / Sub-loop unbundling

a) Included in Market number X

Yes. LLU and SLU are "included" in Market 4 (previously in Market 11).

Sub-loop unbundling is possible and it is explicitly foreseen in PTC's unbundling reference offer, although there are no unbundled sub-loops to date. It is subject to the same generic rules as local loop unbundling, but there may be a lack of detail as how sub-loop unbundling would apply in practice, mainly concerning prices and co-location conditions. I.e., details concerning co-location in street cabinets have not been determined (e.g. regarding space availability inside or close to the street cabinet, backhaul, etc.).

23 A detailed explanation of ANACOM's approach can be found in the report of the prior hearing granted to interested parties of 26th of May of 2006 in http://www.anacom.pt/streaming/Prior_hearing_report_26june2006.pdf?categoryId=38118&contentId=374927&field=ATTACHED_FILE.

24 Anacom has required PT to establish a suitable database (Extranet). This database is to contain location and space information. Access to this database resource is operational since January 2008.

25 See the version 2.9 of this offer (in Portuguese) in <http://ptwholesale.telecom.pt/GSW/PT/Canais/ProdutosServicos/OfertasReferencia/ORAC/ORAC.htm>.

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

Having analysed the Market 11 (in 2005), ANACOM imposed to PT the following obligations: “Access to and use of specific resources networks” (e.g. grant access to local loops and sub-loops and associated resources); “Transparency in the publication of information, including reference offers” (e.g. publication of the ORALL); “Non-discrimination in the provision of access and interconnection”; “Separation of accounts for specific activities”; “Price control and cost accounting” (e.g. set cost-oriented prices); and “Financial Reporting”.

b2) planned / under discussion

Having analysed the Market 4 (in 2008), ANACOM will maintain the current obligations imposed to PT and it will include several set obligations, related do access to ducts and fibre: “Access to and use of specific network resources” – access to ducts; possibility of imposing access to dark fibre where access to conduits is not possible and possibility of imposing obligations on access to fibre optic, following the evolution to next generation access networks (by way of specific decision); and “Transparency in the publication of information” – provision to operators of detailed and timely information on developments in the access network.

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

To date, prices of LLU and associated resources have been regulated according to the principle of cost orientation of prices. ANACOM has based its estimates of costs on: (a) the analytical accounting system of PTC, audited annually; (b) the budgeted costs and the current costs of resources consumed and activities needed for the provision of services; and also with reference to practices in the European Union. In assessing prices consideration is also given to the criteria of economic efficiency²⁶.

d) Availability of reference offer

Yes. The ORALL is available since 2001.

e) Current usage in practice (e.g. available since ..., still under discussion)

There are no unbundled sub-loops to date.

The number of subscribers using an alternative operator for direct access in the fixed market is high, as LLU investments have continued (effectively starting in early 2004), and at the 3rd

²⁶ ANACOM will continue to monitor the evolution of the market and cost accounting methods used for setting prices, as well as the evolution in terms of current European practice, not ruling out the future possibility of an evaluation of prices with consideration (possibly in conjunction with the results of the analytical accounting model already established) to the results of forward looking - long run incremental cost models (FL-LRIC).

quarter of 2008 there were more than 318,000 unbundled loops which represent around 11% of main accesses of the incumbent operator.

The alternative operators have developed specific and innovative offers, especially in terms of “triple-play” and are co-located in around two hundred MDFs of PT, which corresponds to a potential coverage of around 60% of copper loops.

2.4 Bitstream

a) Included in Market number X

Yes. Included in Market 12 in 2005 and Market 5 in 2008/2009.

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

ANACOM concluded in 2005 that PT had SMP in the relevant Market 12 and consequently imposed the following obligations: “Access to and use of specific resources” (e.g. access at different points, regional and national); “Transparency in the publication of information” (e.g. publication of the reference offer of broadband access, including SLAs and compensation for non-compliance); “Non-discrimination in the provision of access and interconnection”; “Separation of accounts for specific activities”; “Price control and cost accounting” (e.g. set cost oriented prices and retail-minus); and “Financial Reporting”.

b2) planned / under discussion

Having analysed the Market 5, ANACOM concluded that no company has SMP in specific areas “Areas C” (i.e., “competitive areas”) and, therefore, that all obligations imposed on PT (in 2005) shall be removed⁵.

In the other areas (“Areas NC”, “non competitive areas”), all the obligations are maintained (see above).

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

To date, prices of bitstream and associated resources have been regulated according to the principle of cost orientation of prices and retail-minus. As with LLU, ANACOM has based its estimates of costs on the analytical accounting system of PTC and the budgeted costs and the current costs of resources consumed and activities needed for the provision of services; and also with reference to practices in the European Union.

d) Availability of reference offer

Yes. Since the early 2000¹, PT has been required to provide a wholesale broadband access product supported by ADSL. That offer, “Rede ADSL PT”, became a reference offer after the analysis of Market 12 in 2005.

e) Current usage in practice (e.g. available since ..., still under discussion)

Bitstream access is offered since the end of 2000, currently on the basis of 28 regional Pol’s and 2 national ones, where an operator may interconnect and collect the traffic.

The number of ADSL access based on the “Rede ADSL PT” wholesale offer increased significantly between the end of 2004 and the end of 2007, with the number of accesses almost doubling during the period and reaching around 700.000 by the end of it.

A new option for an Ethernet aggregation access has been launched by PT in 2008. The practical effect of this offer in the market is yet to be determined, but it is worth noting that the offer is unclear regarding the level of services to be available (e.g. video).

2.5 In-house cabling

Regarding access to in-house infrastructure there are already specific rules for fibre in Portugal, but only for the newer buildings (built after the effective implementation of the above-mentioned ITED regime in 2004).

On the other hand, under the law, in-house infrastructure is the property of building owners/inhabitants, thus, their authorisation is needed to install fibre²⁷. Housing companies have general obligations to ensure that new buildings have an infrastructure that enables sharing of copper infrastructure and many of them currently request the cable operator to pre-cable the buildings. However, currently this does not extend to fibre.

ANACOM is reviewing the ITED regime and it will impose specific rules regarding pre-cabling of (new) buildings with fibre, i.e., all new buildings to be built must be equipped with fibre. In summary, (operators’) access rules will be reinforced, while ensuring the property rights of the owners.

2.6 Backhaul

ANACOM considered, in its analysis of Market 4 that the maintenance of the obligation to grant access to local loops and sub-loops and associated resources, including the “signal delivery service” – a short (fibre) backhaul from the co-located equipment to a close operator’s node – is justified and proportionate.

²⁷ Some market participants claim that the Portuguese law is not clear regarding operators’ rights in this regard: on one hand it states that operators have the right of access but, on the other hand, it imposes a formal authorisation without stating the conditions on which authorisation could be denied.

As discussed within the NGA consultation document, in a FTTCab scenario it will be necessary to guarantee that the operators have an appropriate backhaul product for the connection to their network, whether through leased circuits, dark fibre or a specific backhaul product yet to be created, naturally paying prices that ensure a return on the investment – and on the associated risk – made in the network supporting these offers.

3 National next generation broadband initiatives or measures

Within the context of the development of NGA, it is also worth to mention that, following the Council of Minister's Resolution of 30th July 2008, which adopted strategic guidelines in order to promote investment in new generation networks, the Portuguese Government set as a strategic priority for the country to invest in NGN/NGA, establishing the following strategic orientation, taking into due consideration ANACOM's advice²⁸:

- Enhancing confidence to market agents in order to ensure timely and efficient investment, by a) promoting a model based in infrastructure competition and not only upon services competition; and b) defining clear and transparent regulatory principles.
- Promoting a competitive communications market through the identification and removal of barriers in relation with: a) access to ducts, poles and other critical infrastructure; and b) vertical access in buildings.
- Guaranteeing access to innovative products and services, by a) stimulating demand with the development of advanced solutions enabling the connection of all hospitals, health centres and secondary schools; and b) promoting equal access of all citizens to innovative services, with especial attention to populations with special needs.

The Portuguese Government has also decided to:

- 4) Promote the massive adoption of high-speed internet access and the development of advanced solutions, in order to connect around 10% of the population to NGN/NGA before 2010;
- 5) Connect to NGN/NGA all justice public services, basic and secondary schools, hospitals, health centres, museums and libraries (before 2010);
- 6) Define a calendar to promote the enlargement conditions of NGN/NGA access to the largest number of citizens.

²⁸ ANACOM has identified access barriers concerning ducts and critical infrastructure of all relevant entities and the need for any type of measures (legislative or others) to remove those barriers.

The Government requested the NRA to evaluate and propose solutions to eliminate or diminish horizontal barriers to the installation of fibre, as well as solutions for sharing/mutualisation of buildings' infrastructure, in order to prevent the monopolisation of access to buildings²⁹.

All of these targets were timely completed and the Government has asked ANACOM to formalise its proposals in the form of draft legislation or regulations, by February 2009, namely to:

- Make compulsory the implementation in new buildings and urbanisations of technical specifications that allow and facilitate the installation of fibre;
- Delineate a flexible and reasonable solution for the technical specifications related with fibre installation in already constructed buildings;
- Require operators to ensure that fibre installations are completed with resource to duly certified personnel;
- Define concrete conditions applicable to fibre mutualisation in buildings;
- Establish a centralised information system, including an infrastructure database, to be implemented gradually;
- Simplify and condensate the juridical regime applicable to access to ducts and critical infrastructure owned or managed by all types of entities (e.g. telecom's operators, other utilities, municipalities, etc.) whilst continuing to promote non discriminatory access;
- Stimulate municipalities to foster the development of NGN/NGA³⁰.

The Government has asked ANACOM to formalize its proposals in the form of draft legislation, which is expected to be finished in the first quarter of 2009.

29 The cited Council of Minister's Resolution has determined ANACOM to: a) Identify access and construction barriers to ducts and critical infrastructure of all relevant entities (within 30 days); b) Propose any type of measures (legislative or other) to erase the above mentioned barriers (within 45 days); c) Evaluate and propose solutions to eliminate or diminish vertical barriers to the installation of fibre, as well as solutions for sharing/mutualising buildings' infrastructure, in order to prevent the monopolisation of access to buildings (within 45 days).

30 Namely with resource to adequate construction licensing practices, to the appropriate consideration of rights of way and taxation issues and to fair and timely access to municipal infrastructures, without prejudice to the participation of the municipalities in public-private partnerships.

Romania

1. Market developments

1.1 Incumbent

1.1.1 Actual roll-out

In relation to the access network, the incumbent plans to reduce the length of local loops to less than 1km especially by deploying optic fiber up to street cabinets, to increase the number of broadband enabled lines, with 1,000,000 ports installed by the end of 2008, and to increase the number of deployed ADSL lines.

There are no major public plans for replacing the copper last mile to the end-user with fibre optics.

1.1.1.1 Applied technology (e.g. FTTH GPON, FTTH P2P, FTTB, VDSL, Cable)

FTTC & ADSL2+

1.1.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

Romtelecom offers ADSL services with speeds ranging from 2 Mbps to 20 Mbps prices from 7.5 EUR to 39 EUR bundled with PSTN. VoB can be added on top of the internet connection for free.

1.1.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

Data on broadband coverage per operator is confidential.

1.1.2 Announced roll-out plans (e.g. by 20XX ...)

There has been no official announcement regarding specific NGA roll-out plans. According to press releases, IPTV is in an initial testing phase.

1.2 Competitors (other telcos, cable)

1.2.1 Actual roll-out

Romania enjoys the highest level of infrastructure competition. In July 2008, 22.5 % of broadband connections were based on DSL, while 21.6 % were based on coaxial cable, and 55.9 % on other last mile access technologies such as UTP/FTP.

Romtelecom's largest competitors are cable operators RCS&RDS and UPC.

1.2.1.1 Name of company and applied technology, applied wholesale service (e.g. ULL) or own infrastructure

RCS&RDS is the leading internet provider in Romania with a market share of 40% as of middle of 2008. RCS&RDS started providing internet access based on its own cable network and afterwards upgraded most of it by using FTTB technology (UTP/FTP as vertical wiring).

1.2.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

RCS&RDS, also owner of a 3G license, offers quadruple-play services (analogue/digital TV, internet access, VoB services and mobile services) which can be purchased as a bundle or separate. Internet access speeds range from 2Mbps to 10 Mbps (with metropolitan access with speeds up to 50Mbps) for prices up to 9 EUR. VoB services can be added on top of the analogue/digital TV or internet access for free.

1.2.1.3 Name of company and applied technology, applied wholesale service (e.g. ULL) or own infrastructure

UPC, with a market share of 10% as of mid 2008, offers services based on their own CATV infrastructure.

1.2.1.4 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

UPC has a triple play offer that includes analogue/digital TV, internet services with speeds ranging from 1Mbps to 20Mbps and VoB services. Services can be purchased as a bundle or separated.

2 Wholesale access products available

2.1 Dark fibre

No dark fibre obligation

2.2 Duct Access

Access to ducts is not mandated.

2.3 Unbundling / Sub-loop unbundling

a) Unbundling / Sub-loop unbundling obligations were imposed in the last round of the market analysis in the former market 11, actual market 4.

b1) Regulatory obligations imposed include non-discrimination, transparency, cost-oriented tariffs, accounting separation and access to ancillary services (collocation, backhaul etc.)

b2) ANCOM is currently in the process of analyzing market 4.

c) Cost orientation obligation in place.

d) Reference unbundling offer available.

e) Current usage in practice since 2004.

2.4 Bitstream

In the last round of market analysis, WBA was considered emerging market and no SMP operator was identified.

ANC is currently in the process of analyzing market 5.

2.5 In-house cabling

No in-house cabling imposed.

2.6 Backhaul

Backhaul services mandated in the WLA market.

2.7 Other

-

3 National next generation broadband initiatives or measures

No initiatives or measures.

Slovak Republic

1 Market developments

1.1 Incumbent

Slovak Telekom, a.s.

1.1.1 Actual roll-out

1.1.1.1 Applied technology (e.g. FTTH GPON, FTTH P2P, FTTB, VDSL, Cable)

While offering services using fibre, Slovak Telekom, a.s. uses technology FTTH GPON.

1.1.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

Bundled product Triple play - Magio Comfort (consists of TV, internet plus voice), unbundled products Magio Comfort TV, Comfort 4 G Internet, Comfort Voice. We attach actual prices of product based on fibre.

1.1.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

At the end of 2008 around 200 K households all around Slovak republic close to installation solely within the 10 biggest towns of Slovakia. A precise number of end users is confidential, we may not disclose.

1.1.2 Announced roll-out plans (e.g. by 20XX ...)

1.1.2.1 -1.1.2.3 (see structure "actual roll-out" above)

Plan is to keep on covering as much towns and housing estates, where potential interest shows efficiency of the fibre deployment as possible.

1.2 Competitors (other telcos, cable)

1.2.1 Actual roll-out

1.2.1.1 Name of company and applied technology, applied wholesale service (e.g. ULL) or own infrastructure

Name of company:

Orange Slovensko, a.s. :

Applied technology: FTTH (GPON)

Wholesale model: Own infrastructure

1.2.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

Name of service: OrangeDoma

Type of service: Triple play service (FiberTV, FiberNet, Pevna linka)

Price structure:

Service	
FiberTV	basic channels, premium channels, VoD
FiberNet	bandwidth
Pevna linka (VoIP)	minutes

1.2.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

Homes passed: 270 000 EoY 2008

Homes connected: 20 847 EoY 2008

1.2.2 Announced roll-out plans (e.g. by 20XX ...) – Company confidential

1.2.2.1 – 1.2.2.3 (see structure “actual roll-out” above)

Name of company:

Slovanet, a.s. ,

1.2.1.2 Available retail services (e.g. product name, type of service (e.g triple play), bandwidth, price level, price structure)

Provides triple play services on its own optical infrastructure

1.2.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

70 000 households (November 2008)

These data are from Slovanet's web site.

2 Wholesale access products available

Orange Slovensko, a.s. does not provide wholesale access products

Slovanet, a.s. does not provide wholesale access products

Wholesale access products of Slovak Telekom, a.s.:

2.1 Dark fibre

(the following sub-items apply correspondingly to the other wholesale services)

a) Included in Market number X

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

b2) planned / under discussion

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

d) Availability of reference offer

e) Current usage in practice (e.g. available since ..., still under discussion)

Slovak Telekom doesn't provide dark fibre lease.

2.2 Duct Access

a) – e)

Slovak Telekom has its own product – Carrier duct

2.3 Unbundling / Sub-loop unbundling

a) – e)

Not provided on fibre NGA

2.4 Bitstream

a) –e)

Not provided on fibre NGA

2.5 In-house cabling

a) – e)

Not provided on fibre NGA

2.6 Backhaul

a) – e)

Not provided on fibre NGA

2.7 Other

a) – e)

3 National next generation broadband initiatives or measures

No initiatives or measures so far.

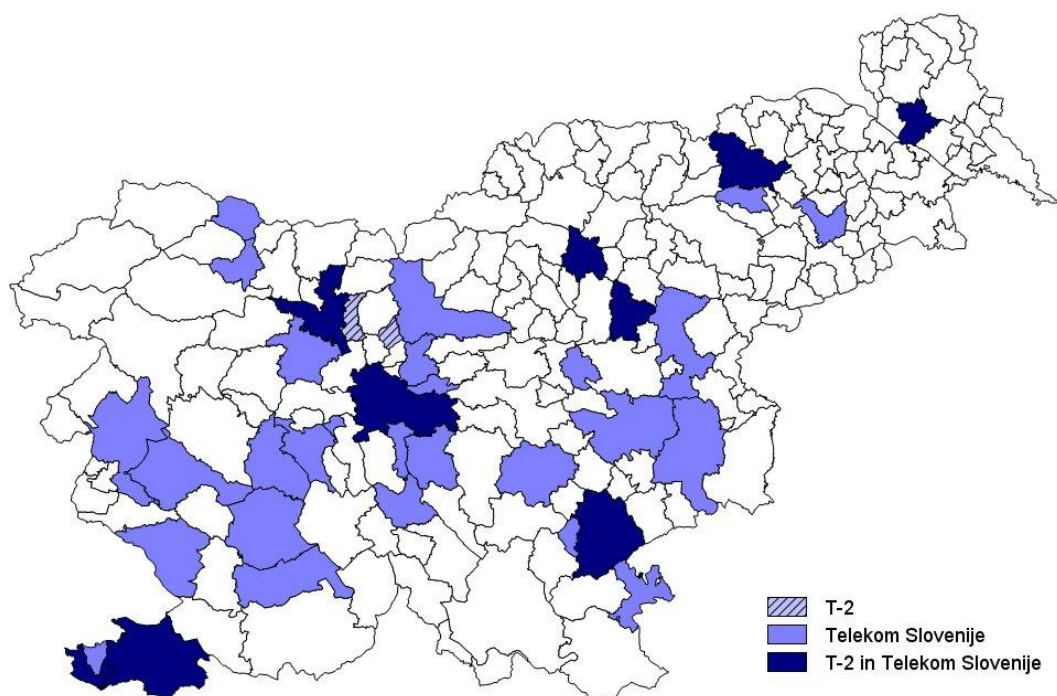
Slovenia

1. Market developments

1.1 Incumbent

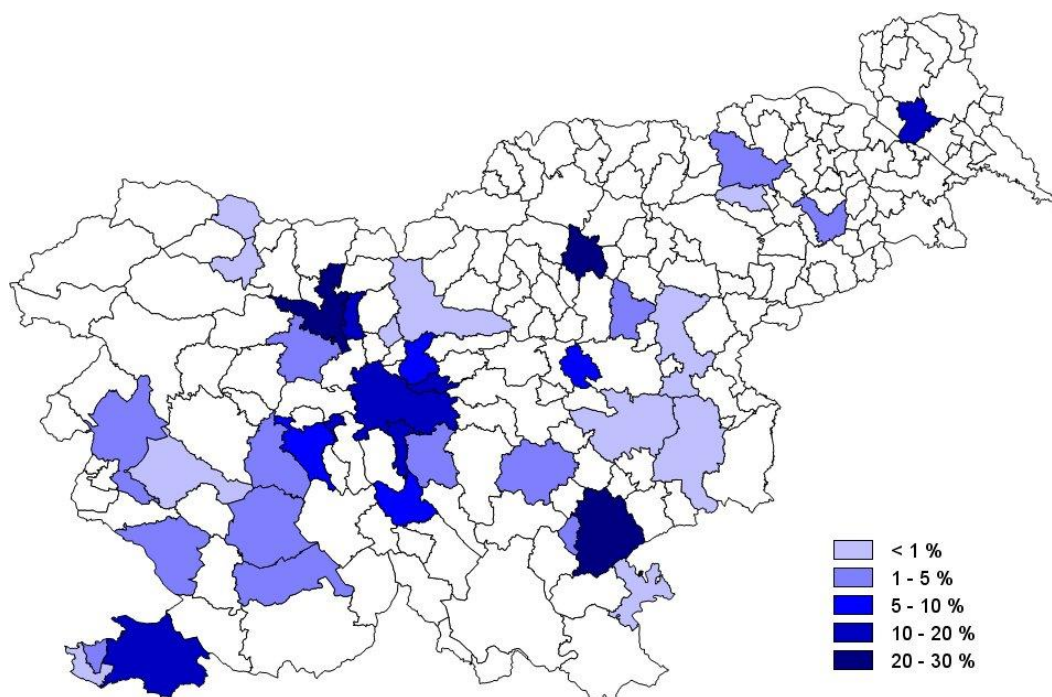
1.1.1 Actual roll-out

Picture 1: Presence of operators according to municipality (active FTTH connections)



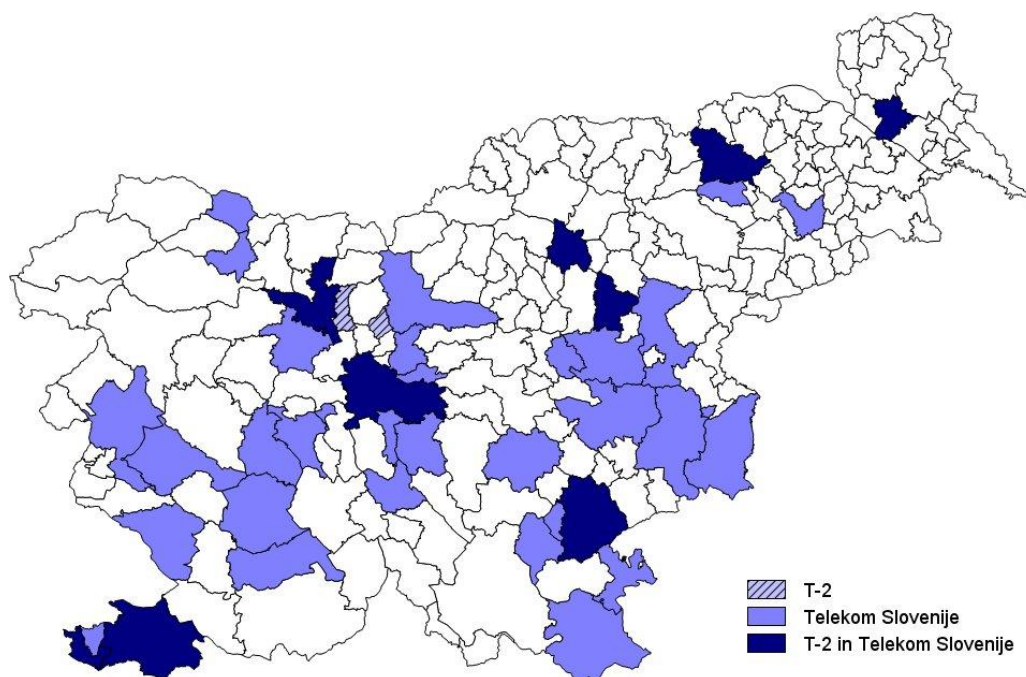
Source: APEK, 2008

Picture 2: Penetration of active FTTH connections per household according to municipality



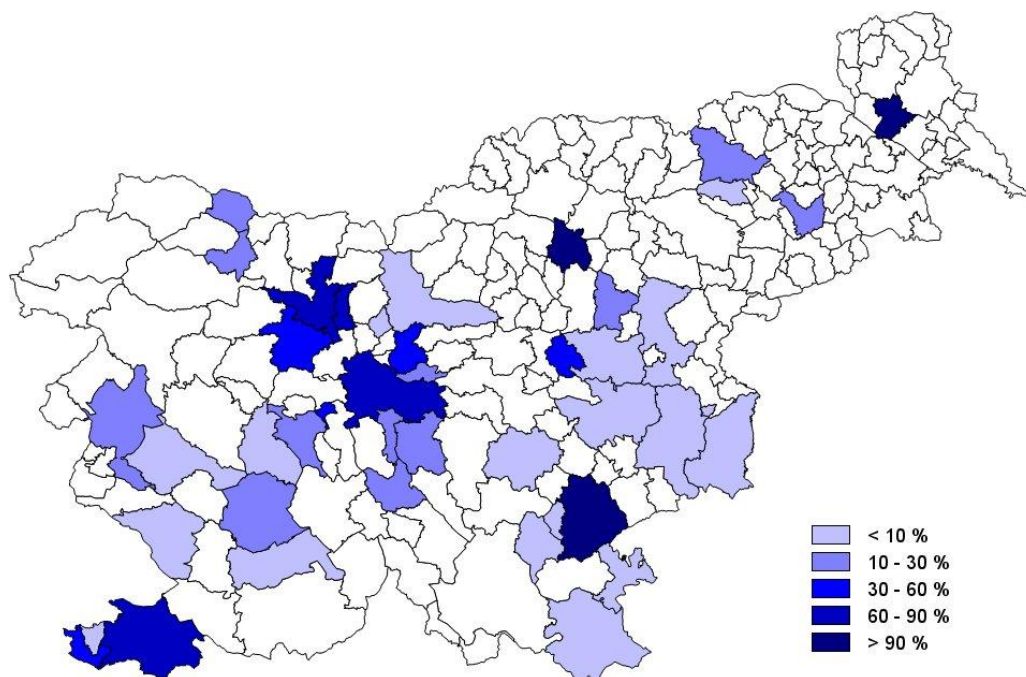
Source: APEK, 2008

Picture 3: Presence of operators according to municipality (active and inactive FTTH connections)



Source: APEK, 2008

Picture 4: Penetration of active and inactive FTTH connections per household according to municipality



Source: APEK, 2008

1.1.1.1 Applied technology (e.g. FTTH GPON, FTTH P2P, FTTB, VDSL, Cable)

FTTH P2P

1.1.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

- SiOL TV

Available independently or as part of the Duo TV, Duo FON TV and Trio packages. Stand-alone SiOL TV connection is available for 15 EUR. A single programme package cost 5 EUR per month, two programme packages cost 8 EUR per month and the full programme package is 9 EUR per month. When entering into contract for at least 24 months the price per TV set-up box is 1 EUR, otherwise the price of the set-up box is 139.90 EUR.

- SiOL telefonija

SiOL telephony, available independently over optical connections or as part of the Duo, Duo FON TV and Trio packages. Each additional telephone connection costs 1.25 EUR.

Two packages of SiOL telephony available:

- *SiOL telephony basic*
from 14 EUR per month (free calls between SiOL telephony subscribers, 120 minutes of free calls within Telekom Slovenije's network)
- *SiOL telephony unlimited*
from 19,99 EUR per month (free calls between SiOL telephony subscribers, free calls within Telekom Slovenije's network)
 - SiOL internet

Available independently or as part of the Duo, Duo TV, Duo FON TV and Trio packages.

The price of stand-alone internet access is 3 EUR (with tax).

<i>Speed</i>	<i>Price in EUR (with tax)</i>
20M/20M	26,00
60M/60M	Price of 20M/20M + 54 EUR = 80 EUR
100M/100M	Price of 20M/20M + 114 EUR = 140 EUR
1G/1G	Price of 20M/20M + 4074 EUR = 4100 EUR

- Duo

Double-play (SiOL internet and SiOL telephony)

<i>Speed</i>		<i>Price in EUR (with tax)</i>
20 / 20 Mbit/s	<i>with SiOL telephony basic</i>	28,00
60M / 60M	<i>with SiOL telephony basic</i>	82,00
20 / 20 Mbit/s	<i>with SiOL telephony unlimited</i>	35,00
60M / 60M	<i>with SiOL telephony unlimited</i>	89,00

- Duo TV

Double play (SiOL TV and SiOL internet)

When entering into contract for at least 24 months the price per TV set-up box is 1 EUR, otherwise the price of the set-up box is 139.90 EUR.

<i>Speed</i>	<i>Prices in EUR (with tax)</i>
20M/20M	29,00
60M/60M	83,00

- Duo FON TV

Double-play (SiOL TV and SiOL telephony)

When entering into contract for at least 24 months the price per TV set-up box is 1 EUR, otherwise the price of the set-up box is 139.90 EUR.

	<i>Price in EUR (with tax)</i>
<i>with SiOL telephony basic</i>	14,00
<i>with SiOL telephony basic</i>	21,00

- Trio

Triple-play (SiOL TV, SiOL telephony and SiOL internet)

When entering into contract for at least 24 months the price per TV set-up box is 1 EUR, otherwise the price of the set-up box is 139.90 EUR.

<i>Price of Trio package (with SiOL telephony basic)</i>	
<i>Speed</i>	<i>Prices in EUR (with tax)</i>
20M/20M	30,00
60M/60M	84,00

<i>Price of Trio package (with SiOL telephony unlimited)</i>	
<i>Speed</i>	<i>Prices in EUR (with tax)</i>
20M/20M	37,00
60M/60M	91,00

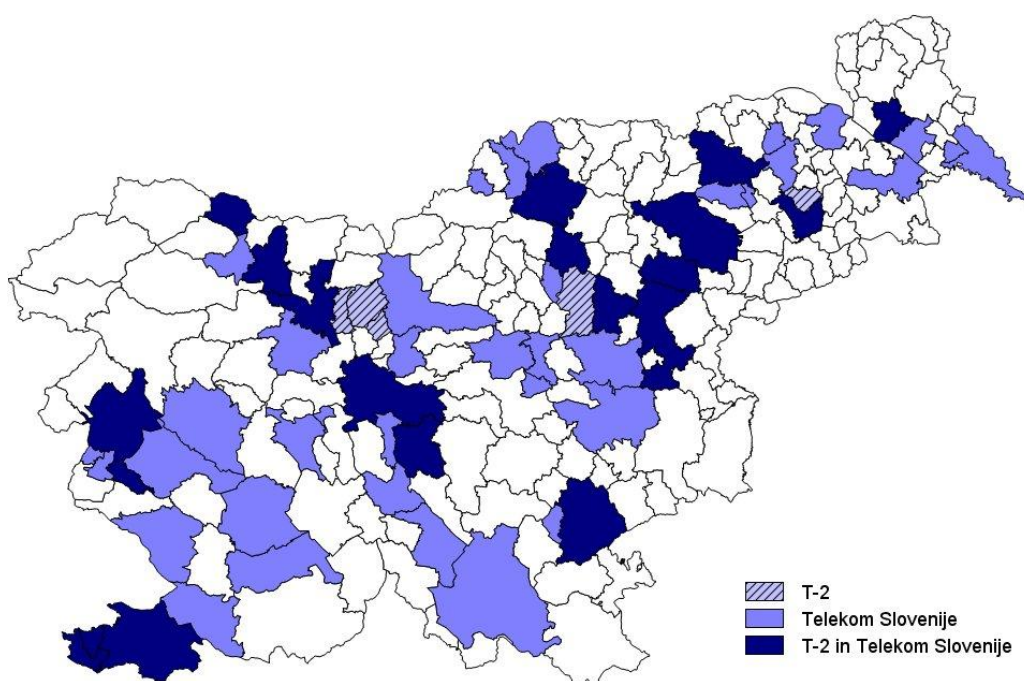
1.1.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

Coverage of Telekom Slovenije d.d. in the third quarter of 2008:

- penetration per household (active connections): 1,4%
- penetration per household (active and inactive connections): 9,6%

1.1.2 Announced roll-out plans (e.g. by 20XX ...)

Picture 5: The planned rolling-out of the FTTH access network in the next two years according to municipality



Source: APEK, 2008

1.2 Competitors (other telcos, cable)

1.2.1 Actual roll-out

See Picture 1, 2, 3 and 4.

1.2.1.1 Name of company and applied technology, applied wholesale service (e.g. ULL) or own infrastructure

<i>Name of company</i>	T-2. d.o.o. Main competitor to the incumbent		AMIS d.o.o	Tuš Telekom d.d.
<i>Applied technology</i>	FTTH	DSL	DSL	DSL
<i>Applied wholesale service</i>	own infrastructure	LLU	LLU, bitstream	LLU, bitstream

1.2.1.2 Available retail services (e.g. product name, type of service (e.g triple play), bandwidth, price level, price structure)

a.) Retail services of T-2 d.o.o.:

- Internet

<i>Speed (FTTH, symmetrical)</i>	<i>Monthly subscription in EUR (with tax)</i>
10 Mbit/s	14,00
20 Mbit/s	28,00
50 Mbit/s	50,00
100 Mbit/s	100,00
200 Mbit/s	200,00
300 Mbit/s	300,00
500 Mbit/s	500,00
1 Gbit/s	1000,00

<i>Speed (VDSL)</i>	<i>Monthly subscription in EUR (with tax)</i>	
	<i>Shared access</i>	<i>Fully unbundled access</i>
1 Mbps / 256 Kbps	14,00	20,00
1 Mbps / 1 Mbps	16,00	22,00
2 Mbps / 2 Mbps	20,00	26,00
4 Mbps / 512 Kbps	17,00	23,00
4 Mbps / 1 Mbps	18,00	24,00
8 Mbps / 1 Mbps	20,00	26,00
5 Mbps / 5 Mbps	26,00	32,00
10 Mbps / 1 Mbps	21,00	27,00
10 Mbps / 2 Mbps	23,00	29,00
10 Mbps / 4 Mbps	25,00	31,00
10 Mbps / 10 Mbps	46,00	52,00
20 Mbps / 1 Mbps	24,00	30,00
20 Mbps / 4 Mbps	28,00	34,00
20 Mbps / 10 Mbps	49,00	55,00
40 Mbps / 8 Mbps	49,00	55,00
40 Mbps / 15 Mbps	56,00	62,00
60 Mbps / 25 Mbps	70,00	76,00

- Television

Available independently over optical connections or as part of several packages. It costs 6 EUR per month to obtain the TV connection (featuring the 8 legally required channels) and 5.50 EUR per month to subscribe to the basic T-2 programme scheme. The subscriber receives one free TV interface (STB) and can rent additional interfaces for 2 EUR (standard TV sets) or 4 EUR per month (HD TV sets).

- Telephony

The monthly subscription fee is 4 EUR for the first telephone number. Each additional telephone number (up to five) costs 2 EUR per month. With every telephone number the user receives a free cord telephone.

- Brezčasna optika

“Timeless optical connection”

Triple-play	
T-2 internet over optical connections	Symmetrical speed of 10710 mbps.
T-2 HDTV	HDTV interface and the basic T-2 programme package
2 T-2 UMTS mobile telephony subscriptions	
Price: 30 EUR per month	

- Brezčasna VDSL

“Timeless VDSL connection”

Triple-play	
VDSL internet	Shared or fully unbundled internet access with speeds up to 10/2 mbp
T-2 TV	IPTV connection, including TV interface and the basic T-2 programme package
2 T-2 UMTS mobile telephony subscriptions	
Price: 36 EUR per month	

- VDSL Paket TV + telefon

“VDSL package TV + telephone”

Double play (television and telephone)

22 EUR per month for standard resolution TV, 24 EUR per month for HD TV.

The same combination of services on optical connections costs 16 EUR per month for standard resolution TV and 18 EUR per month for HD TV.

b.) Retail services of Amis d.o.o.:

Geographically differentiated. The prices provided are for the Slovenian capital, Ljubljana and for the second largest city, Maribor.

- Internet

	<i>Speed (Kbps)</i>	<i>Price (EUR per month)</i>
<i>Amis internet (Amis DSL)</i>	1024/256	16,27 for shared access, 20,00 for fully unbundled access
	2048/384	19,27 for shared access, 23,00 for fully unbundled access
	2048/512	21,28 for shared access, 25,01 for fully unbundled access
	4096/512	22,27 for shared access, 26,00 for fully unbundled access
	10 Mb/768	29,20 for shared access, 32,94 for fully unbundled access
	20 Mb/768	37,56 for shared access, 41,29 for fully unbundled access
<i>“Enka” internet</i>	15 Mb	16,27 (-50% off for the first 5 months)
	20 Mb	20,00 (-50% off for the first 5 months)
	25 Mb	25,00 (-50% off for the first 5 months)
	30 Mb	48,00 (-50% off for the first 5 months)
Only in certain regions of Ljubljana. Includes a free modem.		
<i>“Enka 4 Mb plus” package</i>	Internet up to 4 Mb An active telephone connection with a subscription to Telekom Slovenije is not needed.	22,00 (-50% for the first 3 months)
<i>“Enka 4 Mb” package</i>	Internet up to 4 Mb An active telephone connection with a subscription to Telekom Slovenije is needed.	19,00 (-50% for the first 3 months)

- Telephony

	<i>Service</i>	<i>Price (EUR per month)</i>
<i>“Happy Hours” telephony</i>	Available only when subscribing to Amis internet. Includes 200 free minutes of calls per month (from 8 PM to 7 AM) to all Slovene fixed networks	2,90

- Television

	<i>Service</i>	<i>Price (EUR per month)</i>
<i>Amis television</i>	Available only when subscribing to Amis internet. Not available for speeds of 10 and 20 Mb.	15,00

- Packages

	<i>Service</i>	<i>Price (EUR per month)</i>
<i>“Trojka Amis TV” package</i>	Available only in certain regions of Ljubljana Triple play: -telephony “Slo-brezplačno” (700 minutes of free calls to all Slovene fixed networks per month) -television -internet Includes a free telephone, free modem and a free Amis television interface.	15 Mb for 37,90 EUR 20 Mb for 40,90 EUR 25 Mb for 43,90 EUR 30 Mb for 67,90 EUR (-50% for the first 5 months)
<i>“Trojka BS3 TV” package</i>	Available only in certain regions of Ljubljana Triple play: -telephony “Slo-brezplačno” -cable television -internet Includes a free telephone and a free modem.	15 Mb for 33,90 EUR 20 Mb for 36,70 EUR 25 Mb for 39,70 EUR 30 Mb for 63,70 EUR (-50% for the first 5 months)
<i>“Trojka plus” package</i>	Triple play: -Internet up to 10 Mb -telephony “Slo–brezplačno” -television Includes a free modem and a free telephone.	42,90 (-50% for the first 5 months)
<i>“Trojka Junior” package</i>	Triple play: -Internet up to 10 Mb -telephony “Amis-brezplačno” (free calls in Amis’ network) -television Includes a free modem.	33,00 (-50% for the first 3 months)
<i>“Dvojka TEL” package</i>	Available only in certain regions of Ljubljana. Double play: -internet -telephony “Slo-brezplačno” Includes a free modem and a free telephone.	15 Mb for 22,90 EUR 20 Mb for 25,90 EUR 25 Mb for 28,90 EUR 30 Mb for 52,90 EUR (-50% for the first 5 months)

	<i>Service</i>	<i>Price (EUR per month)</i>
<i>“Dvojka TEL plus” package</i>	Double play: -Internet up to 10 Mb - telephony “Slo–brezplačno” Includes a free modem and a free telephone.	27,90 (-50% for the first 5 months)
<i>“Dvojka TEL Junior” package</i>	Double play: -Internet up to 10 Mb -telephony “Amis–brezplačno” Includes a free modem.	21,90 (-50% for the first 3 months)
<i>“Dvojka TV plus” package</i>	Double play: -Internet up to 10 Mb - television An active telephone connection with a subscription to Telekom Slovenije is not needed.	37,00 (-50% for the first 3 months)
<i>“Dvojka TV” package</i>	Double play: -Internet up to 10 Mb - television An active telephone connection with a subscription to Telekom Slovenije is needed.	34,00 (-50% for the first 3 months)

c.) Retail services of Tuš Telekom d.d.:

- Internet

xDSL internet	
<i>speed</i>	<i>price in EUR per month</i>
256 kbit/s / 128 kbit/s	14,00
512 kbit/s / 128 kbit/s	17,00
10 Mbit/s / 768 kbit/s	30,00

xDSL internet – packages	
<i>“tuštelekom20” family package:</i> up to 4 Mbit/s / 512 kbit/s	20,00 free wireless WiFi modem included
<i>“tuštelekom40” family package:</i> up to 20 Mbit/s / 768 kbit/s	40,00 free wireless WiFi modem included

The subscribers can add the service of tuštelekom IP telephony to their chosen speed of internet for 3 EUR per month, or can add the service of tuštelekom television for 15 EUR per month.

- Television

Tuštelekom IP television costs 15 EUR per month. The TV interface is free of charge when entering into contract for 24 months (otherwise the price is 204 EUR), with each additional interface costing 4 EUR per month.

- Telephony

Stand-alone IP telephony (when the tuštelekom IP telephony user's broadband or cable internet access is provided by another operator) is 8.30 EUR per month. When entering into contract for 24 months the connection is free of charge, otherwise the connection fee is 104.28 EUR.

- "tuštelekom30" package

In Tuš Telekom's network

Triple-play (IP telephony with free calls to all fixed networks and to Tušmobil's network, internet with speeds up to 4 Mbit/s, IP television) for 30 EUR per month.

- "tuštelekom50" package

In Tuš Telekom's network

Triple-play (IP telephony with free calls to all fixed networks and to Tušmobil's network, internet with speeds up to 20 Mbit/s, IP television) for 50 EUR per month.

- "tuštelekom45" package

In Telekom Slovenije's network

Triple-play (IP telephony with free calls to all fixed networks and to Tušmobil's network, internet with speeds up to 1 Mbit/s, IP television) for 45 EUR per month.

- "tuštelekom65" package

In Telekom Slovenije's network

Triple-play (IP telephony with free calls to all fixed networks and to Tušmobil's network, internet with speeds up to 10 Mbit/s, IP television) for 65 EUR per month.

1.2.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

Coverage of T-2 d.o.o. in the third quarter of 2008:

- penetration per household (active connections): 3,6%

- penetration per household (active and inactive connections): 17,1%

1.2.2 Announced roll-out plans (e.g. by 20XX ...)

See Picture 5.

2 Wholesale access products available

2.1 Dark fibre

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) planned:

The Agency plans to include dark fibre in Market 4, “*Wholesale (physical) network infrastructure access (including shared or fully unbundled access) at a fixed location*”, especially if/where no ducts are available.

2.2 Duct Access

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) planned:

The Agency plans to include duct access in Market 4, “*Wholesale (physical) network infrastructure access (including shared or fully unbundled access) at a fixed location*”.

2.3 Unbundling / Sub-loop unbundling

a) Included in Market number X

Included in Market 4, “*Wholesale (physical) network infrastructure access (including shared or fully unbundled access) at a fixed location*”.

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual:

- Provision of access,
- Obligation of non-discrimination,
- Transparency,
- Price control obligation,

- Accounting separation.

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

LRIC; monthly fee for LLU, monthly fee for PSTN

d) Availability of reference offer

Yes.

e) Current usage in practice (e.g. available since ..., still under discussion)

Available since 2003, in commercial use since 2005.

2.4 Bitstream

a) Included in Market number X

Included in Market 5, "*Wholesale broadband access*".

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual:

- Provision of access,
- Obligation of non-discrimination,
- Transparency,
- Price control obligation,
- Accounting separation.

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

FAC CCA, retail minus – BRAS, IP/MPLS. Other prices are cost oriented.

d) Availability of reference offer

Yes.

e) Current usage in practice (e.g. available since ..., still under discussion)

Available for more than 5 years.

2.5 In-house cabling

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) planned:

The Agency plans to include in-house cabling in Market 4, "*Wholesale (physical) network infrastructure access (including shared or fully unbundled access) at a fixed location*".

Spain

1. Market developments

1.1 Incumbent

1.1.1 Actual roll-out

Telefónica has conducted a pilot test ending November 2008. Afterwards, commercial retail offers based on optical fibre have started.

1.1.1.1 Applied technology (e.g. FTTH GPON, FTTH P2P, FTTB, VDSL, Cable)

This pilot test was based on two access infrastructures, VDSL on FTTN and GPON on FTTH. The commercial retail offers are currently for FTTH/GPON.

1.1.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

The available offers (FTTH/GPON) are:

trío futura 30Mb Imagenio Familiar DVR: triple play offer with 30 Mbit/s HSI, data and voice flat-rate, IPTV with DVR, 85.90 €/month

trío futura 10Mb Imagenio Familiar DVR: triple play offer with 10 Mbit/s HSI, data and voice flat-rate, IPTV with DVR, 75.90 €/month

trío futura 10Mb Imagenio Familiar: triple play offer with 10 Mbit/s HSI, data and voice flat-rate, IPTV, 65.90 €/month

trío futura 10Mb Imagenio conexión: triple play offer with 10 Mbit/s HSI, data and voice flat-rate, IPTV (limited channels), 50.90 €/month

1.1.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

The pilot test for FTTH/GPON was approved for a maximum of 200000 passed homes and 5000 connected FTTH customers, in 12 provinces.

1.1.2 Announced roll-out plans (e.g. by 20XX ...)

1.1.2.1 -1.1.2.3 (see structure "actual roll-out" above)

The latest public announcement indicates the following targets by end of 2010: 25% of loops will be 100 Mbit/s capable; >40% will be 30 Mbit/s capable; >80% will be 10 Mbit/s capable

1.2 Competitors (other telcos, cable)

1.2.1 Actual roll-out

1.2.1.1 Name of company and applied technology, applied wholesale service (e.g. ULL) or own infrastructure

1.2.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

1.2.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

ONO

ONO is a cable company (HFC) with own infrastructure, which has upgraded part of its network to DOCSIS 3.0

The current retail offers for ultra-high speed are:

- ONO 50M TV: triple play offer with 50 Mbit/s HSI, data and voice flat-rate, TV, 65 €/month
- ONO 50M: double play offer with 50 Mbit/s HSI, data and voice flat-rate, 59,90 €/month

Coverage is currently limited to 10 cities in the province of Madrid, covering 700000 homes

Mundo R

MundoR is a cable company (HFC) with own infrastructure, which has upgraded part of its network to DOCSIS 3.0

The current retail offers for ultra-high speed are:

- comboR 100M: triple play offer with 100 Mbit/s HSI, data and voice flat-rate, TV, 115 €/month

- combo3 100M: triple play offer with 100 Mbit/s HSI, data and voice flat-rate, TV (limited channels), 95 €/month
- comboR 30M: triple play offer with 30 Mbit/s HSI, data and voice flat-rate, TV, 85 €/month
- combo3 30M: triple play offer with 30 Mbit/s HSI, data and voice flat-rate, TV (limited channels), 65 €/month

Coverage is currently limited to some areas within 3 cities in Galicia

Red Asturcón

It is a public open access network based on FTTH/GPON and own infrastructure, deployed in Asturias and managed by GIT (which is part of the Government of Asturias). It is operative since April 2007.

One of the service providers, Adamo, is currently offering, based on the wholesale offer of this network, the following retail offers:

- Duo 100: double play offer with 100 Mbit/s HSI, data and voice flat-rate, 35 €/month
- Internet 100: single play offer with 100 Mbit/s HSI, data flat-rate, 29 €/month

Coverage is currently limited to 22 cities in Asturias.

1.2.2 Announced roll-out plans (e.g. by 20XX ...)

Not available.

2 Wholesale access products available

2.1 Dark fibre

Imposed as remedy in Market 4 as possible ancillary service, alternative to duct sharing if duct sharing or another alternative solution is not available in a duct.

2.2 Duct Access

Imposed as remedy in Market 4, as ancillary service to unbundling of copper pairs. The obligation to grant duct access is not restricted in terms of duct usage, duct location or duct age. It is cost oriented. An offer is available and operational since September 2008, following the imposition of the obligation (as interim measure) by CMT in May 2008. A reference offer, imposed

January 2009, will be available March 2009. Information about the existing civil infrastructure (ducts, chambers, poles) is available for alternative operators via online access.

2.3 Unbundling / Sub-loop unbundling

Included in Market 4, and imposed as remedy. Cost oriented, with prices based on cost model. Access obligation covers both ULL and SLU, but a reference offer is only available for ULL. ULL is widely used (23,8% of the copper broadband lines, with a growth of 25,4% in 2008), SLU is currently not used.

2.4 Bitstream

Included in Market 5, and imposed as remedy. The market analysis imposes a new enhanced bitstream with regional access points, with capabilities for residential and for business users. Additionally to internet access, due to the imposed wholesale obligation in market 2, it also contains a VoIP capability. It is technologically neutral, and thus valid for copper lines (xDSL, including VDSL) and fibre (for FTTH/GPON), as CMT considers that the substitutability is determined by the offered services and not by the technology. It is however limited to a speed of 30 Mbit/s, as there is considerable uncertainty regarding the retail and wholesale demand for ultra-broadband speeds.

The new and existing bitstream are cost oriented, with eviction prices, based on a cost model (prices for the new bitstream are under study). A reference offer is not yet available for the new bitstream, it is however available for the previous bitstream offer (which will remain in place until the new service is operational).

The current bitstream services are not widely used (5,9% of the copper broadband lines, with a decrease of 14,3% in 2008).

2.5 In-house cabling

Symmetrical measures were imposed February 2009 by CMT, aimed to promote and facilitate sharing of fibre deployments within and near buildings, valid for buildings without Common Telecommunications Infrastructures. These measures establish that operators that deploy in-building fibre wirings shall meet all reasonable access requests, and are obliged to agree with third parties procedures, technical constrains, prices and timings with regards to the provision of access to the fibre facilities installed. Such wholesale agreements must foresee the establishment of technical implementations so that other operators can share fibre resources under reasonable conditions in terms or costs and prices. In addition, to avoid that third operators encounter entry barriers such as property access negatives or lack of space for additional fibre deployments, the first operator in deploying fibre within buildings must play the role of manager of the network resources installed. Thus, the first operator is obliged to carry out the

tasks required to effectively complete the facilities sharing, such as cabling and installation of the referred facilities for third operators. Furthermore, the obligation to facilitate access to the facilities installed in buildings under reasonable costs is imposed, thus guaranteeing that costs do not constitute an entry barrier to third parties. Finally, as transparency obligations are essential in order to permit that third operators are in a position to efficiently arrange and generate access requirements, CMT has estimated that a number of information fields are indispensable for that purpose, such as passed buildings, details about the variety of deployment performed and technical data with regards to distribution boxes and fibre.

2.6 Backhaul

Backhaul is an ancillary service to market 4. The active backhaul services are defined in market 6. A reference offer is available; prices are cost oriented (except fast ethernet). Available services include 2M, 34M, STM-1, fast ethernet and gigabit ethernet.

In most of the exchanges with ULL operators present, backhaul is provided via interconnection of fibre at an external chamber, up to which each operator deploys its own fibre. The duct offer can also be used for backhaul.

2.7 Other

No other wholesale product available.

3 National next generation broadband initiatives or measures

The Ministry of Industry has created an advisory Council for the deployment of ultra-fast access infrastructure. The Council will advise the Ministry of Industry in the drafting of new legislation on Common Telecommunications Infrastructures in buildings (ICTs, which are telecommunications infrastructures, compulsory for buildings after 1998, and which will be updated to include optical fibre) and in the regulation of ducts for the deployment of telecommunications infrastructure in roads and railway lines. Additionally, it will advise on issues such as recommendations and best practices for the elimination of barriers in urban deployments of the new ultra-fast networks.

Sweden

1. Market developments

1.1 Incumbent

1.1.1 Actual roll-out

The incumbent (TeliaSonera) is mostly deploying FTTB, but they also have FTTH. TeliaSonera is offering triple-play (fiber) for 299 sek/month (28 euro) and has approximately 60 000 (fiber) broadband customers.

1.1.2 Announced roll-out plans (e.g. by 20XX ...)

TeliaSonera's project "Next" will before 2011 provide 1.5- 2 millions households and companies with high speed broadband (30-100Mbit).

(<http://www.teliasonera.se/press/pressreleases/item.page?prs.itemId=361457>)

1.2 Competitors (other telcos, cable)

1.2.1 Actual

Excluding TeliaSonera's customers there are 435 000 active fiberconnections in Sweden. The biggest operator is Telenor who offers broadband, telephony and TV. Telenor offers broadband and telephony for 199 sek /month (19 euro)

The cable operators have 546 000 broadband customer. The biggest cable operator is ComHem. ComHem offers triple-play for 268 sek/month (25 euro).

1.2.2 Announced roll-out plans (e.g. by 20XX ...)

Telenor has launched turbo-dsl. Turbo-dsl offers the customer a download capacity of 60 Mbps. Approximately 800 000 household can order turbo-dsl according to Telenor. Turbo dsl combined with telephony costs 349 sek/month (35 euro).

ComHem is deploying broadband with download capacity between 25-50 Mbps. The price for the service is 429 sek/month (41 euro).

2 Wholesale access products available

2.1 Dark fibre:

- a) Included in Market number – Not included in any market
- b) Regulatory obligation (main features, e.g. location of access point along the value chain)
 - b1) actual –no obligations
 - b2) planned / under discussion – access obligation (market 4)
- c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues) NA
- d) Availability of reference offer:
- e) Current usage in practice (e.g. available since ..., still under discussion) TeliaSonera (from march 2009) and other operators offers dark fiber

2.2 Duct Access

- B2) Proposed obligation in market 4

2.3 Unbundling / Sub-loop unbundling

- a) 11
- b1) access, costorientation, reference offer, non-discrimination,
- b2) see b1 (market 4)
- c) LRIC
- d) yes
- e) available since 2001

2.4 Bitstream

- a) 12
- b1) access, price regulation, reference offer, non-discrimination,

b2) see b1 (market 5). Proposed to change price regulation from retail-minus to costorientation

c) retail-minus

d) yes

e) available in practice since 2008

2.6 Backhaul

a) Leased lines (backhaul as such is not regulated at the moment)

b1) access, price regulation, reference offer, non-discrimination,

b2) Market 4 (LRIC)

c) cost-orientation (leased lines)

d) yes, leased lines

e) TeliaSonera offers backhaul products

Switzerland

1. Market developments

1.1a Incumbent (Copper access network)

Swisscom VDSL

1.1.1 Actual roll-out

1.1.1.1 Applied technology

VDSL

1.1.1.2 Available retail services

Triple play offer available (fixed access + DSL + TV); there is no bundle discount for triple play; but when bundling with a mobile postpaid subscription, Swisscom gives away the access charge (for mobile + DSL or mobile + DSL + TV). In this case however fixnet originated calls are blocked.

DSL: 300/100 at 3 CHF/h (max. 59 CHF/month)

DSL: 1000/100 at 34 CHF/month

DSL: 5000/500 at 49 CHF/month

DSL: 20000/1000 at 69 CHF/month (includes free fixnet calls).

TV on top from 22.25 CHF/month

1.1.1.3 Coverage

75% of households (December 2008)

1.1.2 Announced roll-out plans

1.1.2.1 Applied technology

VDSL

1.1.2.2 Available retail services

See above, no additional services announced yet.

1.1.2.3 Coverage

No announcements on future VDSL coverage

Swisscom FTTH

1.1.1 Actual roll-out

1.1.1.1 Applied technology

FTTH P2P 1.1.1.2 Available retail services

Private and small business offerings are yet to be introduced on a larger scale in the market. Business offerings are leased lines, VPN etc. Usually large account products are highly customized and few information is available on such offerings.

1.1.1.3 Coverage

12'500 sites (business customers) are connected through fibre (+40% in 2008).

1.1.2 Announced roll-out plans

1.1.2.1 Applied technology

FTTH P2P (Multi-Fiber)

Swisscom is rolling out 4 fibres from the manhole to the home. It is now looking for cooperations to swap fibres and to divide investment costs and fibres.

Swisscom has signed the first letter of intent for multi-fiber co-construction with a local utility (Groupe E of Fribourg) in March 2009. It foresees a cooperation for the construction of a multi-fiber FTTH access network in the Fribourg area. Operators will each lay four fibres from each apartment/unit up to the manhole (of Swisscom or the utility, depending on the operator constructing in the area). Fibres will then continue up to the constructing operators' ODF and through duct interconnection at the manhole to the partners' ODF. Both operators will now test the model and sign the agreement depending on the results of the test.

In several other cities (e.g. Basel and Bern) Swisscom is negotiating with utilities for a cooperation on multi-fibre. Where Swisscom is currently deploying its FTTH network without cooperation (e.g. Zurich) it is also laying four fibres in order to allow for possible future cooperations based on co-construction or other cooperation models. 1.1.2.2 Available retail services

First retail private and small business offerings have been introduced in April 2009 in Zurich.

	Internet Down- /Upload	HDTV Streams	Telephony	Price/Month
Home basic	20/1 Mbit/s	2 HDTV	Access included + free national fixed line calls	111.- CHF
Home standard	30/3 Mbit/s	3 HDTV	Access included + free national fixed line calls	139.- CHF
Home pro	50/10 Mbit/s	3 HDTV	Access included + free national fixed line calls	179.- CHF

There will be commercial wholesale offering from autumn 2009 with 30-50/10 Mbit/s.

1.1.2.3 Coverage

100'000 Apartments connected (ca. 3% coverage) through FTTH by the end of 2009.

33% of population connected through FTTH by 2015 (investments of 2.8 bn CHF in the extension of the fibre network are planned over the whole period).

1.1b Incumbent (Cable access network)

Cablecom

1.1.1 Actual roll-out

1.1.1.1 Name of company and applied technology, applied wholesale service (e.g. ULL) or own infrastructure

Cablecom (Liberty Global), own Cable access network, cable docsis 3 (no applied wholesale service)

1.1.1.2 Available retail services

Triple play offer available (components: VoIP + Internet + TV); there is no bundle discount for triple play but a temporary discount for at least two ordered products (fixnet access + internet + TV);

hispeed 250/100 at 25 CHF (only with fixnet access (VoIP over Cable))

hispeed 2000/200 at 34 CHF

hispeed 10000/1000 at 49 CHF

hispeed 25000/2500 at 75 CHF

Business offerings up to 10 Gbit/s. Usually large account products are highly customized and few information is available on such retail offerings.

1.1.1.3 Coverage

Cablecom connects 1.9 million households, corresponding to a coverage of around 60%. According to Cablecom 85% of firms in Switzerland are less distant than 500 meters from Cablecom optical fiber.

1.1.2 Announced roll-out plans

1.1.2.1 Applied technology

Cable

1.1.2.2 Available retail services

No anticipations

1.1.2.3 Coverage

No announcements on future coverage

1.2 Competitors (other telcos, cable)

Sunrise

1.2.1 Actual roll-out

1.2.1.1 Name of company and applied technology, applied wholesale service (e.g. ULL) or own infrastructure

Sunrise (TDC), ADSL2+, ULL

1.2.1.2 Available retail services

Sunrise click&call, 5000/500, 59 CHF in ULL areas / 79 CHF in non ULL areas (including free fixnet calls in the evening and on weekends); Discount when bundling with mobile postpaid

Sunrise click&call, 15000/1500, 79 CHF in ULL areas only (including free fixnet calls), 50 CHF when bundling with mobile postpaid

1.2.1.3 Coverage

30% of households in December 2008 (ULL), 80% of households by end 2009 (ULL). Currently no VDSL or FTTH roll-out plans.

EWZ

EWZ is the local utility of the city of Zurich.

1.1.1 Announced roll-out

1.1.1.1 Applied technology

FTTH P2P

EWZ is deploying 4 fibres in-house. However, only 1 fiber is deployed to the building.

1.1.1.2 Available retail services

Retail offerings through open wholesale access for existing retail providers (High definition IPTV, Highspeed Internet, VoD, VoIP, etc.). No own retail services planned.

EWZ has committed to provide non-discriminatory access to its fibres First offers by retail ISPs based on the EWZ fiber access network have now been launched in Zurich:

Orange Private:

Internet Down- /Upload	IPTV	Telephony	Price/Month
30/1 Mbit/s		Access included	69.- CHF
30/1 Mbit/s	1 Stream	Access included	102.- CHF
50/5 Mbit/s		Access included	118.- CHF
50/5 Mbit/s	1 Stream	Access included	151.- CHF

Additional TV Streams at 10.- CHF/month

Orange Business:

	Internet Down- /Upload	Price/Month
Office Fiber Pro 30/1	30/1 Mbit/s	69.- CHF
Office Fiber Pro 50/5	50/5 Mbit/s	118.- CHF
Office Fiber Business 50/10	50/10 Mbit/s	299.- CHF
Office Fiber Business 30/30	30/30 Mbit/s	799.- CHF

Sunrise:

Internet Down- /Upload	IPTV	Telephony	Price/Month
30/1 Mbit/s	1 Stream	Access included	109.- CHF

Netstream:

Internet Down- /Upload	Price/Month	Installation fee
10/1 Mbit/s	183.-	323.-
20/2 Mbit/s	337.-	323.-
30/3 Mbit/s	686.-	323.-
5/5 Mbit/s	678.-	323.-
10/10 Mbit/s	1024.-	323.-
20/20 Mbit/s	1589.-	323.-
50/50 Mbit/s	3239.-	323.-
100/100 Mbit/s	5679.-	323.-

Init7:

Internet Down- /Upload	Price/Month	Installation fee (12 month contract)	Installation fee (24 month contract)	Installation fee (36 month contract)
10/1 Mbit/s	44.- CHF	180 CHF	60 CHF	0 CHF
20/2 Mbit/s	55.- CHF	180 CHF	60 CHF	0 CHF
50/5 Mbit/s	99.- CHF	180 CHF	60 CHF	0 CHF
100/10 Mbit/s	166.- CHF	180 CHF	60 CHF	0 CHF
10/2 Mbit/s	333.- CHF	4'500.- CHF	3'250.- CHF	2'000.- CHF
20/4 Mbit/s	444.- CHF	4'500.- CHF	3'250.- CHF	2'000.- CHF
50/10 Mbit/s	555.- CHF	4'500.- CHF	3'250.- CHF	2'000.- CHF
100/10 Mbit/s	777.- CHF	4'500.- CHF	3'250.- CHF	2'000.- CHF

Several other ISPs are preparing offers.

1.1.1.3 Coverage

Current coverage: 2'190 households and 670 business customers (December 2008), Investments of 200 million CHF until 2013 foreseen. In 2013 13'123 households and 4'020 business customers should be connected.

Groupe E

Groupe E is a local utility based in Fribourg.

1.1.1 Announced roll-out

1.1.1.1 Applied technology

FTTH P2P (Multi-Fiber)

Groupe E is rolling out 4 fibers from the manhole to the home.

Groupe E has signed the first letter of intent for multi-fiber co-construction with Swisscom in March 2009. It foresees a cooperation for the construction of a multi-fiber FTTH access network in the Fribourg area. Operators will each lay four fibers from each apartment/unit up to the manhole (of Swisscom or the utility, depending on the operator constructing in the area). Fibers will then continue up to the constructing operators' ODF and through duct interconnection at the manhole to the partners' ODF. Both operators will now test the model and sign the agreement depending on the results of the test.

1.1.1.2 Available retail services

Groupe E has committed to provide non-discriminatory access to its fibres. Retail offerings through open wholesale access for existing retail providers (High definition IPTV, Highspeed Internet, VoD, VoIP, etc.) are foreseen. No own retail services are planned.

1.1.1.3 Coverage

Current coverage: n/a. Timing and target coverage n/a yet.

Other local utilities

The local utility of St. Gallen (SGSW) has also started the deployment of fiber (FTTH). Retail offerings will be provided through open wholesale access for existing retail providers (IPTV, Internet, VoIP). SGSW aims to reach 90% of city households by 2018.

Many other local utilities are discussing FTTH investments. Many of them are part of "openaxs", an association of local utilities with the aim of promoting utility fiber deployment and in particular non-discriminatory access. Several decisions on public financing of projects are scheduled in 2009 (e.g. Basel (IWB) and Bern (EWB))

2 Wholesale access products available

a) Included in Market number X

b) Regulatory obligation (main features, e.g. location of access point along the value chain)

b1) actual

b2) planned / under discussion

c) Costing (e.g. LRIC, price-cap, costs determined based on cost model; cost allocation issues)

d) Availability of reference offer

e) Current usage in practice (e.g. available since ..., still under discussion)

2.1 Dark fibre

a) no dark fiber market foreseen.

b) None.

c) -

d) No.

e) -

2.2 Duct Access

a) separate duct market (SMP analysis by Comcom/BAKOM under way)

b) No regulated duct offer to date. Cost-based price regulation of ducts if SMP is found by Comcom/BAKOM. Access obligation if capacity is available.

c) LRIC

d) Yes.

e) Only unregulated product today (available since 2007).

2.3.1 Unbundling of the local loop (copper)

a) separate market (no SMP analysis provided as incumbent has recognized its SMP position (ex-post regime))

b) Copper local loop (Endpoint local exchange); cost-based price regulation (no modification foreseen) with collocation obligation.

- c) LRIC
- d) Yes.
- e) Available since 2007, regulated offer since 2008.

2.3.2 Unbundling of the sub-loop (copper)

- a) separate market (no SMP analysis)
- b) No regulated sub-loop offer to date. Cost-based price regulation on hold as parties agreed to renegotiate. Collocation obligation if capacity is available.
- c) Prices would be LRIC
- d) Yes.
- e) Only unregulated product available (since 2008), but not used yet.

2.4 Bitstream

- a) separate market (SMP analysis under verification; market intervention warranted only for 4 years by decision of the parliament)
- b) No regulated bitstream offer to date. Cost-based price regulation of bitstream (*over copper only*) and *only up to the local exchange* will be introduced if the SMP analysis is confirmed by the federal administrative court.
- c) LRIC
- d) Currently no.
- e) Commercial offer available today

2.5 In-house cabling

- a) not addressed yet.
- b) none
- c) -
- d) -
- e) under discussion

2.6 Backhaul

Not addressed yet

2.7 Other

- Leased lines: Currently under SMP analysis by Comcom/BAKOM
- Fixed termination and origination: LRIC price regulated (No SMP analysis provided)
- Mobile termination: No claims, therefore no regulatory intervention in the Swiss ex-post regulatory regime. However, antitrust proceedings are pending.
- Access Billing: (SMP analysis provided), Retail minus price regulated

3 National next generation broadband initiatives or measures

Χυρρεντλψ τηρε ις νο εξπλιχιτ βροαδβανδ στρατεγψ ιν Σωιτζερλανδ ανδ νο νεξτ γενερατιον βροαδβανδ μεασυρεσ ορ ινιτιατιπες αρε ιν πλαχε. Ηοωεπερ, της Παρλιαμεντ ηας ρεθυεστεδ της Γοπερνμεντ το αναλψσε της σιτυατιον ον της τελεχομμυνιχατιονς μαρκετ (ιν παρτιχυλα ρ βροαδβανδ) ανδ το δεπελοπ προποσαλς το αδδρεσσ ποσσιβλε προβλεμς.

Turkey

Roll-out:

A Türk Telekom (Incumbent) -----> VDSL

(Türk Telekom is wholesaler and resales VDSL & provides IP BSA for VDSL)

Coverage: only 9.000 VDSL ports available all around Turkey

(no info about the # of subscribers, it is a very new service)

Retail Products:

1/16 mbps (119 Turkish Liras), 1/32 mbps (149 TL)

B Telekom (ISP) -----> FTTH/FTTB (mainly FTTB)

70.000 homes passed & about 10.000 subscribers

Moreover, 80.000 homes are in quickly connectable positions

Retail Products:

10 Mbps (Unlimited) 63,81 TL

20 Mbps (Unlimited) 100,80 TL

100 Mbps (Unlimited) 137,80 TL

Wholesale access products available:

A Dark Fibre: No (moreover, no discussion about it)

B Duct Access: Yes, but only for the purposes of backhaul (only in cases of LLU; BSA and interconnection)

There is also an annex about such kind of duct access in Reference LLU, BSA and interconnection offers

C Unbundling: Yes, Subloop Unbundling: No

D Bitstream: Yes (both IP and ATM BSA available, but ATM BSA will enter into force in July 2009)

E In-house cabling: not applicable

F Backhaul: See 1 and 2

United Kingdom

1. Market developments

1.1 Incumbent

1.1.1 Actual roll-out

Openreach has announced the 2 sites for operational pilots of FTTC to begin in summer 2009. One of the two exchanges will be in Muswell Hill, London. The other will be an exchange in Whitchurch, South Glamorgan and the pilot will involve up to 15,000 customer premises. End user customers in this trial will experience headline speeds of up to 40 Mbp/s. BT expects to announce detailed plans for the initial market deployment of the Openreach product in early 2010.

Prior to its two local FTTC trials in Muswell Hill, London and Whitchurch, South Glamorgan, Openreach will run a technical trial in the Foxhall exchange area of Kesgrave, Suffolk in early 2009. Some 35 homes will be involved.

Fibre to the premise (FTTP) is being deployed in the Ebbsfleet Valley part of the Thames Gateway project in Kent. Openreach will supply the infrastructure, but BT Retail and its competitors will be offered access to the high speed lines on a wholesale basis. The top available speed will be 100Mbit/s. However, it will initially be limited to around 600 new houses. The development will eventually have some 10,000 homes.

The Olympic Village being built in East London for the Olympic Games in 2012 is expected to deploy local fibre connections. Once the Games are over, the village will be converted to homes and again FTTH will be provided.

1.1.1.1 Applied technology (e.g. FTTH GPON, FTTH P2P, FTTB, VDSL, Cable)

Mixture of FTTH GPON and FTTC/VDSL

1.1.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

To be confirmed

1.1.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

1.1.2 Announced roll-out plans (e.g. by 20XX ...)

BT has announced a target of 10m homes or approx. 40% households (1m homes with FTTH/FTTB and 9m homes with FTTC + VDSL2) by 2012.

1.1.2.1 -1.1.2.3 (see structure "actual roll-out" above)

BT's network plan for 21CN will simplify the hierarchical structure above the MDFs, but would not reduce the number of approx. 5,500 MDF sites.

In October 2008, Openreach published three documents outlining its NGA network developments see response to 1.1.1 above

1.2 Competitors (other telcos, cable)

1.2.1 Actual roll-out

1.2.1.1 Name of company and applied technology, applied wholesale service (e.g. ULL) or own infrastructure

Virgin Media using Docsis 3.0 40% of cable footprint (i.e. around 25% of homes) available since December 2008, with the aim for almost all of the digital cable footprint by mid 2009 (i.e. nearly 50% of UK homes).

1.2.1.2 Available retail services (e.g. product name, type of service (e.g. triple play), bandwidth, price level, price structure)

1.2.1.3 Coverage (e.g. 25% homes passed, number of actual access lines)

1.2.2 Announced roll-out plans (e.g. by 20XX ...)

H2O Networks FTTH (via sewers) in Bournemouth will cover all businesses and 88,000 homes and Dundee 55,000 homes. H2O Networks will connect by March 2009 an initial 30 homes in Bournemouth to its FTTH. Households and businesses have a limited period to opt in to get connected to the 'up to' 100 Mbps network for free. Future connection charges could top GBP400. The local newspapers reported that 5,600 local residents and businesses have signed-up for the service, a 40 percent take-up rate. The network is expected to be completed by 2010.

In Dundee, H2O Networks has offered local residents and businesses in Dundee to connect to its FTTH network for free via an opt-in campaign, which will run over the next 12 months. The FTTH network will allow more than 70,000 households and businesses in the city to benefit from super fast broadband of up to 100 Mbps. It will use a proportion of Scottish Water's waste water network to lay the fibre optic cable across the city and aims to be Scotland's largest fibre to the home (FTTH) network. Work has already started on Fibrecity Bournemouth which has seen a large number of residents and businesses opt in to the initiative over the last couple of months. Work on Fibrecity Dundee will start this summer and will take approximately two years to roll out.

Digital Region NGA project in South Yorkshire. This project is supported by a partnership of Objective 1 (European Commission funding), Yorkshire Forward (the Regional Development Agency), Barnsley Metropolitan Borough Council, Doncaster Metropolitan Borough Council, Rotherham Metropolitan Borough Council and Sheffield City Council. Following a European Union procurement process, Thales Communication Services Ltd has been selected as the provider for the project which will use fibre to the cabinet (FTTC) to around 550,000 households and 40,000 businesses in the region. The Network Operating Centre (NOC) will be in Doncaster. Although the project has taken longer than expected, it will now be a three-year build programme commencing early in 2009 with the first services being offered in the second half of 2009. The network will use 12km of fibre, of which 700m will be new as the majority will be existing dark fibre or private circuits. Thales expect to see a return on investment by years 7-8.

LightSpeed Derby is a project with two targets. First, By 2012, it would like to have a locally managed core fibre network linking up the premises of all public sector agencies, all major businesses, business parks, and all major new developments. By 2016, it would like to have next generation broadband access available to 100% of households.

Small local schemes including FTTH in housing estates in Corby and Andover (and a housing association building 100 homes in Westwhitlawburn housing development in Glasgow. Some major developments under construction are also being built with FTTH e.g. Salford Media City, Titanic Quarter (Belfast), development in Wembley etc.

There have also been some proposals for schemes in Nottingham, Salford, Derby and elsewhere.

1.2.2.1 – 1.2.2.3 (see structure “actual roll-out” above)

See responses above.

2 Wholesale access products available

2.1 Dark fibre

(the following sub-items apply correspondingly to the other wholesale services)

No dark fibre obligation

b2) planned / under discussion

We said that depending on the responses to the Business Connectivity Market Review consultation, we considered access the case for the provision of dark fibre in the access for business connectivity services markets, including new build developments.

2.2 Duct Access

e) Still under discussion

2.3 Unbundling / Sub-loop unbundling

e) In the Ofcom Superfast Broadband consultation SLU with appropriate backhaul products is being considered but still at early stages of discussion. Of course SLU for current generation services is already mandated along with LLU obligations.

FTTH: fibre (for point-to-point) and wavelength (for PON) unbundling is also considered in the Ofcom consultation document.

2.4 Bitstream

e) To reduce roll-out costs and prevent technological isolation, Ofcom is promoting a sets of 5 technical characteristics from which Ehternet bitstream access products could be developed:

flexible range of aggregation and interconnection points

support for multicast (for audio-visual content)

network security (for data protection)

QoS (for prioritising traffic)

wide range of consumer premise equipment.

Currently Openreach is developing its FTTC and FTTH Generic Ethernet Access product on a commercial basis, i.e. it is not mandated by Ofcom following a market review.

Ofcom said it could in future require BT/Openreach to provide ALA-level Ethernet-based "high quality fit-for-purpose wholesale upstream input" allowing communications providers to build their own services and retain as much as possible of the control offered by passive inputs, in contrast to existing bitstream services.

2.5 In-house cabling

No discussion of this in the UK so far. Not an issue addressed by Ofcom so far.

2.6 Backhaul

On 8th Dec. 8, 2008 Ofcom adopted final decision following its Business Connectivity Market Review. Ofcom concluded that there were a range of submarkets and Ofcom outlined the regulation associated with Openreach's fibre-based Ethernet services.

In addition Ofcom has issued a consultation document which will consider the nature and structure of a proposed Leased Lines Charge Control for Openreach Ethernet products and Partial Private Circuits (PPCs).

The 'Business Connectivity Market Review' statement, sets out the SMP regulation applicable to certain specified leased line markets for the next four years or until the next review of this market. This includes the market for wholesale Openreach Ethernet products with bandwidths up to and including 1 Gbit/s.

In their announcement of 8th December 2008, Ofcom said -

"Leased lines play an important role in business communications in the UK. They are a key building block in the communications networks on which UK businesses depend, and which are central to the effective functioning of the economy. It is therefore of considerable importance that the markets for these services operate effectively, and deliver the services which businesses require in a timely, efficient and cost-effective manner, based where possible on active competition between service providers."

Regarding the proposed Leased Lines Charge Control Ofcom said -

"We note that the next charge controls are being set in a dynamic and evolving market environment:

The UK communications market is seeing increased demand for bandwidth in the backhaul network, to support higher speed broadband services and the associated growth of internet traffic.

Ofcom is consulting on Leased Line Charge Controls for wholesale Ethernet Services of 1Gb and below, which will run until September 2012. The consultation period for the Charge Control will run from 8th December until 2nd February 2009. Following this consultation Ofcom expects to publish their Final Statement in March 2009, with the proposed charge controls coming into effect as of 1st April 2009.

Full details of the Ofcom BCMR announcement can be viewed here:

<http://www.ofcom.org.uk/consult/condocs/bcmr08/>

The Leased Lines Charge Control consultation document and supporting reference can be found at: <http://www.ofcom.org.uk/consult/condocs/llcc/>

2.7 Other

e) In Sept. 2008 Ofcom launched its consultation on 'Delivering super-fast broadband in the UK' that ran until 2nd Dec. 2008 with proposals on its policy approach to NGA and Ofcom's statement on 'Next Generation New Build' setting out its approach to NGA regulation applying to new build homes. Ofcom also published its technical specifications on ALA.

With regard to Ofcom's New Build Statement, it stated that:

Where there is only one access network, the operator of that network to provide access on a fair, reasonable and non-discriminatory basis through fit for purpose wholesale access products.

Public Telephone Network providers provide a battery backup facility in compliance with General Condition 4 (part of the UK general authorisations regime)

Publicly Available Telephony Service providers to take all reasonable steps to ensure network integrity and service reliability to comply with General Condition 3.1(c). (part of the UK general authorisations regime)

Providers are opting for backup lasting four hours.

Universal Service Obligation continues to apply but that a parallel copper network is not necessary to meet these USO obligations and the designated USO provider may find an alternative means of offering its USO.

Annex 2: Table on NGA Factual Development

NGA Factual Development							Regulatory Decisions	Next generation broadband initiatives or measures	Remarks
Mainly Scenario 1 (FTTCab)	Mainly Scenario 2 (FTTB/H)	Cable (DOCSIS 3)	Comparison Deployment (Coverage): 1) last country study, 2) actual 1.1.2009, 3) mid-term future	„Joint“ projects	local authorities				
Austria	Interest from incumbent (but no formal decision so far)	Competitors (on small scale local level)	Field trials ongoing: deployment announced for 2009	No figures available / no deployment yet	no joint projects	no projects by local authorities	Consultation in 2007; industry working groups + workshops in 2008 organised by NRA. Market analysis for market 4 about to be started		
Belgium	Incumbent	-	Upgrade started for 65 % coverage	1) – 2) 61 % 3) 80 % 2011	-	-	SLLU + WBA VDSL2 + duct backhaul	Broadband initiatives are being investigated by the minister.	Considering broadcast in Market Analysis 5 2009
Czech Republic	Incumbent trial / Interest from incumbent (but no formal decision so far)	Incumbent: trial OLOs: (Smart-comp, Ci-Net, Mattes) in main cities.	Mainly DOCSIS 2.0, soon migration procedure to 3.0	1) N/A 2) There is no official information regarding NGA deployment from the operators, but less than 5% 3) N/A	no joint projects	There is a funding project for municipal, fibre based, networks in some municipalities in Czech Republic. The networks will be public networks and their principal role is to interconnect several public local authorities within the municipality.	-	A public co-funding project for the deployment of a FTTH, “open access” network in several major cities and towns in Czech Republic.	

NGA Factual Development						Regulatory Decisions	Next generation broadband initiatives or measures	Remarks
Mainly Scenario 1 (FTTCab)	Mainly Scenario 2 (FTTB/H)	Cable (DOCSIS 3)	Comparison Deployment (Coverage): 1) last country study, 2) actual 1.1.2009, 3) mid-term future	„Joint“ projects	local authorities			
Denmark	Incumbent Competitors	Incumbent Competitors (FTTB/H)	Incumbent Competitor (limited upgrade to docsis 3)	1) 18 % Fibre and fibrelan. 57 % cable 2) 18 % Fibre and fibrelan. 57 % cable	joint projects on small scale level (power utility companies deploying FTTH)	A small number of local distribution of Cable	Consider inclusion of incumbents Cable- network in market 5 decision (draft). Inclusion of backhaul transmission facilities (dark fibre and ducts) + imposition of announcement procedures for remote positions in market 4 decision.	The Danish government is currently setting up a high speed committee.

NGA Factual Development						Regulatory Decisions	Next generation broadband initiatives or measures	Remarks	
Mainly Scenario 1 (FTTCab)	Mainly Scenario 2 (FTTB/H)	Cable (DOCSIS 3)	Comparison Deployment (Coverage): 1) last country study, 2) actual 1.1.2009, 3) mid-term future	„Joint“ projects	local authorities				
France	no	Incumbent = Orange (FttH G-PON) Competitors = SFR (FttH G-PON & Point to Point in Paris) Free (FttH Point to Point)	Numerical cable (FttLA based on DOCSIS 3.0 technology)	1) FT 270 M€ Free 160 M€ SFR 300 M€ 2) FT 3M homes in the FttH zone (10 cities), 500 000 homes passed. Numericable : 3M homes passed SFR/Free : 1M homes passed 3) FT 4 bn € until 2012, Free 4M homes passed by end 2012 Numericable 8M homes passed by end 2011		A few FttH projects are under study or roll out by local authorities in small and medium cities (a few thousands homes passed) Some local authorities are putting their ducts at disposal of alternatives operators (ex: Montpelier)	Market Analysis of market 4 : - relevant market including copper loop, fiber loop and ducts - FT SMP has to give access to : => unbundled access to copper local loop and sub loop => access to its ducts and manholes for Fttx rolls out Market Analysis of market 5 : - relevant market including bit-stream access based on DSL and fiber - FT SMP has to give access to : => DSL bit-stream	- vote of the “Loi de Modernisation de l’Economie” in Summer 2008 : => introduction of a right to fiber => obligation for an operator to give access to the last part of the fiber in buildings where he has rolled out its fiber network => power of symmetrical regulation for ARCEP - implementation in 2009 of two decrees to help local authorities to evaluate the rollout of networks infrastructure and services on their territories - ARCEP is about to publish recommendations on the sharing of the last part of fiber, ¹⁹¹ based on trials done in the last 3 months	- no obligation through SMP regulation on fiber, either on market 4 or market 5 for the moment - ARCEP deals with the question of access to fiber within the symmetrical obligation of sharing of the last part of the fiber loop - balanced regulation of NGA through: - asymmetrical regulation of the ducts of the incumbent - symmetrical regulation of the last part of the fiber

NGA Factual Development						Regulatory Decisions	Next generation broadband initiatives or measures	Remarks
Mainly Scenario 1 (FTTCab)	Mainly Scenario 2 (FTTB/H)	Cable (DOCSIS 3)	Comparison Deployment (Coverage): 1) last country study, 2) actual 1.1.2009, 3) mid-term future	„Joint“ projects	local authorities			
Germany	Incumbent	Competitors	<p>1) DTAG: VDSL (50 cities: 12 deployed in 2006, 27 envisaged for end 2007, rest from 2008 onwards) ADSL2+: 750 cities envisaged for end 2007 NetCologne: 9.000 households envisaged for 2007</p> <p>2) DTAG: VDSL: 50 cities / ADSL2+ 750 cities. NetCologne: 10.000 customers connected (1.9.2008), M-Net: 10.000 buildings envisaged for 2008.</p> <p>3) DTAG: no clear announcement. NetCologne: >50.000 buildings envisaged. M-Net (Munich): 60% of all flats (2011)</p>	DTAG/Vodafone projects in 2 cities (planned projects with other competitors: not officially confirmed)	some local utilities in regional centres rolling out FTTH networks (e.g. Schwerte, Sindelfingen)	<ul style="list-style-type: none"> - subloop-unbundling (obligation but not operational) - access to ducts (only if not possible / unavailable: access to dark fibre) 	<p>Optimization of shared use of existing infrastructures/facilities</p> <p>Infrastructure atlas and database on construction sites to be developed</p> <p>Tax concessions for installations connecting broadband to/withing building</p> <p>Support programmes (> €150 Mio) for broadband white spots</p>	

NGA Factual Development						Regulatory Decisions	Next generation broadband initiatives or measures	Remarks
Mainly Scenario 1 (FTTCab)	Mainly Scenario 2 (FTTB/H)	Cable (DOCSIS 3)	Comparison Deployment (Coverage): 1) last country study, 2) actual 1.1.2009, 3) mid-term future	„Joint“ projects	local authorities			
Greece	Incumbent trial	There is no official retail product from OLOs or the Incumbent.	No	There is no official information regarding NGA deployment from the operators	-	There is a funding project for municipal, fibre based, networks in 75 municipalities in Greece. The networks will be public networks and their principal role is to interconnect several public local authorities within the municipality	<ul style="list-style-type: none"> - The definition, analysis and remedies for Market 4 are under National consultation and are not notified yet - subloop-unbundling (obligation but not operational) - access to ducts (only if not possible / unavailable: access to dark fibre) 	A public co-funding project has been approved and is being designed. Its main scope is the deployment of a FTTH, “open access” network in several major cities and towns in Greece. The funding mechanism is based on a Public Private Partnership approach.
Hungary	Incumbent, on a small scale.	Incumbent (FTTH) Competitors (FTTB)	Mainly DOCSIS 2.0, soon migration procedure to 3.0				Consultation in 2008. Market analysis for market 4 and 5 in 2009.	No

NGA Factual Development						Regulatory Decisions	Next generation broadband initiatives or measures	Remarks
Mainly Scenario 1 (FTTCab)	Mainly Scenario 2 (FTTB/H)	Cable (DOCSIS 3)	Comparison Deployment (Coverage): 1) last country study, 2) actual 1.1.2009, 3) mid-term future	„Joint“ projects	local authorities			
Ireland	Incumbent trial	Approx. 5,000 with 2 altnets Small incumbent trial	No	1) N/A 2a) Competitors: 0.5% 2b) Incumbent: Dependent on outcome of incumbent trial – delayed over one year 3) Original announcement was 37 largest exchanges covering approx 40% of population		28 regional mans	Duct access Backhaul Dark fibre (all pending)	1) National Broadband Scheme with “3 Mobile” – for rural areas 2) Various North-South government backed schemes 3) 27 Government owned MAN’s in regional cities & towns - open access dark fibre & managed services

NGA Factual Development						Regulatory Decisions	Next generation broadband initiatives or measures	Remarks
Mainly Scenario 1 (FTTCab)	Mainly Scenario 2 (FTTB/H)	Cable (DOCSIS 3)	Comparison Deployment (Coverage): 1) last country study, 2) actual 1.1.2009, 3) mid-term future	„Joint“ projects	local authorities			
Italy	Incumbent interest	Incumbent trial. Used by OLO (Fasweb) in main cities.	No	INCAMBENT 1) NA 2) Incumbent: trial in Milan 3) Incumbent: coverage should reach 65%, corresponding to 1140 cities, in the long term OLO (FASTWEB) 1) NA 2) about 2 millions homes passed in some main cities 3) NA	No	No	<ul style="list-style-type: none"> - subloop-unbundling available in unbundling reference offer (not used by OLO yet) - access to ducts (for connection from MDF to local exchange incumbent provides an offer in the unbundling reference offer. General obligation may be defined at the end of the second market analysis 11, not yet completed) 	
Netherlands	Incumbent (mainly pilots) (FTTC)	Joint venture of incumbent and Reggefiber (FTTH, Point-to-point)	Yes, but in its early stages. Deployed on larger scale in 2009.	1) 2) 1-2% (FTTH) 3) 10-15% in 2011 (FTTH) Incumbent decision on future (large scale) roll out VDSL/FTTH depends on evaluation of 2009 roll outs	Joint venture incumbent / Reggefiber	More than 40 local initiatives (increasing involvement of Reggefiber)	<ul style="list-style-type: none"> - fibre unbundling - sub loop unbundling - “business” WBA on fibre 	General symmetric facility sharing obligation in the telecommunications law relating to access to ducts.

NGA Factual Development						Regulatory Decisions	Next generation broadband initiatives or measures	Remarks
Mainly Scenario 1 (FTTCab)	Mainly Scenario 2 (FTTB/H)	Cable (DOCSIS 3)	Comparison Deployment (Coverage): 1) last country study, 2) actual 1.1.2009, 3) mid-term future	„Joint“ projects	local authorities			
Norway	Incumbent (Telenor) is considering FTTC. One competitor (NextGen-Tel) has recently announced that they will offer VDSL2.	Competitors (mainly FTTH P2P), but incumbent has also started offering FTTH (GPON)	Incumbent and competitor are still testing. No commercial offers yet.	1) N.A. 2) No details on NGA-coverage available yet on the national level. However, in some regions/cities/municipalities, the coverage is above 50 %. 3) N.A.	There are a few examples of joint projects, mainly related to engineering work (ducts etc.). However, such co-operation is usually on a case-by-case basis.	Yes (mainly through fully or partly owned power utility companies).	<ul style="list-style-type: none"> - Sub loop unbundling available (but not yet widely used) - Access to ducts (part of the incumbent's co-location reference offer) - Access to dark fibre 	No national initiatives or measures taken specifically targeted towards next generation broadband.

NGA Factual Development						Regulatory Decisions	Next generation broadband initiatives or measures	Remarks
Mainly Scenario 1 (FTTCab)	Mainly Scenario 2 (FTTB/H)	Cable (DOCSIS 3)	Comparison Deployment (Coverage): 1) last country study, 2) actual 1.1.2009, 3) mid-term future	„Joint“ projects	local authorities			
-	Incumbent (mainly pilots) (FTTH) A pilot project is being carried out in Warsaw by the incumbent. The operator has chosen for tests a building with 265 flats in one of Warsaw district. Study group is composed of young people who help TP to find right scenario for rolling out NGA. Dialog (alternative operator) has already carried out a comprehensive test of PON. By the end of 2008, there were 3 120 access fiber lines provided by 17 alternative operators. Some of those operators are cable providers who operate locally (in Silesia, Wielkopolska)	Yes, but in its very early stages. INEA-cable operator announced in 2009 plans to start NGN roll-out. It didn't precise details about planned technology.	Incumbent's decision on future VDSL/FTTH roll out depends on giving the operator guarantees for return on investment.	No joint projects	No	So far there are no regulatory decisions. The Polish regulator at this moment is conducting market analysis for markets 4 and 5. Access to the ducts will be taken into account in market 4 analysis.	Ordinance foreseeing an obligation to equip the building with telecommunications installation covering the whole distance from connection to the public telecommunications network to end user's premises.	-

Poland

NGA Factual Development						Regulatory Decisions	Next generation broadband initiatives or measures	Remarks	
Mainly Scenario 1 (FTTCab)	Mainly Scenario 2 (FTTB/H)	Cable (DOCSIS 3)	Comparison Deployment (Coverage): 1) last country study, 2) actual 1.1.2009, 3) mid-term future	„Joint“ projects	local authorities				
Portugal	No formal plans announced (Incumbent with ADSL 2+ only)	Incumbent and competitors (2, including cable)	Yes	1) NA 2) 0,5 % competitors 50 % by 2010 (incumbents/competitors)	Possibly (see Remarks)	Yes. Some very restricted regional FTTH projects.	1) access to ducts 2) possibly, access to dark fibre and fibre unbundling subject to specific consultation	a) Connect to NGN/NGA all justice public services, basic and secondary schools, hospitals, health centres, museums and libraries (before 2010); b) Make compulsory the implementation of fibre in new buildings and urbanisations; c) Open a non-discriminatory access to ducts and critical infrastructure owned or managed by all types of entities (e.g. telecom's operators, utilities, municipalities, etc.).	Government protocol signed in January by the main operators (including the incumbent): possible impact on coverage, "joint" projects and by local auth.

NGA Factual Development						Regulatory Decisions	Next generation broadband initiatives or measures	Remarks
Mainly Scenario 1 (FTTCab)	Mainly Scenario 2 (FTTB/H)	Cable (DOCSIS 3)	Comparison Deployment (Coverage): 1) last country study, 2) actual 1.1.2009, 3) mid-term future	„Joint“ projects	local authorities			
Romania	Incumbent	Competitors (mainly cable operators)	No information available.	Data on coverage is confidential.	No	Yes. In Bucharest, following a public-private partnership, a metropolitan network will be developed.	Subloop-unbundling obligation is in place but not used in practice	No initiatives or measures.
Slovak Republic	-	Incumbent, competitors	Yes, but it is in early stages.	1) NA 2) Incumbent - At the end of 2008 around 200 K households all around Slovak republic close to installation solely within the 10 biggest towns of Slovakia. 3) NA	-	None	-	So far no next generation broadband initiatives or measures

NGA Factual Development						Regulatory Decisions	Next generation broadband initiatives or measures	Remarks
Mainly Scenario 1 (FTTCab)	Mainly Scenario 2 (FTTB/H)	Cable (DOCSIS 3)	Comparison Deployment (Coverage): 1) last country study, 2) actual 1.1.2009, 3) mid-term future	„Joint“ projects	local authorities			
Slovenia	Incumbent, competitors. The AO T-2 holds the majority of market share in FTTH.	Not yet implemented .	1) // 2) Coverage of incumbent, Telekom Slovenije: Penetration per household (active connections): 1,4% Penetration per household (active and inactive connections): 9,6% Coverage of AO T-2: Penetration per household (active connections): 3,6% Penetration per household (active and inactive connections): 17,1% 3) AO Amis deploying its fibre network in limited areas. If inactive lines of the incumbent, Telekom Slovenije would change to active, the market share of the incumbent would significantly increase and would parallel that of the AO T-2.	No joint projects	European and state funding for local municipality projects of open access NGA networks.	Market analysis for market 4 and 5 currently underway.	No initiatives or measures planned, as level of investment is already very high.	

NGA Factual Development						Regulatory Decisions	Next generation broadband initiatives or measures	Remarks
Mainly Scenario 1 (FTTCab)	Mainly Scenario 2 (FTTB/H)	Cable (DOCSIS 3)	Comparison Deployment (Coverage): 1) last country study, 2) actual 1.1.2009, 3) mid-term future	„Joint“ projects	local authorities			
Spain	Incumbent (field trial)	Incumbent Competitor (field trial)	Competitors (limited upgrade to Docsis 3.0)	1) > 40 % for 25 MBit/s (2009) 2) n.a. 3) 2010: 25% of loops with 100Mbit/s, >40% of loops with 30Mbit/s		FTTH public open access network in Asturias	1) duct Access (RDO), if not available: dark fibre 2) WBA for VDSL & Fibre up to 30 Mbit/s 3) SLU (without offer) 4) Symmetric in-building access obligation for fibre	Advisory Council for new law to include fibre in Common Telecommunication Infrastructures in buildings, deployment of fibre in roads an railway lines, and elimination of barriers in urban deployments
Switzerland	Incumbent	Incumbent, three major local utilities	Yes	<u>Incumbent:</u> 1. VDSL: 75% by 2010 (announced end 2006) 2. VDSL: 75% FTTH: <1% 3. VDSL: n.a. FTTH: 2015 – 33%	Letter of intent between Swisscom and the local utility Groupe E (Fribourg) foreseeing a cooperation for the construction of a multi-fiber FTTH access network in the Fribourg area.	The cities of Zurich and St. Gallen and the Canton of Fribourg invest through local utilities (FTTH); other local decisions are ahead (e.g. Basel and Bern)	- none definite yet - law permitting duct access → regulation under way - law permitting sub-loop unbundling → regulation on hold (as parties agreed to renegotiate)	
Turkey	Interest from incumbent (but insignificant deployment)	Competitors (on small scale local level)	No deployment of cable operator	2) 01.3.2009 → Insignificant 3) No considerable roll out plan	no joint projects	no projects by local authorities	No regulatory decisions	

NGA Factual Development						Regulatory Decisions	Next generation broadband initiatives or measures	Remarks
Mainly Scenario 1 (FTTCab)	Mainly Scenario 2 (FTTB/H)	Cable (DOCSIS 3)	Comparison Deployment (Coverage): 1) last country study, 2) actual 1.1.2009, 3) mid-term future	„Joint“ projects	local authorities			
UK	Openreach & Sky Trials	Fibre to the premise (FTTP) is being deployed by Openreach in the Ebbsfleet Valley to be offered to retail SPs. Also competitors (mainly non-traditional operators / new infrastructure providers on a city or new development basis e.g. H2O in Bournemouth and Dundee	50 MBit/s service launched 12/08, 40% of footprint enabled at launch, with the aim for almost all of the digital cable footprint by mid 2009 (i.e. nearly 50% of UK homes)	BT FTTC 10m homes by 2012, commercial deployment early 2010 pilots ongoing	None	Yes	Statement made on new build, further consultation and statement on superfast broadband to be published on 24/02. Market reviews to follow	

Annex 3: Table of Price Control Measurements

Price control measures		Access Products				Backhaul products				Bitstream products
		DUCT-access	Unbundled Fibre	Subloop (copper)	Inhouse wiring access	DUCT-access	Dark Fibre	xWDM-access	Capacity-access (Ethernet, SDH)	Bitstream access
Annex 3 to PRD1 Report	Regulation	N	N	Y	Y	N	N		Y	Y
	Tariff	0	0	Y	Y	0	0		Y	Y
	Type	0	0	already paid with enduser access fee => 0 €	FL-LRAIC	0	0		Efficient service provision	retail minus
Austria	Regulation	N	N	Y	N	Y	Y	N	Y	Y
	Tariff	0	0	Y	0	N	N	0	Y	Y
	Type	0	0	LRIC - bottom up	0	cost oriented (but tariff not yet fixed)	cost oriented	0	LRIC - bottom up	LRIC - bottom up
Belgium	Regulation	N	N	N	N	N	N		N	N
	Tariff	0	0	0	0	0	0		0	0
	Type	0	0	0	0	0	0		0	0
Czech Republic	Regulation	N	N	Y	Y	Y (draft)	Y (draft)		Y	Y
	Tariff	0	0	Y	Y	Y	Y		Y	Y
	Type	0	0	LRIC (LRAIC)	HC	LRIC (LRAIC)	LRIC (LRAIC)		LRIC (LRAIC)	LRIC (LRAIC)
Denmark	Regulation	N	N	Y	N	Y	N		N	Y
	Tariff	0	0	Y	0	?	0		0	Y
	Type	0	0	HCFDC	0	?	0		0	retail minus
Estonia	Regulation	Y	N	Y	Y	Y	N		Y	Y
	Tariff	Y	0	Y	Y	Y	0		N	Y
	Type	?	0	current cost	?	?	0		0	no eviction price
France	Regulation	N	N	Y	Y	Y	Y		Y	Y
	Tariff	0	0	Y	Y	Y	Y		Y	Y
	Type	0	0	?	?	?	?		?	?
Germany	Regulation	N	N	Y	N	Y (under consultation)	Y (if duct sharing is not possible - under consultation)		Y	Y
	Tariff	0	0	Y	0	N	N		Y	?
	Type	0	0	Y	0	N	N		Y	?
Greece	Regulation	N	N	Y	N	Y (under consultation)	Y (if duct sharing is not possible - under consultation)		Y	Y
	Tariff	0	0	Y	0	N	N		Y	?

	Type	0	0	FL-LRAIC	0	LRIC (Bottom Up)	LRIC Bottom Up)		LRIC Bottom Up)	?
Ireland	Regulation	N	N	Y	N	N	N		Y	Y
	Tariff	0	0	Y	0	0	0		Y	Y
	Type	0	0	FL LRIC	0	0	0		for PPC: FL-RIC, for WLL: retail minus	retail-minus
Italy	Regulation	N	N	Y	N	Y	Y	Y	Y	Y
	Tariff	0	0	Y	N	N	N	Y	Y	Y
	Type	0	0	Cost oriented (FDC-HCA)	0	0	0	Cost orientation	Cost orientation	Cost Orientation (FDC-CCA+efficient provision)
Netherlands	Regulation	Y (non SMP)	Y	Y	Y	Y (non SMP)	Y	Y	Y	Y
	Tariff	N	Y	Y	Y	N	Y	Y	Y	Y
	Type	0	For FttH: DCF, for FttO: EDC	Embedded Direct Cost	part of unbundled fibre	0	Embedded Direct Cost	Embedded Direct Cost	For FttH: DCF, for FttO: EDC	Embedded Direct Cost
Norway	Regulation	N	N	Y	N	Y	Y		Y	Y
	Tariff	0	0	Y	0	Y	N		Y	N
	Type	0	0	HC	0	?	0		HC	0
Poland	Regulation	N	N	N	N	N	N		N	N
	Tariff	0	0	0	0	0	0		0	0
	Type	0	0	0	0	0	0		0	0
Portugal	Regulation	Y	N	Y	Y technical regulation	Y	Y	Y 1. currently short back-haul 2. possibly for the future, if ducts not available	Y	Y
	Tariff	Y	0	Y	N	Y	N		Y	Y
	Type	HC FDC (existing ducts); current costs (new ducts)	0	combination of historical and current costing	0	HC FDC (existing ducts); current costs (new ducts)	0		?	combination of historical and current costing
Slovak Republic	Regulation	N	N	N	N	N	N		N	N
	Tariff	0	0	0	0	0	0		0	0

	Type	0	0	0	0	0	0		0	0
Slovenia	Regulation	N	N	Y	Y	Y	Y		?	Y
	Tariff	0	0	Y	?	?	?		0	Y
	Type	0	0	LRIC	?	?	?		0	FAC CCA, retail minus (IP-services)
Spain	Regulation	Y	N	Y	Y	Y	Y		Y	Y
	Tariff	Y	0	N	Y	Y	Y		Y	Y
	Type	cost oriented	0	cost oriented	reasonable prices	cost oriented	cost oriented		cost oriented	cost oriented + eviction prices
Switzerland	Regulation	N*	N	N*	N	N*	N		N*	Y
	Tariff	0	0	0	0	0	0		0	Y**
	Type	LRIC	0	LRIC	0	LRIC	0		LRIC	LRIC
United Kingdom	Regulation	N	N	Y	N (In-house wiring was liberalised in the UK in the 1980s)	N	N		Y	Y
	Tariff	0	0	Y	0	0	0		Y	Y
	Type	0	0	LRIC	0	0	0		LRIC	Non-discrimination

* Ex-post regulation foreseen but procedure pending

** Ex-post regime: Tariff determination pending

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