



Synthesis of the ETNO Position Paper

ETNO Reflection Document in response to the Commission Recommendation on regulated access to Next Generation Access Networks (NGA)

For the personal attention of:

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The European Telecommunications Network Operators' Association is representing 43 major companies from 36 European countries, providing electronic communications networks over fixed, mobile or personal communications systems. ETNO's primary purpose is to establish a constructive dialogue between its member companies and actors involved in the development of the European Information Society to the benefit of users. More information on ETNO can be found at: www.etno.eu

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Dear Mr. Colasanti,
Dear Mr. Rodford,

ETNO is pleased to send you an overview of its recently adopted Position Paper in reply to the Commission Recommendation on regulated access to NGA. This contribution is not confidential. The executive summary of our views is as follows:

Context

The European ICT sector is facing an unprecedented investment challenge. So far the deployment of new high-speed fibre access networks (NGA) in Europe has been slow. Only a tenth of the fibre lines deployed in East Asian economies¹ and less than half of those deployed in the US have been built in the EU.

The world is now facing an economic and financial crisis. The ICT industry, given the right conditions, could play a major role in overcoming this crisis by channelling investment to high-speed fibre access networks. It is widely acknowledged that such investments would positively effect productivity growth, the competitiveness of EU businesses and eventually help to preserve and create employment in the EU.

The Commission's final NGA Recommendation could play a vital role in creating a virtuous circle for NGA investment by reducing regulatory risk to improve conditions for NGA investment while supporting competition through open access to economic bottlenecks.

ETNO is very concerned that the draft recommendation does not yet provide the adequate response to the increased risks involved in NGA investment and therefore will not facilitate those investments in Europe. Despite several positive starting points, key elements of the draft should therefore be adapted or revised accordingly.

Elements ETNO supports but that should be re-enforced

- **ETNO supports the stated goals of the Commission** to promote investment and competition in NGA and to foster sustainable infrastructure-based competition in the process as far as possible. Infrastructure competition provides most innovation and long-term choice to consumers.

¹ Japan and Korea

- We also welcome a more targeted **‘graduated approach’ to regulation which takes account of different competitive conditions in different regions** in particular with regard to infrastructure competition. These elements should be further strengthened.
- The **Recommendation should remain neutral as regards the technology used for the roll-out of fibre networks to premises and homes**. At the same time, different technologies and architectures can lead to different market outcomes which should be fully taken into account in subsequent regulation. This approach is in line with the technologically neutral EU framework.
- The aspect of **legal certainty** should be re-enforced in the Recommendation. ETNO welcomes the Commission’s support for a consistent regulatory approach over successive review periods to access remedies and pricing obligations for NGA. Concrete guidance should be given on how NRAs can ensure such legal certainty regarding access conditions over successive market reviews.

Elements where significant changes are required

The regulatory response to investment risk

- The draft Recommendation does **not provide the much-needed signal to potential investors that risky NGA investments will be adequately treated** in the context of sector-specific access regulation. In particular, the Recommendation should provide more flexibility to adequately reflect investment risk in the context of access prices and conditions.
- To this end, the **Recommendation should introduce the concept of risk sharing which allows a fair distribution of risk between the investor and access seeker**, putting operators on a more equal footing with regard to investment risk. In a regulated environment², risk sharing essentially corresponds to the possibility that regulated prices reflect the degree of commitment by the beneficiary of access relating to contract duration and volume. This would bring the cost structure of entrants closer to that of the investor, leading to a more level playing field and to positive incentives for all market players to offer attractive prices on the retail market.
- The proposed project-specific **risk premium alone will not solve the lack of incentives for widespread NGA roll-out in Europe**. In the current draft, its impact on the access price remains unclear as the investment risk should already today be taken into account when determining the cost of capital for regulatory costing. Even if a risk premium results in higher wholesale revenues for the investor, raising prices for the new infrastructure can in many market situations lead to a competitive disadvantage of NGA networks vis-à-vis competing platforms and the current copper network that often will coexist with NGAs for some time. These shortcomings underline that there is no one-size fits all solution for incorporating risk in the regulatory approach to new networks and that the Recommendation should embrace further forms of allocating risk in access prices and conditions.
- The draft’s **approach to risk in FTTN deployment** appears to be in breach of the principle of technological neutrality and should be revised. FTTN-deployment can play an important part in the technology mix for fibre roll-out and should as far as justified benefit from the same regulatory principles as FTTH.

² “Risk sharing” can take different forms: in a regulated environment, risk sharing takes place in access prices and conditions; but risk can also be shared outside the regulatory remit in a situation where alternative operators invest in parts of an NGA together with the first mover on a commercial basis, s. p. 14 of these comments.

Gradation of remedies and geographic segmentation

- We invite the Commission to provide **clearer guidance to NRAs on the graduated approach to remedies in markets 4 and 5**. The recommendation should explicitly state that where duct and facilities access ensure effective competition at retail level, no further access obligations, e.g. for wholesale broadband access, should be imposed. Although the current draft proposes a gradation of remedies it remains ambiguous as it seems to suggest continued regulation on market 5 in such circumstances. Targeted regulation of economic bottlenecks should replace the “ladder of investment” which is not a meaningful concept in an NGA environment.
- In this context, the Recommendation should express **support for a geographical segmentation of markets where appropriate and geographical differentiation of remedies across markets 4 and 5**. The business case for duplication of a first or second NGA network will often have to be assessed locally, not at national level, influencing the choice of targeted remedies by NRAs.
- Geographic segmentation, starting from an analysis at the retail level, also allows to better **take into account competing platforms such as cable or future wireless broadband networks**. Cable networks in particular are an important factor in the context of NGA roll-out and are generally not addressed by ex-ante economic regulation. The role of competition from cable networks and utility companies in view of rolling back regulation and, where appropriate, achieving a regulatory level playing field between all platforms should be further explored in the Recommendation.

The need to address symmetric sharing obligations

- The recommendation limits itself to SMP-obligations. This does not respond to the new regulatory challenge created by NGA roll-out where the first mover - which is not necessarily the incumbent -, connects a customer to the high-speed network. For instance, utility companies own much of the basic infrastructure and are now deploying dark fibre in a number of areas. As long as they are not designated as having SMP, their investment conditions would be far more favourable than for the established operator.
- Therefore, in addition to the need to support geographical segmentation in the recommendation, the Commission should **encourage symmetric sharing obligations**, at least for passive network elements where proportionate, **to ensure a level playing field and choice for all consumers**.

Pricing principles for existing assets

- The **draft’s pricing principles for existing assets such as ducts should be thoroughly revised or deleted** (main text and Annex I). By proposing to price components of the local loop at historic costs, EU regulatory policy would undermine the long-term ability of network operators to maintain and update the vital access infrastructure and would distort investment decisions by market players. The proposed change in pricing methodology could lead to a competitive disadvantage of newly-built infrastructures instead of supporting new roll-out as intended by the Commission.
- As highlighted by the ERG in its opinion on the draft Recommendation, the use of historic costs would also lead to severe inconsistencies in the wholesale pricing regime. Historic costs at national level depend on arbitrary factors such as the history of

the ownership of ducts and related financial and accounting transactions. The use of historic costs for passive network elements would also be inconsistent with cost references used for unbundling as historic costs have been explicitly rejected as the reference for unbundling prices by the European Court of Justice.

Approach to new markets

- ETNO welcomes that the draft recognizes the possibility of new services constituting new markets provided over NGA networks, e.g. IP-TV, which in most Member States does not meet the 3 criteria test for ex-ante regulation. However, the consultation document **contains a biased assumption against new markets** and for chain substitution which is **in breach of competition law methodology**. Instead, NRAs should carry out an in-depths and open-ended analysis of demand and supply-side substitution.

Choice of technology and network architecture

- An important characteristic of the technologically neutral EU framework is that it remains **neutral regarding the technology choices of operators**. To intervene in investment decisions with a view to impose potentially inefficient NGA network architectures or specific technologies would further raise capex requirements and ultimately be paid for by consumers in the form of delayed service availability and higher prices. For example, the investor should determine the location of the network concentration/mutualisation point in case he deploys a passive optical fibre network (PON).
- The Recommendation should note that a regulatory framework is applicable to different technologies and architectural models of FTTH such as multi-fibre and single-fibre which can be realised on either technology. As already highlighted, this can lead to different competitive outcomes that should be fully taken into account in subsequent regulation.

Annex II

- The **Annex on equivalence** of service provisioning is in contradiction to the draft Recommendation itself as it presumes the need for comprehensive access to passive infrastructure. The draft - and the underlying legal framework - only justifies proportionate regulation of passive network infrastructure. Moreover, it is **not demonstrated why the enforcement of non-discrimination** which is overall effective by NRAs **has to be harmonised for this particular market segment**. The Annex should be deleted.

We hope that you will be able to support our remarks.

Yours sincerely,



Michael Bartholomew,
ETNO Director

I. Introduction – the economic and regulatory challenge posed by NGA

ETNO welcomes the objective of the Commission of achieving a timely and competitive roll-out of next generation access networks in Europe.

The positive effects of a timely roll-out of high-speed NGA networks for the economy, for employment and for society as a whole are widely recognized.¹ A huge increase in capacity is essential to deliver future services and to cope with the growing demand for existing applications. Whether it is for the promotion of new services benefiting society such as tele-medicine or for the competitiveness of Europe's small and medium-sized businesses requiring a high-capacity connection to the global information society, Europe needs a high-speed, high-quality communications infrastructure.

As acknowledged by the Commission, Europe is currently lagging behind other economies in FTTH roll-out, notably the United States and Japan². All available data points to lower coverage and lower take-up in next generation networks in Europe, with only half the number of subscribers compared to North America and a mere tenth of Japan's and South Korea's.³

Against this background, it is a pressing challenge for Europe to ensure timely investment in NGA networks. The costs of providing European households with a mix of FTTH and FTTN networks have been estimated at 250-300 billions €. ⁴ ETNO members are ready to take part in this major investment effort. Today, they account for more than 70% of investments in the EU, rolling out networks in their home market and in other EU markets as alternative operators.

Investments in NGA are a vital condition to overcome the current economic downturn by contributing to productivity growth and employment in the EU. The ICT industry, given the right conditions, could play a major role in overcoming this crisis. ⁵ As the Commission notes, expectations over regulation influence the nature and timing of investments in NGA. Although the concept of deregulation has come under question in the financial sector, the electronic communications sector is not only already highly regulated in Europe, but requires a new regulatory approach to NGAs to overcome the current investment backlog in Europe.

The European Parliament has acted on this challenge, by proposing additions to the current provisions of the Framework and Access Directives related to network access. They include a stronger emphasis on geographic segmentation, allowing a fair sharing of risks in the context of NGA access

¹ For a detailed discussion see Plum, A Framework for Evaluating the Value of Next Generation Broadband, http://www.broadbanduk.org/component/option,com_docman/task,doc_view/gid,1009/Itemid,63/

² EC press release IP/08/1370

³ IDATE (2008), Merrill Lynch (2008), FTTH Council North America (2008)

⁴ Agcom, based on McKinsey Analysis, estimates the costs of fibre networks in Europe at up to 300 billion € http://www.sepe.gr/files/pdf/sepenews/pdf26/viola_en.pdf

⁵ Explanatory Note to the draft recommendation, p. 3

and the possibility of continuity of access conditions for a longer-term period.⁶

ETNO is very concerned that the Commission's draft Recommendation does not include or even discuss most of these measures which have received broad support by EU Parliamentarians. Also, the draft Recommendation does not evaluate the policy options and remedies that have been adopted in those areas outside Europe which have succeeded in achieving a faster fibre roll-out such as Japan or the US.

The time between now and when the changes to the telecoms framework in Member States will take effect in 2010 will be a decisive period for the creation of new NGA infrastructure in the EU. It is therefore important that the Commission guidance 'gets it right' and acts consistently with the EP's objectives for a competitive and enabling environment for fibre roll-out in Europe.

In the following, we would like to propose the most important changes to the draft Recommendation to achieve the right balance between incentives for much-needed NGA investments, open competition and consumer benefits.

II. Detailed comments

NGA as an opportunity for infrastructure competition

ETNO fully supports the Commission's objective to ensure a competitive environment in the transition to NGA.

The regulatory regime for NGAs should not prejudge or preempt the extent of future infrastructure competition or the business models of different market players in an NGA environment. The competitive landscape of European electronic communications networks and services is under fast transformation. Regulation should take into account this dynamic when addressing the issue of competition in the context of NGA roll-out. Competition patterns and business models will be adapted to the NGA environment. NGA provides the opportunity for more intense and more sustainable competition than today.

ETNO agrees with the Commission that "*facilitating infrastructure competition is the preferred regulatory option. This allows longer-term sustainable competition and increases consumer choice and innovation.*" (Expl. Note, p. 2). This commitment to achieving sustainable infrastructure competition wherever possible should be included in the Recommendation.⁷

⁶ S. European Parliament legislative resolution of 24 September 2008 on Commission review proposals, <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P6-TA-2008-0449+0+DOC+XML+V0//EN&language=EN>

⁷ E.g. in para 7 of the Recommendation, as new 2nd and 3rd sentence

It has been argued that the move to NGA would signal the end of full infrastructure competition. As the Commission points out⁸, the opposite is the case: different from the legacy copper network which has never been fully duplicated, NGAs are already being rolled-out in a competitive environment in a number of areas of Europe. Examples include

Slovenia:

In Slovenia, FTTH is already ubiquitous in urban areas. There is fierce competition for the high-speed access market between the incumbent operator Telekom Slovenia and "T2", a fibre-based new entrant who is the market leader in fibre. At the same time, cable has consolidated and provides a ubiquitous second infrastructure with improved triple play offers, as customers are more and more attracted to IP-TV (the share of IP-TV has doubled in a little more than a year to approx. 30%). In densely populated areas, consumers will be able to choose between at least 2-3 NGA networks.

France:

In France, Numericable says it is by far the market leader for fibre and very high speed services. It plans to reach 3 million households with 300 Mb/s FTLA technology by the end of this year and 9 million by the end of 2011. Iliad-Free stated that FTTH roll-out would be profitable in all building where its market share reaches 15% of households and plans to spend 1 billion € in FTTH roll-out in competition with other fibre networks. SFR-9 and Orange have just signed an agreement open to all other undertakings for reciprocal access to the in-building fibre networks to accelerate their respective fibre roll-out. Orange's duct access reference offer is used by its competitors. Already four operators offer commercial fibre services.

Germany:

In cities like Cologne, where a utility provider already in summer 2006 started deploying FTTH and plans to reach 800.000 households by 2011, at least three NGA networks will coexist for a majority of households: Net Cologne's FTTH network, Deutsche Telekom's VDS-L network and upgraded cable networks. Similar plans are already considered for Munich (M-Net, 400.00 households in 2011) and also for less dense areas (EWE-Tel in Lower Saxony).

Some analysis has been carried out recently to demonstrate the limited or non-existent business case for duplication of fibre networks. Yet, different models come to different results. **The economic viability of infrastructure competition in an NGA environment is assessed in more detail in the Annex to this position.** Undoubtedly, changing conditions on financial markets can affect the immediate outlook for investment in parallel infrastructure. But whatever the realistic figures in a given scenario are, the exact results of such models should not change the regulatory approach to fibre access networks at EU level. Regulatory policy should in any event

⁸ DG Infso presentation "Next Generation Access" at Communications and Competition Law conference 2008, 20 October 2008, slide 5

- fully maintain the incentives for investment in new access networks by all players, while facilitating arrangements that lead to a reduction of the costs of network roll-out. ETNO provides its proposals for such a regime in this response.
- provide the tools to adapt regulation to the resulting conditions of competition by geographically adapting regulation to emerging infrastructure competition.
- Provide an investment-friendly regulatory regime also for those areas where not more than one full NGA infrastructure is expected to develop.

Provided these conditions are met, the market will determine the efficient scope of infrastructure competition. From the developments one can already observe in several high-density areas in Europe it is clear that NGAs sustain a significant degree of infrastructure competition. Regulatory policy that facilitates such developments helps to expand the boundaries of infrastructure competition to more regions of Europe to the benefit of consumers.

Gradation of remedies and geographic segmentation – providing open access to economic bottlenecks

The draft recommendation partly follows the approach to graduate remedies from the deepest level of the network to higher network layers. This is in principles welcome as it helps to establish a targeted and proportionate access regime. The text states that

“In a Fibre to the Home (FTTH) context, [a level playing field on the corresponding electronic communications retail markets] can in principle be achieved subject to economies of density and scale as long as equivalent access is provided by the SMP operator to the relevant passive elements of its legacy network.” (Recital 7) and that

“Where SMP operators deploy fibre to the home, NRAs should impose further physical access obligations (access to unlit fibre) beyond access to ducts [...] where access to this infrastructure is technically or physically impossible or where it is not economically viable [...] to ensure effective competition.” (para. 15)

The regulatory principle guiding these two statements and parts of the Explanatory Note is that **access to the relevant bottleneck facility in a given area is the appropriate and proportionate regulatory remedy to ensure competition in Next Generation Access** in case the economic conditions for applying ex-ante regulation and finding market power are met.⁹

The gradation of remedies and increased geographic differentiation of regulation are closely linked. Different from the – mostly nation-wide

⁹ It should be noted that effective infrastructure competition can also develop based on voluntary sharing arrangements between an NGA investor and operators participating in the investment through long-term rights and commitments, provided that certain market and network architecture conditions are met. In such a case, the need for regulation would cease altogether as the competition landscape would be shaped in an effective way from the outset.

available – legacy copper network, often one or more NGAs will be deployed in certain geographies and “(..) *geographic variations in network competition may be more pronounced as a result of these factors and should be incorporated in the NRA’s analysis.*” (Rec. 3) The economies of density and scale referred to in the draft vary according to geography, requiring a differentiated regulatory treatment for different zones. The different dynamics observed in the market once different infrastructures compete for the end-user demonstrate that the reach of alternative networks, together with demand side characteristics such as density, is an important factor for geographic differences in competitive conditions which require adjusted regulatory remedies.^{10]}

To enshrine and further clarify this more targeted approach to regulation proposed by the Commission in the draft, ETNO suggest adding the following paragraph to the Recommendation:

“3a) NRAs should carry out a joint analysis of markets 4 and 5 of the Recommendation [on relevant markets]. Where the conditions for applying ex-ante regulation (3-criteria test) are fulfilled and SMP is found NRAs should impose appropriate remedies granting access to the identified economic bottleneck in a given geographic area which allows effective competition to develop at the retail level. No further access obligations should be imposed in that case (principle of fostering competition at the deepest level of the network where it is sustainable).”

Such principle would provide valuable guidance to NRAs to ensure that harmonised principles are applied by NRAs when choosing the level of intervention in an NGA network.

It would also help to overcome the dilemma posed by the fact that markets 4 and 5 are wholesale markets that have been originally created by regulatory intervention on the incumbent’s network. As described in previous ETNO positions, this poses the risk of an overly narrow wholesale market definition which does not sufficiently take into account competitive constraints by competing platforms and remedies in upstream wholesale markets in view of competition at the retail level.¹¹ Once a regulatory remedy in market 4 achieves competition at the retail level in a given area, there is no need to impose remedies on an upstream wholesale market for broadband access.¹²

The Commission’s approach of remedies gradation is somewhat contradicted by the statement in para 23 that *“where SMP is found on Market 5, wholesale broadband access remedies should be maintained for the existing services*

¹⁰ S. ETNO RD288 - comments on the ERG draft common position on geographic aspects of market analysis

¹¹ The Commission advises NRAs to take into account these constraints in the SMP assessment, s. comments pursuant to Article 7(3) of Directive 2002/21/EC in UK/2007/0733: wholesale broadband access in the UK, p. 9

¹² This relationship between markets 4 and 5 should be further clarified in the next update of the Commission recommendation on relevant markets. To ensure an appropriate gradation of remedies under the current recommendation on relevant markets, NRAs should in such a case carry out a three criteria test of market 5 which would reveal a lack of high and persistent entry barriers given the economic viability of competition based on access products in market 4. As a result, no regulation would be imposed on market 5. Moreover, in practice full infrastructure competition or competition on a lower network layer often lead to competitive voluntary wholesale broadband offers for third parties.

and any chain substitutes". This recommendation would preclude the necessary proportionality assessment by NRAs. It should be adapted in the light of the aim to foster competition at the deepest level of the infrastructure where it is effective and sustainable, e.g. in the following form:

"wholesale broadband access remedies should only be maintained for the existing services where remedies imposed in market 4 are not sufficient to ensure effective competition at the retail level in a given geographic area."

NGA investments will take place at different times, and by various operators, in different geographic segments within individual national markets. In view of the above, ETNO therefore calls for the inclusion of recommendations on geographic segmentation of national markets and remedies in the NGA Recommendation to address this. The economics of NGA investments will vary widely within member states depending on the dispersion of customers and the presence of competing infrastructures. In the same way, NRAs should carry out a forward-looking analysis of the potential economic bottlenecks which will occur at a different level of the network in different geographic segments of each national territory. Once competition problems are identified in these distinct geographic segments, the remedies chosen must reflect the nature of the competition problem identified and address only the specific bottleneck.

Proportionality of remedies

A recommendation on NGA regulation should respect the proportionality requirement of the EU regulatory framework. Remedies under the EU Directives can only be imposed after a market analysis, the designation of SMP, the identification of competitive problems and selection of the appropriate remedies proportionate to the nature of the identified problem. These are fundamental corner stones of the European regulatory framework as we find it in the directives.

The recommendation appears to short-cut the third step of the analysis by prescribing a far-reaching and detailed range of remedies that should be imposed on any SMP company, leaving little room to NRAs to calibrate measures related to NGAs in proportion to the national market conditions and the real nature of the problems identified. This is the case in particular for paras 4, 5, 9 and 10 of the draft.

As there are clear distinctions between market situations in different EU Member States, these recommendations, if followed, would inevitably lead to disproportionate outcomes at national level. The Recommendation should clarify that the specific obligations may not be relevant in all circumstances, but should be applied in case they are suited and judged proportionate to remedy a specific market failure identified by the NRA.

Need to address symmetric facilities sharing obligations

The focus of the draft recommendation on SMP-remedies is overly narrow as it does not address symmetric facilities sharing obligations. It also assumes that the SMP-operator will always be a fibre-based operator, and mostly the former incumbent which will in the future no longer be the case.

Fibre investment leads to a new competition paradigm in many areas of Europe. In a competition for the market, the first party to lay fibre in an area - which need not be the incumbent and in many cases in Europe is an alternative operator¹³, connects a customer to the high-speed network may control some form of bottleneck (e.g., in-house cables, ducts,..).

In areas where no effective infrastructure competition emerges, this leads to a “patchwork of local monopolies” which can only be addressed by a balanced approach relying on symmetric access obligations and adequate geographic segmentation of markets. A recommendation that limits itself to SMP-obligations does not respond to a future key regulatory challenge and leaves this new feature of NGA roll-out and regulation untouched, potentially leading to very different regulatory approaches in Member States. National initiatives already target symmetric access, e.g. the French *‘loi de modernisation de l’économie’*¹⁴.

The symmetric sharing of basic facilities is covered by the EU Directives in Art. 12 Framework Directive and therefore can form part of a Commission Recommendation under Art. 19 Framework Directive. Moreover, an extension of NRA powers to impose binding obligations for symmetric facilities sharing is envisaged in the current review debate.

Against this background, in addition to the need for a support in the recommendation for geographical segmentation of markets, the Commission should encourage symmetric sharing obligations at least for passive network elements where proportionate, to ensure a level playing field and choice for all consumers. Such guidance would be based on Art. 12 Framework Directive. The starting point of the French law that the opening of basic facilities in the local access network should apply to the first mover irrespective of SMP is a pragmatic approach and could be adequate in other Member States in comparable market situations.

As regards ducts, NRAs should also take into account existing ducts by non-telecoms operators in the assessment whether the imposition of duct access on the SMP-operator is proportionate. They should encourage the opening of such ducts for the purpose of building electronic communications networks as far as possible under national law.

A related aspect is the future role of regulation vis-à-vis cable networks. A more granular geographic market definition may lead to the identification of cable operators as SMP-operators in given areas of a national territory. NRAs will then have to decide on remedies in the relevant wholesale markets. The current draft does not provide guidance to NRAs on potential remedies to be imposed in such circumstances.¹⁵

¹³ At the end of 2007, almost two thirds of fibre access lines in Europe were deployed by alternative operators against 11% by incumbents, reference FTTH Council/Idate

¹⁴ <http://www.assemblee-nationale.fr/13/ta/ta0176.asp>, Art. 29 f.

¹⁵ ERG has been active in this field, s. ERG (03) 33rev2: Revised Common Position on wholesale bitstream access (includes a chapter on cable network access)

Response to NGA investment risk – risk premium, risk sharing and value-based pricing

ETNO recognises that in many circumstances in an NGA environment, open access to either passive or, where this is insufficient to lead to sustainable competition at the retail level, active wholesale products will continue to be needed to ensure effective competition. In this case, the question of how regulators address the increased risk involved in NGA investments becomes decisive for maintaining incentives for investment in new high-speed networks.

The Commission recognises an increased risk for most scenarios of NGA investment (with the exception of FTTN, s. p. 16 below) and presents a proposal for responding to this increased risk in regulatory practice, namely a project specific risk premium.

Given the current regulatory environment for NGA deployment in Europe, any proposal that could help to remove regulatory obstacles to investment in NGA is *a priori* welcome. However, the draft Recommendation in its current form does not provide the much-needed signal to potential investors that risk-taking will be adequately rewarded in the context of future ex-ante access regulation. In particular, the Recommendation should provide for further mechanisms to adequately deal with risk in the context of access prices and conditions such as risk sharing and value-based pricing.

- What type of investment risk is relevant for new fibre roll-out

As a starting point for discussing the risk of NGA investment, it may be useful to briefly look at the types of risks connected to the roll-out of new fibre-based access networks, which are interlinked but may require different regulatory responses.

Demand side risk firstly relates to the extent and speed of take-up and utilization of the new network. This risk is likely to be particularly high in the initial phase of the investment. Overlay strategies and in some cases regulatory requirements mean that the new network will for some time 'compete' with the copper network as alternative platform. The speed of migration can vary as the demand for services provided over the new network remains uncertain. In addition, technological uncertainty fuels the risk of stranded investment in the long-term (e.g. over the role of future wireless broadband platforms). It is most marked in markets already characterised by strong inter-platform competition, e.g. with cable.

Even if one assumes a situation in which the above-mentioned risk is largely absent, uncertainty remains over the price development and future ARPU. Which premium will consumers be willing to pay for the enhanced access capabilities and for new services running over the network (and will regulation allow the investor to explore this potential)?

- Risk sharing as a necessary complement to a risk premium

An obligation for granting access at a regulated price to a newly build access network gives a structural cost advantage to the second mover over the investor. The first mover faces a fixed cost structure, leading to high losses in the first phase of the investment as high fixed costs are distributed over few users of the new network. The second mover can choose between a fixed and variable cost structure when facing demand uncertainty, heterogeneity, geographical differences and demand evolving over time. Before making an own investment, the access seeker can exit the market at low cost while the investment of the first mover is sunk. It is recognised that this flexibility of the access seeker has an economic value (option value).^{16 17}

The proposed risk premium does not address this imbalance which is linked to the first type of risk described above (extent and speed of take-up, technology risk). A risk premium which significantly affects the wholesale price could even make it more difficult to create demand for a new network as it becomes less attractive compared to competing platforms because of an overall higher price level. If the copper-platform stays comparably cheaper, this in turn increases the risk of slow take-up of products based on an overlay fibre networks.

Regulatory policy can overcome this imbalance by providing for a stronger commitment by entrants and providing regulatory certainty to the investor over terms and conditions of access for a longer-time period. The Recommendation should allow for risk sharing mechanisms which would allow a fair distribution of risk between the investor and access seeker through access conditions and prices, putting operators on a more equal footing.

Risk sharing in a regulated environment essentially corresponds to the possibility that regulated prices reflects the degree of commitment by the beneficiary of access relating to contract duration and volume. Long-term contracts with minimum volumes would guarantee an attractive wholesale price for the entrant calculated on the basis of LRIC and possibly adjusted by a risk premium. Entrants would acquire full control of physical assets or virtual access products, including the possibility of secondary trading.¹⁸ This in turn is likely to lead to a secondary wholesale market, benefiting smaller service providers. Also, short-term risk sharing contracts could be offered which would not involve a commitment by the access seeker but be

¹⁶ S. e.g. Pindyck, 2007, Mandatory Unbundling and Irreversible Investment in Telecom Networks, Review of Network Economics, Vol.6, Issue 3 – September 2007

¹⁷ **Option value:** an investor with an opportunity to invest is holding an option – he has the right but not the obligation to buy an asset at some future time of his choosing. When an investor makes irreversible investment expenditure, he exercises his option to invest. He gives up the possibility of waiting for new information to arrive that might affect the desirability or timing of the expenditure. This lost option is an opportunity cost that must be included as part of the total cost of the investment. Network owners, if regulated, must share their capital with rivals at the option of the rival. Rivals are free to utilise facilities, and they are not obligated to financially support network investments. The operational flexibility is of great value to entrants, and is very costly to supply by incumbents. The pricing rules as defined today do not compensate incumbents for these rights. Wholesale prices are therefore set below competitive market levels, so incumbents actually subsidise entrants. When regulation reallocates rights from network owners to other users, it impacts incentives to create, expand, or modernise networks.

¹⁸ Similar risk sharing arrangements are established in the communications industry for examples in the form IRUs (indivisible rights of use) for overseas cable.

priced higher than long-term access, with access prices reflecting the option value attached to the flexibility of such a form of access.

It should be pointed out that risk sharing mechanisms as part of the regulated pricing, is not calling into question open access to the new networks, but would be an integral part of regulated access under the supervision of the NRA. Access based on fair risk sharing helps the investor to recoup its investment and is beneficial for the access seeker who profits from discounts and long-term planning certainty. It should be recalled that ETNO members often invest in fibre in one part of the EU or a national market but are entrants in another and have a strong own interest in fair access possibilities and conditions.

In practice, there may also be agreements between several investors to share an initial investment to jointly develop new markets. Such investment sharing schemes are strategic decisions by undertakings which are outside the scope of regulatory intervention but may have an impact on the competitive situation and thereby on the outcome of market analyses by NRAs.

For consumers, risk sharing has the positive effect of leading to several players that are committed to rapidly developing the new market with attractive prices (considering that each player has fixed costs to distribute over a growing number of customers) and service innovation.

Fair risk sharing has already been embraced by the European Parliament as a necessary component of the future access regime for NGA.¹⁹ Also, Ofcom has expressed interest in risk sharing models in its latest consultation on super-fast broadband in the UK.²⁰

In view of the above, the final recommendation should foresee that NRAs should allow the conclusion of risk sharing arrangements and include a reference to the main concepts proposed by Parliament. This would be an important first step for promoting a comprehensive regulatory response to risk and legal certainty for NGA investment. The Commission, NRAs and ERG would be involved in further developing conditions for risk sharing mechanisms.

- Ensuring the effectiveness of a risk-premium

It follows from the previous conclusions on risk sharing that the proposed project-specific risk premium on the WACC alone will not solve the lack of incentives for widespread NGA roll-out in Europe. But it can help as a component of the access price to address risk involved in NGA investment, whether within or outside a risk-sharing mechanism.

However, in the current draft, the impact of the premium itself on the access price remains unclear. The investment risk should already today be taken into account in determining the cost of capital in the context of price regulation. The outcome at national level of the current Annex could be

¹⁹ S. above, fn. 9

²⁰ Ofcom, consultation on 'Delivering super-fast broadband in the UK', Summary, pt. 1.2.6

that existing cost calculations are adjusted before a risk premium is applied with the effect that the overall access price level does not rise despite significant risks involved. The use of the CAPM to calibrate the rate of return is not further defined. ETNO notes that other methods could be used if they are fully justified as meeting the same quality standards.

It is doubtful whether the given comparisons with current WACCs in the telecoms industry and with betas from other industries are meaningful in their present form. Some ETNO Members, *inter alia* from new Member States, pointed to the fact that in their countries, the pre-tax WACC granted by the regulator has been significantly higher than the figures cited in Annex I of the draft as typical for the telecoms sector in recent years. Also, the Annex refers to the media industry as a possible benchmark for the required rate of return. However, WACC increments in percent compared to a European incumbent for the media industry is only 1%, whereas for application and service providers like Google or Amazon it is 9%.²¹

In order to at all contribute to improving NGA investment conditions, the Recommendation should provide further guidance on the risk premium which ensures that an adequate risk-premium is actually applied in regulatory practice and leads to higher wholesale revenues for the investor as compared to current price regulation at national level where risks are higher.

Finally, where a risk premium is applied as part of the measures to better take into account investment risk, the question arises whether the premium has to be taken into account in margin squeeze tests. If this was the case, the risk premium could amount to a competitive disadvantage for the investor and impede attractive pricing in the market penetration phase. We invite the Commission to clarify how such unintended consequences of a risk premium can be avoided.

- Pricing flexibility for value pricing is indispensable part of NGA regulatory regime

The above underlines that there is no one-size fits all solution for incorporating risk in the regulatory approach to new networks and that the Recommendation should embrace further forms of allocating risk in access prices and conditions.

Another indispensable part of any NGA regulatory regime is flexible retail pricing. Retail and wholesale price differentiation is needed to sustain a fibre business model and profit from customers varying willingness to pay (discounts, different prices to diff. categories of products and different customers etc.). Willingness to pay equals the value of a specific product for a specific customer. For example, end-users are likely to be willing to pay significantly more for 50 MB/s symmetric access than for a simple telephone connection, though both will be provided over fibre after a migration to NGA networks and costs will not differ substantially. By leading to

²¹ Paolo Annunziato, "a risk premium assessment", <http://intranet.etno.be/cini/Forum%20presentations/Forum-02-Annunziato.ppt#365,2>

differentiated retail prices with different profitability, value-based pricing increases incentives for fibre roll-out, which in turn leads to further innovation and product development with additional customer value, potentially creating a 'virtuous circle' of service innovation and network roll-out.

The fixing of cost-based wholesale prices undermines this flexibility and leads to rigid retail markets.²² Pricing flexibility is therefore also required at the wholesale side to extract value and differentiate offers in the market. A pricing model based on customers' willingness to pay would be made impossible by the current wholesale pricing regime relying on cost-oriented prices and price-squeeze tests in view of the different retail products. The Commission should enshrine value-based pricing in the recommendation. ETNO is happy to further contribute on details of this concept.

- Treatment of risk for FTTN

ETNO is concerned with the proposed treatment of fibre investment taking the form of FTTN (or FTTC), pt. 5 of Annex I.

The draft considers FTTN as a *"modernisation of the copper-based network, which should not encompass a higher risk"*. This recommendation is not substantiated and in apparent breach of the principle of technology neutrality. It remains unclear, what this assumption is based on. In reality, the rollout of FTTN is connected with both high investments and high risks. FTTN is not only a replacement of existing technology but significantly alters the access network to provide much higher download and upload speeds and enable new services such as HDTV. Whereas the required investment differs compared to an FTTH scenario, considerations on the different types of risk associated with fibre investment apply similarly to FTTH and FTTN roll-out. In certain circumstances, FTTH investment may display a different risk profile, e.g. where it is accompanied by a longer maintenance of the parallel copper platform. Apart the points mentioned above, however, there is no other reason to treat the regulatory risk fundamentally differently in an FTTH and FTTN scenario.

The consultation documents note that ²³: *"It is likely that the most effective strategy for NGA deployment will utilise a mix of technologies to deliver these services depending on specific local characteristics [...]"*. The fact that the recommendation only acknowledges the specific risk of FTTH investments may lead to distortions of market forces and to reduced incentives to deploy alternative technologies (non-FTTH) where reasonable. In order for market players to be able to choose the most relevant technology as part of the 'mix' described above, regulation should not a priori exclude a risk premium for one of those.

Ensuring legal certainty over several market review periods

²² Cf. Luigi Prosperetti, "sustainable regulation after the financial crisis"; paper for the ETNO Forum debate, Venice 24 October 2008, p. 4., <http://intranet.etno.be/cini/Forum%20presentations/Forum-01b-Prosperetti.pdf>

²³ See Explanatory Note, Chapter 2.1 „Different NGA architectures“, in particular page 5.

For an investor, the regulatory treatment over the lifecycle of the investment is a key ingredient to any business plan. The aspect of legal certainty should therefore be re-enforced in the Recommendation.

ETNO welcomes that the Commission favours “*a consistent regulatory approach over successive review periods to access remedies and price obligations*” for NGA (para. 8). The statement should be accompanied by an analysis of the legal constraints to guaranteeing such consistency, especially regarding access and pricing conditions, under the current EU regulatory framework. Concrete guidance should be given how NRAs can ensure such legal certainty on access conditions for periods longer than the regular interval between market reviews and for periods more in line with the investment cycle.

It should be noted that even where continuity of regulatory conditions are ensured, regular market reviews to adapt regulation to market developments would still be needed. Regulation should be lifted where effective competition has developed and consequently no operator has SMP in the market and be adapted if market definitions have changed due to technological or market developments.

Pricing principles for existing assets

The draft’s pricing principles for existing assets such as ducts should be thoroughly revised or deleted (para. 5 and Annex I). By proposing to price components of the local loop at historic costs and deviating from current cost accounting, EU regulatory policy would undermine the long-term ability of network operators to maintain and update the vital access infrastructure and would distort investment decisions by market players.

Firstly, tariffs based on historic costs are usually below the efficient level that guarantees the durability of the infrastructure in the long term: for important infrastructures such as telecommunications access networks, the accounting lifecycle is shorter than the economic one. Consequently, an important proportion of the operational assets is amortised in the accounting. The non- amortised (non-depreciated) portion is determined in ‘current’ money, and therefore is likely underestimated.

By contrast, a forward looking approach based on current cost accounting fosters fair and sustainable infrastructure competition and provides for incentives for network investment. E.g., Ofcom states that “*charges based on HCA give poor signals for investment since they reflect cost of when the asset as been purchased rather than what it could cost now. There is a danger that basing prices on HCA... could stifle efficient investment in access networks in the longer term*”.²⁴ With regard to NGA, the proposed change in costing methodology could - by putting pressure on prices of the existing copper platform - lead to a comparative disadvantage of newly-built infrastructures and further slow down investment, contrary to the aim of the recommendation.

²⁴ Ofcom, “Valuing copper access, Proposals”, (2005), 3.10, page 11

The proposals in the draft are disruptive with regard to the current practice of regulatory accounting and costing principles used by NRAs and the Commission's own Recommendation on the subject from 2005²⁵, risking major inconsistencies in the pricing regime. The ERG comments in its opinion to the draft recommendation,

"The Commission recommendation of the use of historic costs is contradictory to previous guidance and there is no explanation why this should be the appropriate cost base." [...] The proposed pricing principles for existing assets are] incoherent and contradictory to established regulatory best practice and the earlier guidance of the Commission on cost accounting and accounting separation.

Finally, a use of historic costs and deviation from current cost accounting for certain assets in the local loop would not only lead to an inconsistent wholesale pricing regime, but also risk increasing discrepancies in pricing across Member States, as the historical differences in network roll-out would co-determine pricing levels. The change in methodology therefore could increase inconsistencies across Member States.

If the Commission intends to maintain specific recommendations for the pricing of existing assets, it should recommend LRIC and current cost accounting also for existing assets to ensure both a consistent set of principles across Member States and adequate incentives to invest.

Approach to new markets

ETNO welcomes that the draft recommendation and in particular the Explanatory Note recognise the possibility of new services constituting separate markets provided over NGA networks, such as IP-TV. ETNO agrees that NRAs should carry out a detailed substitutability analysis of the retail broadband services and the corresponding wholesale inputs in their review of market 5 in particular (p. 17 Expl. Note).

Firstly, the recommendation should clarify that the outcome of the market analysis need not be either a common retail market with existing services or a "newly emerging" market, i.e. one where the three criteria cannot yet be determined. NRAs may also find separate markets which are provided in a competitive environment at retail level, such as, e.g., linear TV services, for which the three criteria can be examined but are not met at retail level in the absence of corresponding wholesale regulation on the fibre platform. In such cases, no wholesale regulation specific to the retail market in question will apply.

ETNO is very concerned with the statement in para 23 of the draft recommendation that

"Unless there are clear indications of a break in the chain of substitution as compared to current product markets, services provided over NGA networks should be considered as incremental upgrades and therefore not treated as new markets."

²⁵ The Commission Recommendation (2005/698/EC) lends clear support to current cost accounting for access price regulation

It seems to contain an 'assumption against' new markets and 'for' chain substitution. The statement is biased and as such not in line with competition law which requires an open-ended analysis of demand and supply-side substitution, as does the Commission's own Explanatory Note. The para should be reworded, e.g.:

"NRAs should carry out a detailed substitutability analysis of the retail broadband services and the corresponding wholesale inputs in their review of market 5 in order to establish whether newly emerging or otherwise separate retail markets emerge in an NGA context."

In this context, it is worth noting that access lines providing a 100kb/s downstream capacity and those providing 1 MB/s broadband (a 10 times increase in capacity) are placed in different markets, while 1 MB/s and 100 MB/s broadband access (100 times increase) are apparently assumed to be in the same market. It becomes questionable in view of capacity upgrades of cable networks to DOCSIS 3.0 technology whether copper-based broadband can still compete on the full range of services. An open-ended market definition at wholesale and retail level in view of possible new markets is more important than ever in the transition to NGA.

Interventions in network roll-out and network architecture

An important characteristic of the technologically neutral EU framework is that it does not give a mandate to determine technology choices of operators. Interventions by NRAs to influence investors' decisions and have them adopt a more costly or less efficient network structure for regulatory reasons, e.g. because it offers more possibilities for unbundling, would increase the investor's capex and would ultimately be paid for by consumers in the form of delayed service availability and higher prices.

At the same time, the regulatory framework is applicable to different technologies and architectural models of FTTH. When describing the different possible forms of FTTx roll-out, the draft seems to assume that the prevalent technology will be GPON and seems to focus on this scenario.

The Recommendation should acknowledge that possible physical unbundling requirements should not undermine an efficient network structure:

- The investor should determine the location of the network concentration/mutualisation point in case he deploys a passive optical fibre network (PON). The statement that the concentration point should host "a sufficient number of end-users" is at least misleading in this context and should be deleted. Also, the location of the concentration point should not be pre-determined. For example, concentration points outside buildings are more costly, require new standalone infrastructure, and may bring more complexity as they may result in overlap with other FTTH networks.

- The draft insists (para. 4) that incumbents should build sufficient space in new passive infrastructure for other operators.²⁶ The recommendation in its current form is disproportionate, difficult to operationalise and further decreases the degree of certainty for investors in the market. It is not possible to forecast where alternative operators will invest and clearly not all new infrastructure will be used by alternative operators. As a result, the SMP-operator would have to cover extra cost for empty and not needed infrastructure, further raising the costs of fibre investment. It raises questions as to who will finally approve the right and “appropriate” amount of capacity and how to deal with potential strategic behaviour from interested parties who may not state their true preferences or simply gather strategic information. It also remains open how such additional capacities would be treated in the context of costing, especially if usage differs from the expectations. Para. 4 therefore needs to be urgently brought in line with the principle of proportionality.
- The general recommendation in para 6 that „[...] SMP operators may need to design elements of their new networks with third party access seekers in mind or else maintain their existing access offers longer than anticipated.” (pt. 6) is vague and could become a major break to NGA investment. The text now opens the possibility of interventions in future network architecture linked to the migration from the copper platform to an NGA. As the Ofcom in its NGA consultation points out, for current network owners, effective transition is likely to be one of the keys to the long term success of NGA investments.²⁷ Under the EU framework, access obligations should be determined based on a facts-based market analysis, not be designed in advance by *de facto* urging investors to adopt specific network architectures by threatening to delay the switchover to the new infrastructure.

Transparency and migration

ETNO agrees that an effective and transparent migration from current generation broadband to NGAs is essential to ensure a non-disruptive development of competition in an NGA environment.

At the same time, migration requirements must not reduce cost efficiency: Timely re-design of the access network avoids massive costs incurred by operating old and new infrastructure in parallel.

Information requirements should not undermine prospects for infrastructure competition and should not put the investor at a structural disadvantage vis-à-vis its competitors. The draft requires (pt. 10) that only SMP-operators should provide “interested parties” with appropriate information about its future network modification.

²⁶ It says that “SMP operators should therefore be required to ensure that when they roll out new ducts, other civil engineering works and other elements which are not active, sufficient space is allowed as appropriate for other operators to make use of these facilities.”

²⁷ Ofcom consultation “delivering super-fast broadband”, Summary, pt. 1.33

In practice this would mean that alternative operators and possibly competing platform operators such as cable providers would have the occasion to obtain information about the SMP-operator's NGA roll-out strategy. Alternative operators would have the opportunity to customize their own strategy and minimize own investment in areas where the SMP-operator is going to invest. As a result, the entire investment risk in many areas will shift to the SMP operator and prospects for infrastructure competition will be negatively affected. Information about future roll-out should be given "just in time", i.e. at the point of roll-out, to ensure transparent and effective migration without creating an uneven playing field to the detriment of the investor.

Annex II

Once network access is regulated under market 4, the provision of access products by a regulated operator will likely fall under the obligation of non-discrimination (Art. 10 Access Directive). NRAs have gained in-depth experience with imposing non-discrimination *inter alia* in the process of local loop unbundling.

The Commission does not demonstrate why the enforcement of non-discrimination has to be harmonised for this particular market segment of access to passive infrastructure elements for NGA roll-out as it is proposed in Annex II. No indication or justification is given why ERG best practice on implementation of non-discrimination needs to be replaced by an EU 'equivalence' rule, which moreover seems to assume some stricter form of separation between business units of the regulated entity.

Annex II is undermining the market-analysis based system of remedies imposition and should be deleted.

Notwithstanding this general position, the statement on p. 13 should in any case be revised that (...) *"in order to create a level playing field among entrants and the incumbent for the provision of NGA-based services, regulation should require the incumbent to provide access to its passive infrastructure under the same conditions, be it internally or externally."*

It assumes that all "passive" infrastructure of the incumbent automatically is included in regulation. This is in contradiction to the principle of gradation of remedies enshrined in the Recommendation (cf. para. 15) and is contradictory to a geographically differentiated market analysis. The statement in fact includes an assumption that all passive infrastructure is non-replicable - such assessment should not be pre-determined by regulators, let alone at EU level.

The condition of an *"SMP operator committing itself to adequate compensation in case of failure to comply"* appears to be inspired by specific national legal systems and is overly prescriptive. Civil and administrative laws have different effective ways to impose fines in case of non-compliance.

ETNO contribution reflecting the majority view expressed in RD295 "ETNO Reflection Document in response to the Commission Recommendation on regulated access to Next Generation Access Networks (NGA)" available at www.etno.be, adopted by statutory majority of ETNO Full Members.

Annex to the ETNO Synthesis Paper in response to the Commission Recommendation on regulated access to Next Generation Access Networks (NGA)

AN ECONOMIC ANALYSIS OF COMPETITION DYNAMICS IN BROADBAND NETWORKS AND THE COMPETITIVE IMPACT OF NGANS

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1 Summary

The economics of broadband access networks show that the European policy goal to reach sustainable competition between infrastructure-based telecommunications operators is feasible, both with current technologies and with NGNs.

The empirical evidence shows that infrastructure competition is already widespread in Europe and is delivering excellent results in the areas in which it is present. Up to date, around a half of the European homes and businesses have the choice of broadband services delivered via several DSL operators and either a cable one or (in some areas) a fibre operator, and even several fibre ones in some metropolitan and industrial districts. Recently, infrastructure competition has intensified with the deployment of broadband wireless networks by mobile operators or niche providers, which in several countries (like Austria or the Czech Republic) have already grabbed a market share of more than 30% from fixed operators.

Infrastructure competition will continue to be sustainable when new generation networks are deployed. Actually, the first fibre deployments show that alternative operators are in many cases the first movers and, overall in Europe, they have deployed roughly as many fibre lines as the incumbents.

The main drivers of competition will be the ARPU levels, the features (speed, mobility, etc.) demanded from services, total service penetration and the availability of civil

infrastructure. Differences in user density will also be relevant, but more in the sense of allowing different technical platforms to prevail in different areas than in the overall number of competitors they will be able to sustain.

2 Current dynamics of infrastructure competition in Europe

Platform competition in broadband access networks is currently a reality in Europe. Cable, DSL and wireless operators actually compete in most European cities and towns. Although DSL operators continue to be the leading player in most cases, there are places in which other operators (usually cable) have the largest market shares. Although the coverage of cable networks has not increased very much over the last years, we cannot discard that attractive, uncovered areas do not get cabled in the near future. We have had examples cases of cable operators laying their networks in areas not previously covered by analogue cable TV, such as Spain, where cable coverage grew from zero to 50% of homes between 1998 and 2008. Both cable and DSL operators address the market with comparable, albeit different, dual-play and triple-play offers, and in general have a profitable and financially sustainable business model.

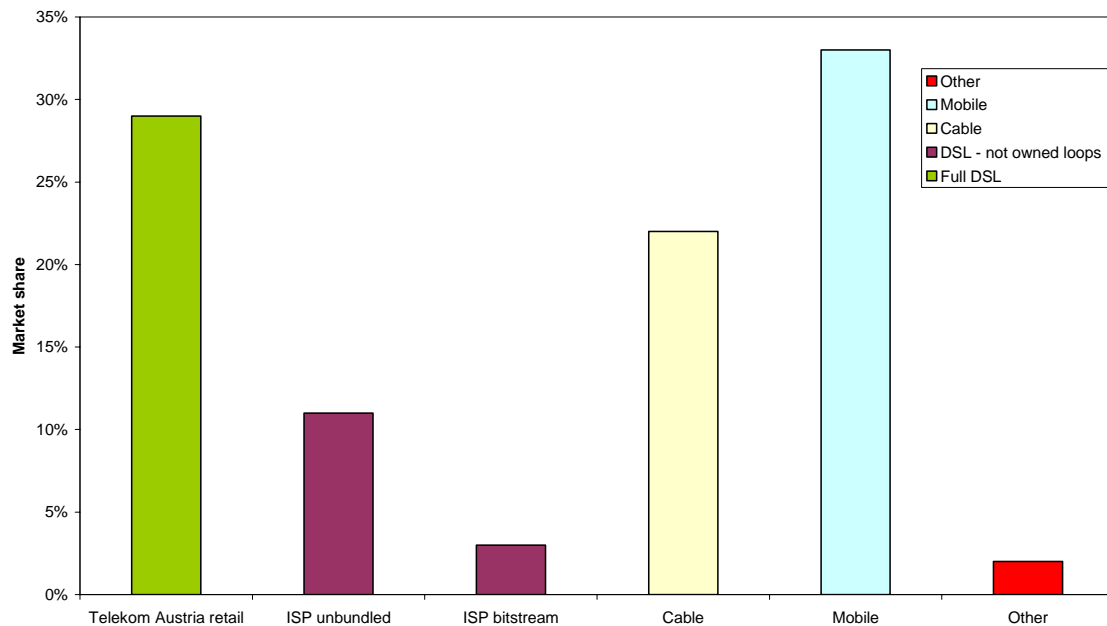
Fibre networks have also been deployed in most major cities. Financial and industrial districts are usually served by several metropolitan fibre operators, and in some cities like Milano (Italy), Cologne (Germany) or Stockholm (Sweden) fibre networks have also been deployed in residential areas.

In the last two years a new platform has entered the broadband market: wireless. Wireless operators are taking advantage of the enhanced capacities of their 3G networks to enter the broadband market, competing head on with current DSL and cable offers. In addition to the higher value of mobility, wireless dual play prices are also compelling for users from a fixed location. They are becoming increasingly attractive for average fixed broadband customers.

As a result, wireless operators are growing and grabbing sizeable market shares in many countries. This became evident in 2007 in countries like the Czech Republic, in which WiFi operators won big market shares, or Austria where the most successful wireless platform was mobile. Today, wireless operators amount for 33% of the Austrian market and 40%¹ of the Czech one. Other European countries have witnessed in 2008 big inroads of mobile operators in the turf of DSL and cable, and everything points to a situation where we are going to a market with three (or four) technologies (DSL, cable, 3G and WiFi/WiMAX), allowing 3 to 7 infrastructure-owning operators to compete with each other in a sustainable way.

¹ 30% market share for fixed wireless operators (WiFi, WiMAX) plus 10% for mobile ones.

Broadband platform competition - Austria 2008



3 Economic prospects for infrastructure competition between NGANs

3.1 The impact of NGN technologies on platform competition dynamics

Infrastructure competition with current technologies is thriving and sustainable. However, some say that the renewal of access networks with NGN technologies may modify the economics of the business to the degree of making platform competition impossible in many places of Europe.

However, as will be developed further in the following sections, economic analysis supports the finding that the economics of access networks built with NGN technologies in general allow infrastructure competition. What is more, in most cases current suppliers of broadband services should be able to evolve their networks into NGN and to stay in business.

The analysis that has been conducted covers a number of the most representative scenarios in Europe, and their conclusions are valid for these scenarios. It is not intended to be comprehensive, and it cannot be ruled that in other geographic or service scenarios the results be different.

To understand how NGN technologies can impact the dynamics of platform competition, several separate effects are to be taken into account:

1. NGNs allow the sale of new services and applications
2. NGNs modify the relative cost positions of operators
3. Operators migrating their current operations into NGN need to do it in a progressive way, without cutting off abruptly their current operations and customer relationships

The likely impact of these effects is analysed in the following.

3.2 New services are likely to reinforce platform competition

Since these new services are likely to have a value for customers, one can expect that, *caeteris paribus*, the operators' revenue per customer (ARPU) will increase. For any given cost function, this would allow operators to make a wider margin than with current ARPUs, thus allowing operators to reach break-even at lower market shares.

Another feature of NGAN technologies is that every one of them (VDSL, FTTH, HFC with DOCSIS 3.0, WiMAX, LTE) deliver different technical features:

- Dedicated connections, like those of xDSL and FTTH, allow an easy delivery of true Video on demand (VOD);
- HFC allows very efficient delivery of multichannel TV programming;
- LTE and, to a lesser extent, WiMAX, allow the mobility of terminals and location-related services;
- Shared medium technologies, like wireless and HFC, have traffic as the main cost driver, thus allowing operators to profitably offer cheap tariffs for low usage customers,
- Dedicated connection technologies, in exchange, have the connection as their main cost driver, and therefore allow offering low tariffs per traffic unit (even flat rates per connection) to high traffic users.

This gives room to operators to devise strategies based on differentiating their offers targeting those customer segments that value most their technology's unique features. Different operators can therefore engage in innovative retail competition, differentiating their offers by leveraging the unique capabilities of their networks, rather than competing on pure price.

In summary, service innovation brought by NGN technology is, *caeteris paribus*, likely to reinforce platform competition rather than to weaken it.

3.3 Changes in costs are likely to keep platform competition sustainable²

² The results presented in this chapter are built on the analyses and models presented in the paper "Exploring potential natural monopoly properties of broadband access networks" by Bruno Soria and Félix Hernández-Gil (Telefónica) at the 19th European Regional Conference of the ITS, Rome, 20 September 2008.

3.3.1 Analytical tools

There are several potential analytical approaches to the assessment of the prospective industry structure after the introduction of NGN technology. In this chapter an analysis of potential end games after the full replacement of current networks by NGN technologies has been selected..

To assess the impact of NGANs in market structure, the cost functions of operators running NGAN networks of different technologies at different penetration and market share points have been obtained using the COSTA model, an engineering model developed by Universidad Politécnica de Madrid³. Cost data for different scenarios have been afterwards fed into simple profitability analyses to assess the sustainability of operators with different market shares and technologies.

COSTA model calculates the monthly network cost of a broadband access connection using one of three NGAN technologies: wireless (WiMAX), cable (DOCSIS 3.0) or fibre (GPON or VDSL2). Current non-NGAN technologies like ADSL or GPRS are not included in the current version. Cost functions are calculated for different geographic settings: dense urban, urban, suburban, rural and sparse rural. Capex and Opex data are also produced.

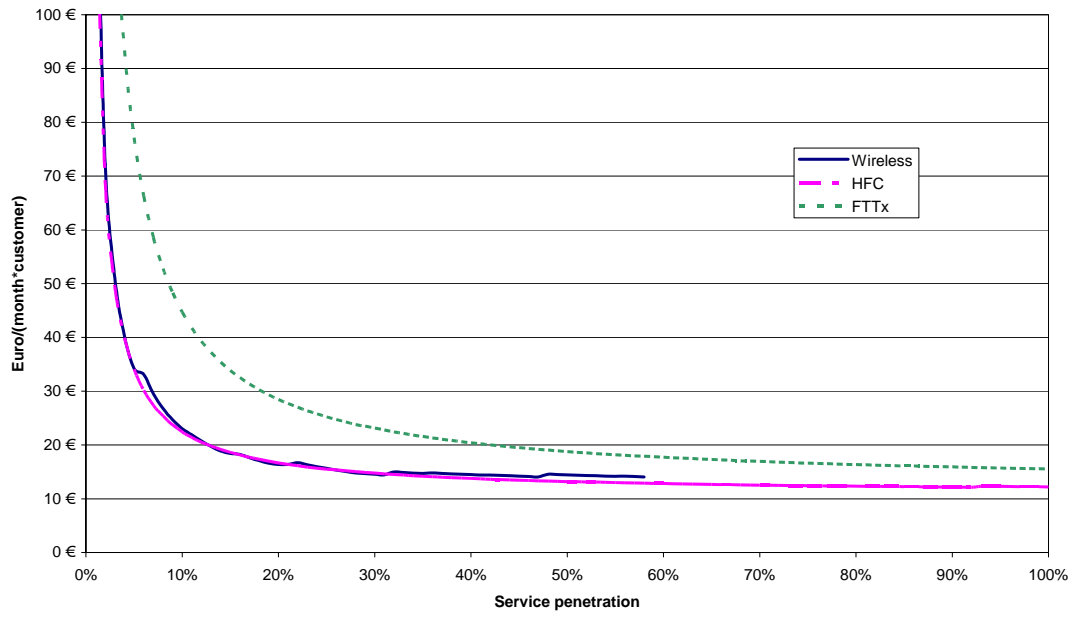
COSTA model allows the analysis in five different geographic settings, defined by their population density: Dense urban, Urban, Suburban, Rural and Sparse rural. It assumes flat terrain and a uniform distribution of homes within an area comprising 65,000 customer premises. Since this hypothesis are very favourable, but affect in a very similar manner all technologies, the results usually explain correctly the relationship between technologies in real world situations, but underestimate to a certain degree the actual costs. Different hypotheses would obviously influence results.

3.3.2 Differences between geographic areas

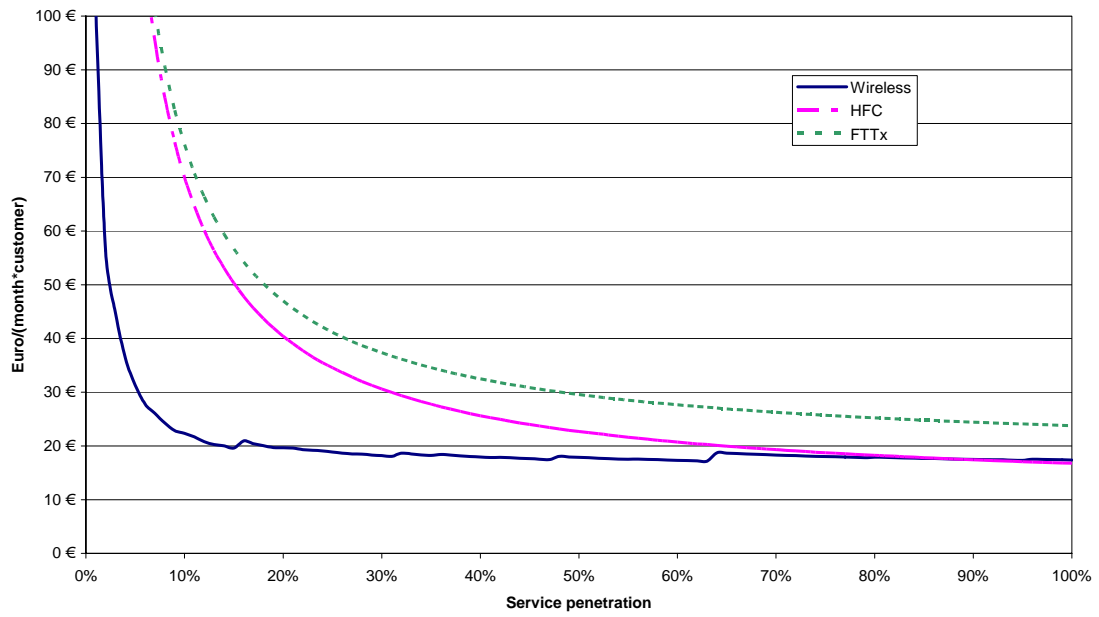
The first result that the model yields is that the economics of NGAN are very different in different geographic areas, to the extent that the expected industry structures are very different. If the case of standard speed Internet connections is considered, it can be seen that fixed networks are likely to be more successful in high density areas, whilst wireless are best suited for rural ones.

³ COSTA model (*COSTes de redes de Acceso* –COST of Access networks) is to be presented to the public in a public conference next November 18th in Madrid. Please refer to “Grupo de Tecnologías de la Información y las Comunicaciones”, leaded by Jorge Pérez jperez@gtic.ssr.upm.es for details about the model.

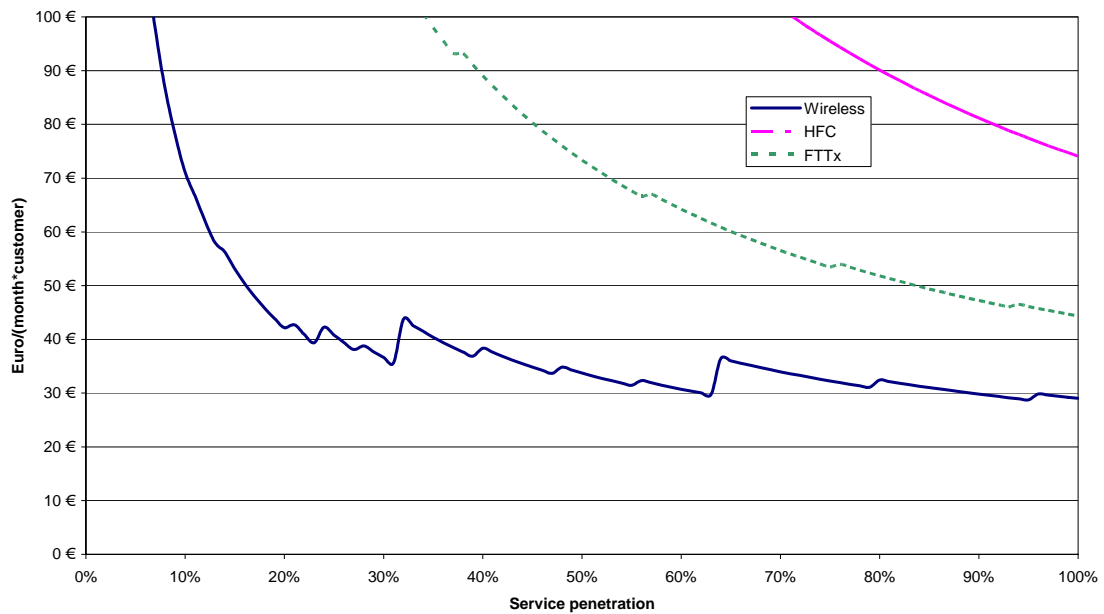
Dense urban area - Triple play with Internet access at 6 Mbps



Suburban area - Triple play with Internet access at 6 Mbps



Sparse rural area - Triple play with Internet access at 6 Mbps



The main conclusion is that, since the economics of NGNs are so different from area to area, the best approach for operators, as well as for regulators, will be to deal with every kind of area in a different, specific way.

3.3.3 Differences driven by service or connection speed

The type of service that users demand also impacts on industry structure. In addition to different cost functions for the same technology when delivering different services, the platforms available for different speeds are not the same.

Examples of service speeds	Potential NGN platforms
Triple play-enabled connection with Internet access at 6 Mbps downstream	<ul style="list-style-type: none"> ▪ Wireless ▪ Cable ▪ FTTx
30 Mbps downstream	<ul style="list-style-type: none"> ▪ Cable ▪ FTTx ▪ FTTH
100 Mbps downstream/symmetrical	<ul style="list-style-type: none"> ▪ Cable ▪ FTTH

3.3.4 Specific analysis: very high speed services in urban areas

The analysis of the sustainability of infrastructure competition has to be done separately for different geographic areas and service features.

For the sake of brevity, one area and service type will be analysed in this annex. Dense urban areas⁴ need not a thorough analysis, for competition between several fibre networks already exists in many European cities, where metropolitan fibre operators like Colt, Verizon or utility-backed city carriers compete with the incumbent telephone operator and usually also with one cable. The analysis will therefore focus in urban areas⁵. Since very high speed services are the ones in which fewer platforms could compete, very high speed services (100 Mbps connections) were selected to be sure that the most difficult scenario was covered.

Together, urban and dense urban ones amount for more than one half of the European population (check) and are the ones in which infrastructure competition has usually existed for the longer time (normally between DSL and cable). Of course, additional analyses have to be conducted for other geographic and service scenarios in due time.

3.3.5 *Greenfield scenario*

To begin, the scenario of full infrastructure construction (greenfield) will be analysed as the base case. Since in most urban areas civil infrastructures already exist, and incumbent infrastructure operators are one of the owners (other being municipalities and public utilities that can put their ducts in the market), the case of competition between operators that can use their existing ducts and others that have to lease or build theirs will be analysed later.

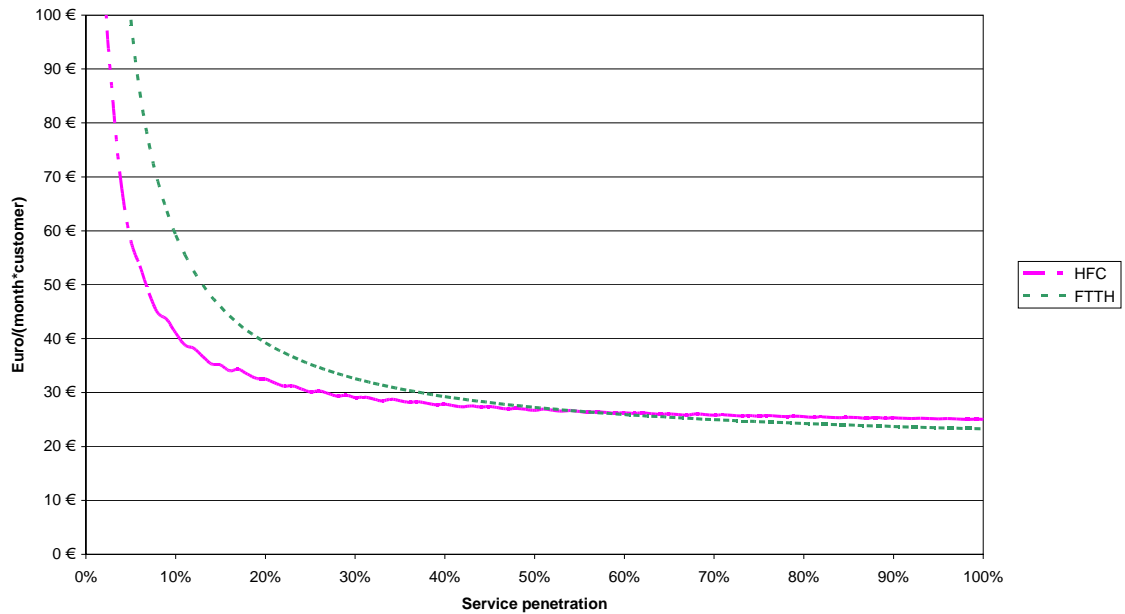
If we cast a look first at the shape of the cost curve, it becomes evident that price is the main driver of the number of operators that can profitably compete in a market at any given service take up rate. Because of economies of density⁶ in the left part of the cost curve, low prices will increase the minimum size needed to make a profit.

⁴ COSTA model, following the criteria of the European project MUSE, takes a density of 7,187 user locations per km² for dense urban areas.

⁵ COSTA model, following the criteria of the European project MUSE, takes a density of 3,116 user locations per km² for urban areas

⁶ Density economies are a particular case of scale economies, which are constrained to a given area. Within this area, the highest the number of customers, the lowest the unit cost, but having a large scale in one area does not confer any cost advantage in another one.

Urban area - 100 Mbps High quality



It is interesting to note that, in the case of very high speed services, cable reaches minimum cost at a penetration /market share lower than fibre networks. This suggests that incumbent cable operators can have a first mover advantage if they decide to upgrade their networks before the incumbent telephone operator or the unbundlers.

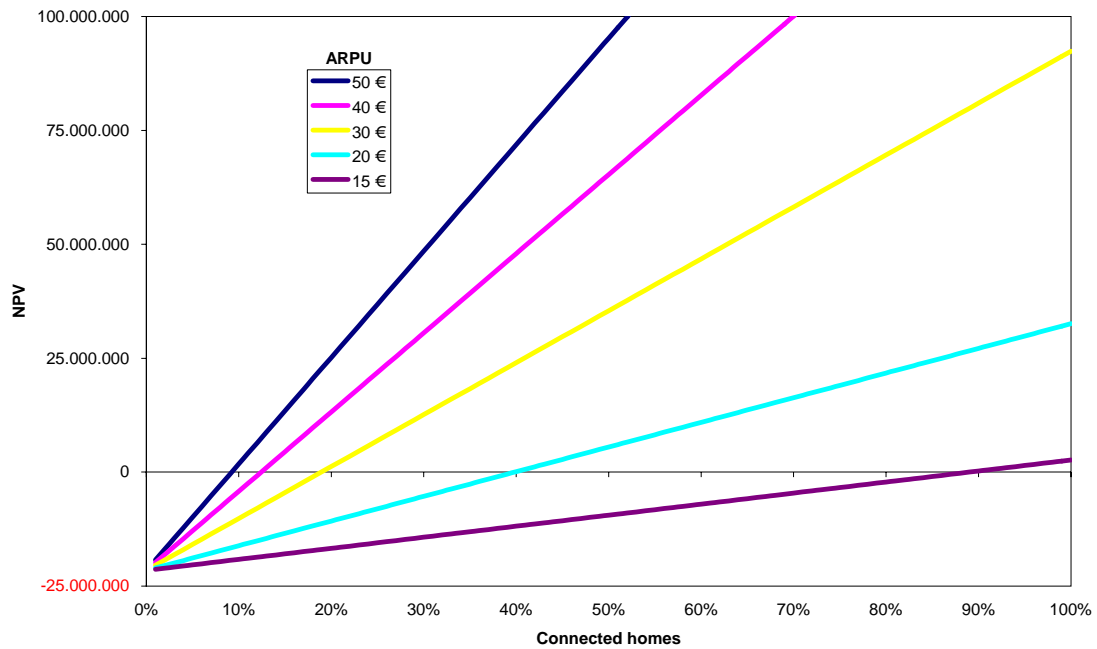
If we analyse the impact of price levels in the market structure, we see that the maximum potential number of profitable operators decreases sharply with average revenue. Next figure shows the NPV of full infrastructure-owning fibre operators in an urban area that offer 100 Mbps service at different wholesale ARPU levels⁷. The minimum number of connected homes⁸ that an operator needs to get to be able to break even is not very high for wholesale ARPUs of 30 euros and above, but increase sharply below that revenue levels.

⁷ Assuming a WACC of 10%, thanks to no regulatory risk.

⁸ This number is related to market share and total service take up by a simple formula:

$$\text{Connected homes}_i = \text{Total connected homes} * \text{Market share}_i$$

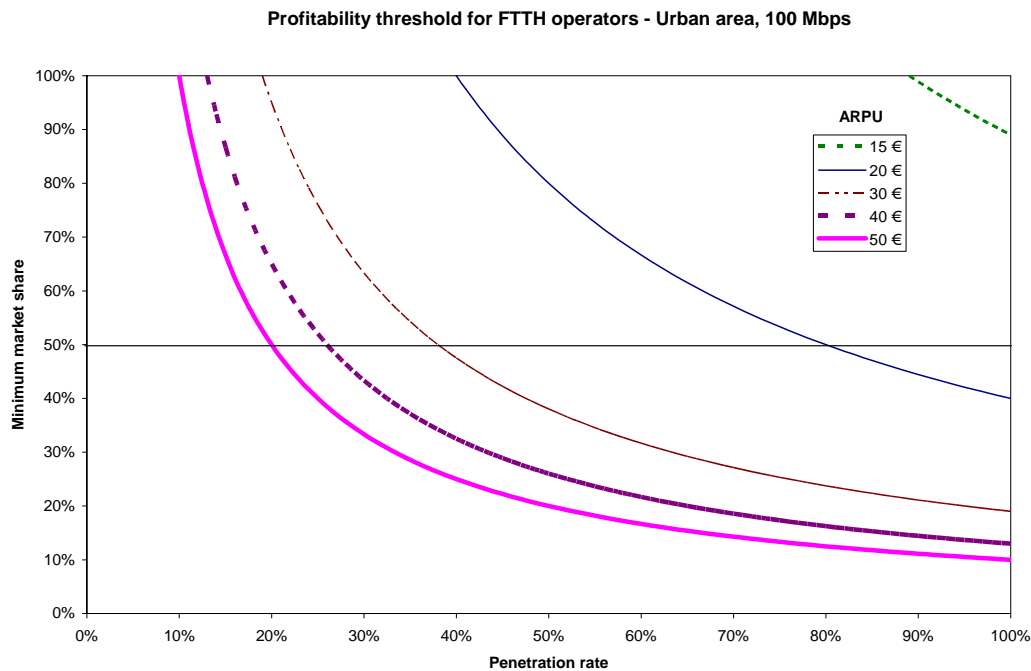
Break even analysis - Urban FTTH operators 100 Mbps



This means that the maximum number of competing operators (assuming equal market shares and 100% service penetration), depending on the revenue per connection, is not only greater than one, but might be very high.

ARPU level (euro/month)	Break even (connected homes/total homes)	Max number of operators (universal penetration)
50	10%	10
40	13%	7
30	19%	5
20	40%	2
15	89%	1

Since penetration is not likely to be universal nor market shares to be equal, when the penetration rate of the service is taken into account, a potential number of market structures arise. It may be seen in the figure above that, the higher the total penetration rate, the higher the number of potential profitable network competitors. However, it should not be forgotten that, a low penetration rate of high speed services means that there are many customers purchasing lower speed services, which in turn can make profitable other operators running cheaper, lower performance technologies. Infrastructure competition in the case of low penetrations will then be more inter-modal than intra-modal.



It can be concluded that, for realistic penetration rates and ARPU levels, competition between several fibre operators will be sustainable in the long run in a greenfield scenario.

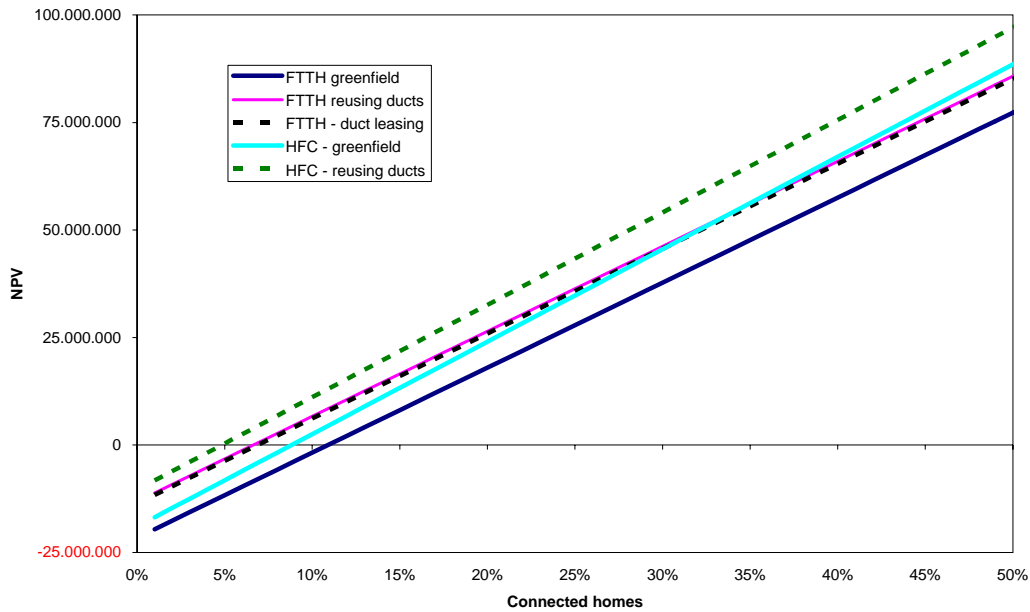
3.3.6 *The impact of duct ownership and access conditions*

When the availability of existing civil infrastructure is taken into account, relevant changes in the cost and profitability of operators happen with relation to the greenfield base case. Two different situations are analysed: that of an incumbent operator that already owns the ducts needed to deploy an NGN (be it a telephone operator that deploys FTTH or a cable one that upgrades its HFC network with DOCSIS 3.0), and that of a new entrant that leases the ducts it needs, be it from the incumbent telecommunications operators (telephone and/or cable) or from an utility, the sewer manager or the municipal authority. In this case, in order to perform a robust analysis, a lease price of 6 euro/metre of duct is considered, which is well above the lease prices that are charged in most markets.

To simplify the presentation of the results, two instances of revenue are displayed: 50€ and 30€ per month.

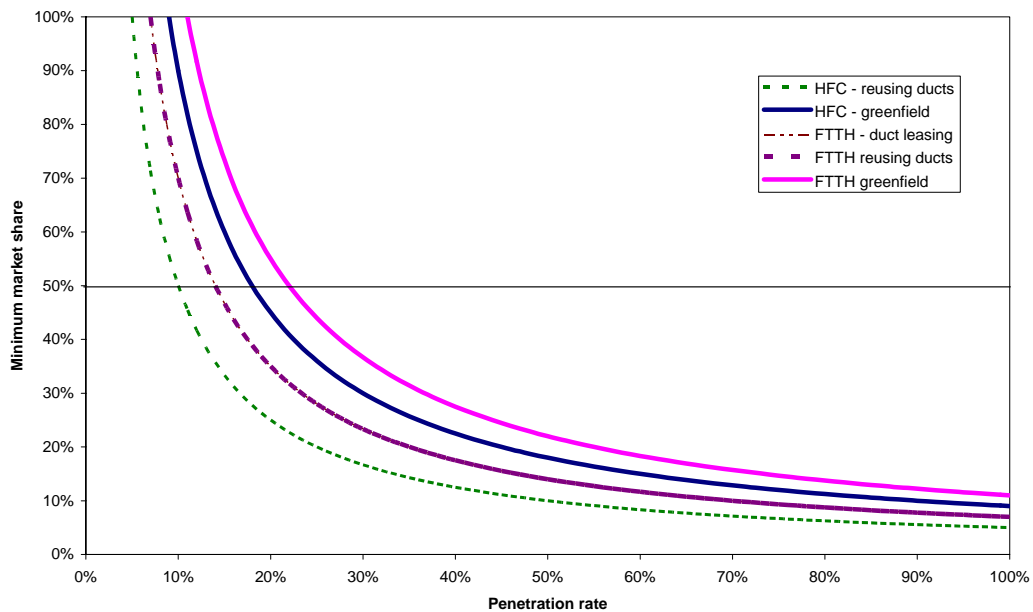
In the case of high revenue (50€ month), it can be seen that the financial prospects for both incumbents and new entrants greatly improve over the greenfield scenario. Cable operators consolidate a very advantageous position, whilst incumbent and alternative fibre operators have very similar business cases, as the lease price of ducts is a small percentage of the network costs.

Break even analysis - Urban operators 100 Mbps, 50€ ARPU



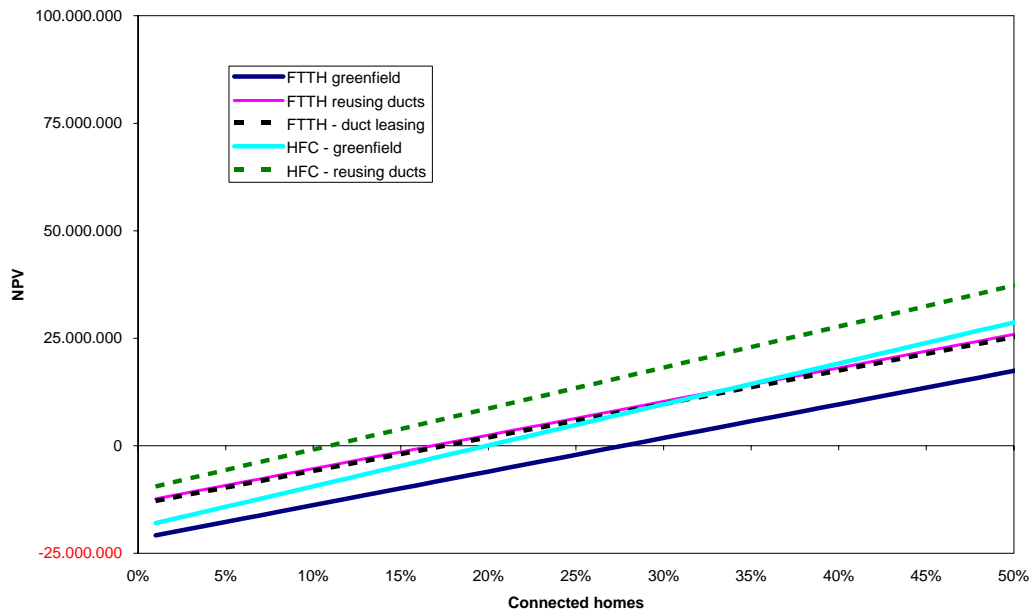
When this data is used to calculate the profitability threshold for competitors to be viable, the competitive conditions also improve. In this scenario, the minimum market share for a FTTH operator (incumbent or new entrant) to become profitable falls from 37% to 23% at penetration rates as low as 30%.

Profitability threshold - Urban area, 100 Mbps, 50€ ARPU



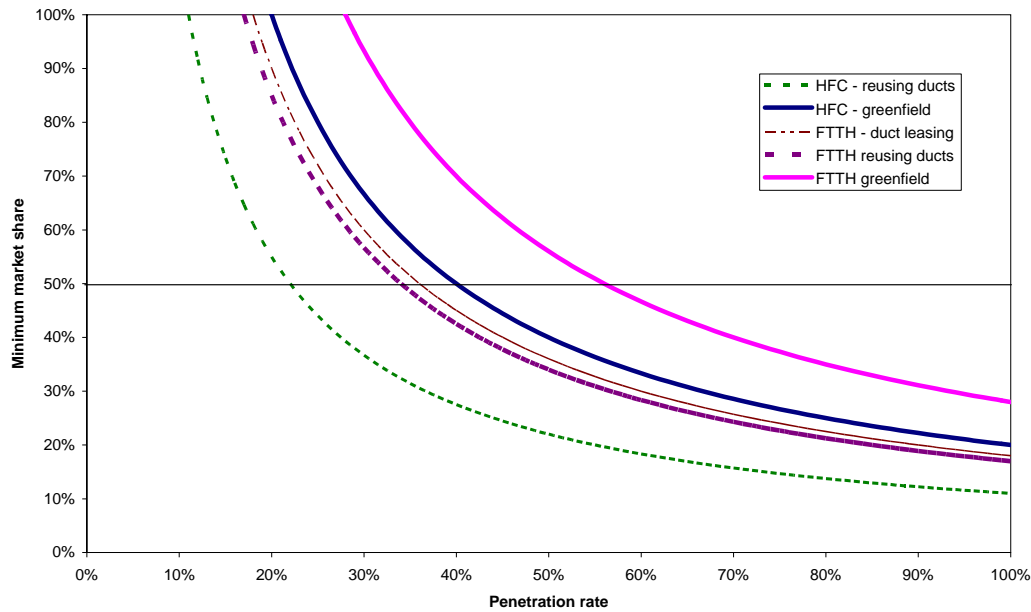
Of course, a decrease in the revenues would put pressure on the number of competitors, but not necessarily impede competition. When the previous analyses are run for monthly revenues of 30€ it can be seen that the availability of ducts (owned or leased) greatly enhances the profitability of all kinds of operators (especially cable ones) and lowers the market share needed to break even.

Break even analysis - Urban area 100 Mbps, 30€ARPU



As expected, this makes competition between several NGN operators viable at penetration rates around 40%, especially where there is already competition between cable and DSL.

Profitability threshold - Urban area, 100 Mbps, 30€ARPU



4 Conclusions and implications

The assertion that broadband access networks may become less competitive in Europe after NGN deployment is not correct.

Industry structure is expected to vary greatly with population density, ARPU, service take-up, user demand requirements and the availability of civil infrastructure.

- Population density and user requirements will drive which technologies have the best cost position, thus allowing very different industry structures in different areas
- The higher the ARPU, the service take-up and the availability of civil infrastructure, the more potentially competitive a market becomes.

Differential regulatory treatment to different geographic areas will be in line with the underlying economics of NGNs.

Regulatory measures aimed at forcing prices lower than the competitive equilibrium are likely to decrease, rather than increase, the degree of competitive rivalry and the number of competitors in the market.