

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



July 2009

Executive Summary

- Next generation access (NGA) networks are a key prerequisite for Europe's future competitiveness and the participation of its citizens in the global information society. **ETNO welcomes the Commission's ambition to provide a policy framework for NGA deployment** with the present Recommendation on access to NGA and the forthcoming guidelines on state aid for broadband networks. The Commission guidance should promote private investment in NGA networks through a consistent approach in both documents.
- **ETNO supports the objectives** of the draft Recommendation to foster **investment and innovation** in new and enhanced infrastructure while preserving strong market **competition**. We welcome the Commission's recognition of the increased risks incurred by undertakings investing in NGA networks.
- ETNO is concerned that **the Recommendation, if adopted in its present form, will not achieve the stated objectives** of innovation, competition and, in particular, investment in next generation access networks. The **draft foresees extensive access and price control obligations imposed on operators of new NGA network** as the standard regulatory solution, and largely **transposes the current regulation of copper networks to the NGA environment**. This approach is not in line with the conclusions of the spring European Council and the preliminary agreement by the European Parliament and Council on the legislative review proposals aimed at adapting the current regulation to yet-to-be-built NGA networks in order to encourage investment in these networks.

- The Recommendation should be redrafted to give proportionate guidance to NRAs on potential **access obligations** for NGA networks.
 - The guiding principle for access to new high-speed networks should be a **gradation of remedies**, ensuring, where necessary, access to the identified bottleneck in a given area to achieve effective competition in the market. A cumulative imposition of access obligations within markets 4 and 5 as foreseen in points 15, 19, 34, 36 would be disproportionate and would result in inefficient and unwarranted obligations, raising the regulatory burden imposed on the investing company. Several NRAs follow the approach to target access obligations to the relevant access bottleneck in new NGA networks to promote the emergence of sustainable infrastructure competition wherever feasible. For example, in denser areas an effective duct access regime may suffice to ensure effective competition, alleviating the need for unbundling obligations.
 - The Recommendation should ensure that NRAs fully take into account the conditions of competition in **different geographic areas**. Geographic differences may be more important in an NGA context as deployment depends upon geographic factors, such as population density and existing network coverage of entrants. A failure to take into account geographic differences would hold back investment and competition in more competitive areas to the detriment of consumers.
 - The Recommendation should recognise that **access to facilities in the ‘terminating segment’ should be symmetric** in principle, i.e. not linked to a position of significant market power (SMP) in current market 4, to ensure a level playing field for investors and promote choice for consumers. The draft Recommendation remains limited to a discussion of asymmetric remedies imposed on operators with SMP in current markets 4 and 5 without addressing the possible need for access to facilities such as ducts in the access network regardless of an SMP-position. The obligation contained in point 15 - 17 should apply symmetrically and only to the extent proportionate in view of market demand. Access to in-house wiring (point 15) should not be addressed under market 4.
 - The draft Recommendation should be amended to **not grant a ‘2nd mover advantage’** by mandating a blanket six-months advance availability of wholesale products for new services (point 33).
- ETNO notes certain positive statements on **pricing principles** and welcomes the mention of new pricing models for risk diversification in NGA in Annex 1. The practical guidance contained in the draft Recommendation, however, foresees cost-orientation, i.e. the strictest form of price regulation, for NGA wholesale products as the standard remedy.

- Freedom to set the level of wholesale access prices (**'pricing flexibility'**) is an **important factor for a successful NGA business case**. This is recognised in the draft Recommendation, but only in a very specific context (point 29). Points 22 and 33 - 40 should foresee pricing flexibility whenever effective non-discrimination is in place and sufficient pricing constraints on the investor are present in the market.
- The Recommendation should give coherent guidance on the new pricing models to drive investment and penetration (Annex I points 7, 8). In particular, the **margin squeeze test should not undermine** the effectiveness of **long-term contracts and volume discounts**. To this end, wholesale prices used as the input to the margin test should be those based on volume and term commitments, net of any option premiums for late entry or early exit.
- ETNO is concerned with statements on an 'ex-ante' margin squeeze' test in Recital 27. The **preference for a "reasonably efficient operator"** test is not in line with competition case law and **contradicts the regulatory objectives** of supporting service penetration and NGA investment.
- The instruments to take account of increased investment risk in the access price including a risk premium should also apply to civil engineering works carried out for the purpose of installing NGA networks
- **NGA deployment should be market-led**. Regulation should be careful not to 'pick a winner' be it a particular technology, network architecture or form of commercial cooperation. At the same time, different technology and network topology have to be taken into account in regulation, reflecting their competitive outcomes, which the draft in principle recognises. The Commission does not strike the right balance on this point, however, and *inter alia* wants to impose specific network solutions in the terminating segment (multi-fibre, point 18), which would further raise the regulatory burden for potential investors. No specific network topology or architecture should be mandated – *de jure* or *de facto* - by NRAs.
- In an NGA environment, welfare-enhancing **commercial agreements are in principle better suited to market needs than ex-ante economic regulation**. Negotiated arrangements for network access and commercial sharing of risk between investors and competitors should be viewed favourably and not be substituted by regulation, unless they are anti-competitive. These arrangements will take various forms in different Member States or geographic areas and should be business-driven.
- The draft Recommendation acknowledges the need for **regulatory certainty** and attempts to provide certainty on specific regulatory responses to market outcomes. Investors need to be able to anticipate regulatory

decisions over the lifecycle of the investment. Regulatory principles should thus be clear before investment decisions are made. This implies a strong commitment by the NRA, for example on pricing principles for taking into account increased investment risk (s. above). The possibility for such commitment should not be limited to situations where market conditions stay broadly constant, as the current draft does under point 6.

- The Recommendation should not assume unchanged market definitions. In the draft Recommendation, this assumption leads to erroneous guidance on the need for new wholesale access products. Even though the question of market definition is not directly covered in this Recommendation, the draft assumes that new NGA-based services will be included in currently existing relevant product market definitions (points 32, 33, 34), requiring the imposition of corresponding wholesale products. It also assumes that there will be a single SMP operator for NGA services and that this operator coincides with the SMP operator in current market 4. ETNO maintains that a proper demand and supply side substitution analysis is required before any conclusions on the scope of the relevant market can be drawn. The recommendation should **emphasise the need to analyse the geographic dimension of markets and** to possibly **define new or more segmented product markets** within the scope of current markets 4 and 5 in terms of capacity, pricing or functionality of NGA products. NRAs would in that case be required to carry out the 'three criteria test' before new obligations for NGA-based services are introduced.
- ETNO agrees that an **effective migration** from current generation broadband to NGA is essential to ensure a non-disruptive development of competition. The Recommendation should clarify that bilateral or multi-lateral commercial agreements regarding the appropriate migration paths, among investing SMP-operators and alternative operators currently enjoying access to the network, are the most efficient means to ensure network evolution. A 'blanket' five year period for maintaining existing obligations should not be specified in the Recommendation.

I. Introduction - Encouraging private investment in NGA in Europe^{1 2}

ETNO welcomes the opportunity to comment on the draft Commission Recommendation on regulated access to Next Generation Access Networks (NGA) of June 12, 2009 ("the NGA Recommendation" or "draft Recommendation").

The availability of super-fast broadband connections can play a vital role for Europe's economy and citizens by stimulating productivity growth across sectors, as well as preserving and creating employment in Europe. Very high-speed broadband will help to ensure Europe's long-term competitiveness and allow future participation of its citizens in the global information society.

As highlighted in the conclusions of the March European Council, investment in new and enhanced access infrastructure should be promoted in view of the *"fundamental role of telecommunications and broadband development in terms of European investment, job creation and overall economic recovery."*ⁱ

These new networks are needed as the backbone for sustained growth of the industry to respond to the exponential growth of online traffic and to open up new opportunities for EU citizens and businesses, for example, creating and sharing digital content thanks to higher upload speeds, engaging in new forms of collaborative working online, taking advantage of future services such as distant health care, etc.

As presented in more detail in ETNO's response to the first draft Commission NGA Recommendation, a number of factors, including the regulatory environment, have resulted in a situation where private investments in new networks in Europe are at far lower levels than in other developed economic regions.ⁱⁱ The costs of rolling out Europe-wide NGA have been estimated at around € 250-300 billion.ⁱⁱⁱ

The sheer size of the investment means that private capital will have to provide the large majority of the financial resources. Public funds will in some geographic areas play an important but complementary role. Against this background, the present Recommendation and the

¹ TDC does not support this position.

² BT does not support the comments in sections 4, 5 and 6 of Chapter III, linked conclusions summarised in Chapter I, and Annexes I-III related to section 4.

Commission's forthcoming guidelines on state aid for broadband networks should provide a consistent set of guidance for investors and public authorities. Maximising the reach and extent of private investment in NGA benefits public authorities and EU citizens, both as consumers and tax payers.

European network operators are prepared to respond to the investment challenge posed by NGA^{iv} and to provide financial resources at an unprecedented scale for the roll out and operation the networks and development of new services. One of the preconditions for investment decisions by ETNO Members, however, is a fair and predictable regulatory environment based on an equitable treatment of all types of NGA.

II. A shared set of objectives - competition, investment and innovation

ETNO welcomes the Commission's ambition to formulate a NGA Recommendation to provide guidance to national regulatory authorities (NRAs) and provide more certainty to the market on the regulatory principles for deployment of NGA. The Recommendation should provide all players with the incentive to invest in new access networks while ensuring vibrant competition in NGA.

ETNO also welcomes that the draft NGA Recommendation acknowledges the need to alleviate additional and unnecessary regulatory risk to promote large-scale private investment. Investing financial resources on the scale required for NGA in an uncertain business environment will entail substantial business risks. Clear rules facilitating these investments need to be in place to allow investors a timely roll-out of NGAs.

ETNO fully supports the overall aim of the draft Recommendation as stated in Recital 1, namely to promote *"efficient investment and innovation in new and enhanced infrastructure ... taking due account of the risks incurred by all investing undertakings and the need to maintain effective competition."*

When pursuing this objective, NRAs should focus on fostering investment, innovation and competition. While the 'efficiency' of investment is a legitimate concern of regulators, in the presence of competitive pressures and adequate conditions for investment markets are best suited to determine the efficient level of investment.

III. Main changes required to the Recommendation

ETNO is concerned that the draft Recommendation will not achieve the stated objectives of innovation, competition and, in particular, investment in next generation access networks in Europe. If adopted in its present form, it risks undermining incentives for investment in NGA infrastructure in particular by the established operator as well as limiting the potential for sustainable competition based on competing infrastructures.

Changes in a number of key areas are required to achieve the stated objectives of increased investment, innovation and effective competition in NGA: These are:

- (1) an appropriate role for symmetric regulation in the access network
- (2) a market-led approach to technology and network architecture
- (3) regulatory certainty
- (4) a proportionate gradation of access remedies, adapted to different geographies
- (5) pricing flexibility to allow value-based pricing
- (6) fair risk sharing in access pricing and adequate margin squeeze test
- (7) sound market definition with option for geographic and product segmentation
- (8) an efficient migration regime.

1. Role of symmetric regulation in the access network

The draft Recommendation is limited to a discussion of asymmetric remedies imposed on operators with significant market power (SMP) in current markets 4 and 5.

However, deployment of NGAs by different players in different local areas (a street, a multi-dwelling unit, a district) lead to increasingly symmetric competition challenges. The sharing of certain elements of the access infrastructure may be required to facilitate deployment of NGAs regardless of an SMP-position in current market 4.^v This may for example be the case where a utility provider, an entrant or a cable operator^{vi} deploys fibre to the premises and the provision of a full alternative infrastructure is not viable. Such facilities would represent a true 'bottleneck', resulting in a need for symmetric access, particularly in the 'terminating segment'.

Art. 12 Framework Directive^{vii} will be reinforced with the review of the electronic communications Directives and enable NRAs to take appropriate measures for the sharing of facilities, such as ducts and in-house wiring, by all operators installing access networks. Accordingly, a number of obligations foreseen in the draft Recommendation should, if at all, apply in this symmetric manner (e.g., point 15, s. below, 2.).

The Commission therefore should extend its guidance and take into account the application of Article 12 Framework Directive and define proportionate regulation of markets 4 and 5 accordingly, especially in view of an adequate gradation of SMP-remedies.^{viii} The application of symmetric measures can be a very important tool for addressing competition concerns, in particular in the terminating segment and its exclusion from the Recommendation's scope significantly reduces the value of the Recommendation as a comprehensive reference for NGA regulation in the internal market

2. A market-led approach to NGA technology and architecture ³

The roll-out of NGA confronts investors with the choice of several technologies and network architectures as well as deployment scenarios. Investors can adopt different high-speed broadband technologies suiting different market needs, for example, in fixed networks, VDSL, Ethernet – point-to-point (P2P) fibre, BPON, EPON, GPON, WDM-PON or cable.

Among the leading companies in FTTx markets worldwide, no clear 'technology winner' is emerging. The most common technology appears to be GPON, but P2P solutions are also deployed at some scale.^{ix} The type of technology or architecture is chosen by the investor as a function of the market situation, including the degree of competition from alternative platforms, roll-out costs and demand expectations, both at the retail and wholesale level.

At the same time, policy makers and regulators take an interest in the technical, town-planning and competition features of different NGA networks, for example when awarding public funds or devising rules in policy areas linked to NGA. A number of measures that can be envisaged in this context, e.g. the provision of sufficient duct capacity in new building sites by a property developer are not covered by the Recommendation.

³ Swisscom does not support the comments in this section.

- **No imposition of specific types of fibre roll-out**

Different technology and topology choices also have to be taken into account in regulation, reflecting their different competitive outcomes (s. below).

However, in the context of ex-ante regulation Commission guidance is bound by several principles enshrined in the regulatory framework, among them technological neutrality and the obligation not to distort competition between operators on the market. The telecoms framework moreover foresees a limited set of ex-ante obligations which constitute an upper limit of intervention (s. Art. 8 (3) Access Directive^x).

Against this background, ETNO is very concerned that the draft Recommendation attempts to impose a specific NGA architecture by advising NRAs to oblige SMP-operators to roll-out specific network solutions in the terminating segment, “where legally possible under national law” (point 18).

The imposition of a specific network topology on the SMP-operator outside the scope of the EU legal framework. Moreover, such an obligation would severely distort competition, as it only addresses one player in the market, the SMP-operator, despite the symmetric nature of competition issues in the terminating segment (s. above).

This concern is also valid for the obligations for access to the terminating segment set out in point 15, and for the requirement to foresee extra-space in ducts for further operators in point 14. Such measures should -- if legally feasible and appropriate -- be addressed to all investors in an NGA network under Art. 12 Framework Directive, not be unilaterally imposed on the SMP-operator. Art. 9 Access Directive allows NRAs to require information on specific network characteristics, but neither this article nor Art. 12 Access Directive allow the imposition of such characteristics on the SMP-operator. ETNO also maintains that access to in-house-wiring, often owned by the landlord, should not be addressed under market 4 but by symmetric rules (point 15).

A direct obligation on an investor to create extra capacity is problematic as such especially in case end-user demand and demand by access seekers is uncertain, as is often the case in the early phase of NGA roll-out. The varying level of income and capital available across member states need to be taken into account before suggesting a “one-size-fits all” solution as in point 18.

Generally, the Commission and NRAs should refrain from prescribing technology and architecture choices which could lead to over- or under-investment, leading to suboptimal results in the market.

- **Taking account of different technology and topology in regulation**

It derives from the principle of proportionality to take into account the competitive outcomes of different network architectures or different forms of co-operation or in regulation. Guidance on remedies should fully reflect that effective competition can be achieved under several deployment types, risk-sharing- or cooperation arrangements, both on a multi-fibre and single-fibre FTTH- and on a VDSL basis.

ETNO believes that the key principles to foster NGA investment incentives as laid out in 3 – 8 below should be applied to all types of NGA deployment. The competitive outcomes of other scenarios such as specific co-operation agreements and/or network topology would in addition justify further regulatory relief.

Generally, specific network structures or ownership arrangements will meet market needs in some, but not in all cases. Therefore, regulators should be careful not to attempt to ‘pick a winner’ be it a particular technology, network architecture, or form of commercial cooperation, and should not risk steering investors towards specific types of deployment which do not meet market needs in all circumstances. Co-investments and other arrangements between operators should be business driven.

- **focus on fibre unbundling appears not technologically neutral**

A concern with regard to technology neutrality is posed by point 20 stating that NRAs should impose a “fibre unbundling” obligation irrespective of the technology used.

Given that one of the most common technologies used for FTTH roll-out, GPON, currently does not allow physical “unbundling” at the ‘MPOp’ (metropolitan point of presence), the text appears to discourage deployment of this specific technology versus others. Again we would like to underline that a competitive outcome at retail level, where not achieved by market forces, can be ensured by adequate regulation on any fibre technology or architecture. To impose obligations that can *de facto* only reasonably be met by specific technologies would contravene the technological neutrality principle of the framework.

- **Definition of NGA not future-proof**

The current definition of NGA as solely *“wired access networks which consist wholly or in part of optical elements”* (point 8) is not in conformity with the principle of technological neutrality under the regulatory framework and as such not future-proof. In Europe NGA deployment is still in its infancy. Although only a limited number of technologies may eventually succeed in delivering very high-speed broadband connections, it is at this stage uncertain that these will only be wired technologies. ETNO suggests removing the definition as no exhaustive definition of “NGA” is needed for purpose of the Recommendation.

3. Regulatory certainty

ETNO welcomes the Commission stating that “regulatory certainty is key to promoting efficient investment by all operators” (Rec. 8).

Point 6 of the draft Recommendation, however, recognises the need for a “consistent regulatory approach over appropriate review periods” only where there will be “broadly constant market conditions”. This contradicts the compromise agreed by the Parliament and the Council in the review process on the need for regulatory certainty. It also fundamentally misunderstands the purpose of regulatory consistency which is to alleviate additional risk for investors, not to respond to constant market conditions.

In the absence of regulatory certainty, in particular on the terms and conditions of network access, regulatory risk will add to the business risk and negatively affect investment decisions. Investors need to be able to anticipate regulatory decisions over the lifecycle of the investment: regulatory principles should be clearly outlined before investment decisions are made and fully take account of their effects on regulatory risk. This implies a strong commitment by the regulator to that should not be undone with changing market conditions or a changing economic outlook.

Such a commitment would not exclude adjustments to regulatory conditions in the light of market developments according to pre-determined and predictable rules. The Recommendation should specify that NRAs should be able to make precise commitments on how access terms and conditions will develop “in future market reviews in reaction to likely changes in market circumstances.” (point 6), and not just provide an explanation as currently foreseen.

Also in the presence of such regulatory certainty, regular market analyses would still be carried out, to:

- determine whether SMP is present in the market and remedies are still proportionate (in absence of SMP or where the obligation is no longer required, regulation would be lifted),
- determine how remedies will be adapted to changing market conditions according to the previously laid out approach.

4. Proportionate gradation of access remedies and geographic segmentation

The objectives of the imposition of remedies under the EU regulatory framework, namely to impose regulatory remedies where this is proportionate and necessary to remedy a specific market failure in the interest of the end-user, are laid down in Art. 8 (3) and Art. 12 (2) Access Directive and Art. 8 Framework Directive. Article 12 (2) Access Directive states that

“ When [NRAs] are considering whether to impose the obligations referred in paragraph 1, and in particular when assessing whether such obligations would be proportionate to the objectives set out in Article 8 of Directive 2002/21/EC (Framework Directive), they shall take account in particular of the following factors:

- (a) the technical and economic viability of using or installing competing facilities, in the light of the rate of market development [..]*
- (b) the feasibility of providing the access proposed, in relation to the capacity available;*
- (c) the initial investment by the facility owner, bearing in mind the risks involved in making the investment;*
- (d) the need to safeguard competition in the long term; [...]*
- (f) the provision of pan-European services.”*

- **Gradation of remedies**

ETNO encourages the Commission adopt an approach that targets regulatory intervention at the relevant economic bottleneck in line with Article 12 (2) Access Directive.

The first draft Recommendation of September 2008 outlined such an approach, a gradation of remedies from the deepest level of the network to higher network layers to promote infrastructure competition. It stated that *“In a Fibre to the Home (FTTH) context, [a level playing field for retail competition] 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.^{xvi}

ETNO has welcomed this approach. NGAs offer the possibility to achieve sustainable and effective infrastructure competition in many parts of Europe (on the economics of infrastructure competition in NGA networks s. Annex I to this submission). Empirical findings that effective access to basic facilities such as ducts, depending on the availability of duct space, increases the scope for full infrastructure competition by more than a third (for supporting economic research on the effects of commercial or regulated access to ducts on infrastructure competition s. Annex II to this submission).

The present draft Recommendation abandons a proportionate gradation of access remedies in favour of an extensive set of access obligations, largely mirroring access obligations on the current copper-based networks (points 15, 19, 34, 36). For market 4, the approach is summarised in Recital 21:

“On Market 4, it is thus important that in principle the whole range of different physical access products [access to civil engineering works, to the terminating segment and the unbundled fibre loop], including backhaul, is available as remedies.”^{xvii}

However, a parallel imposition of a range of access obligations at cost-oriented prices, including a new ‘fibre unbundling’ obligation, actively reduces the potential of NGA to lead to more infrastructure-based competition and, as a result, increased choice for consumers. A ‘fibre ladder of investment,’ as also discussed by the ERG^{xviii}, disregards technology constraints and would lead to inefficient (over-)regulation of nascent NGA markets.

For current generation broadband, empirical evidence shows a negative impact of ‘ladder of investment’-type regulatory regimes on investment by entrants and incumbents (for a discussion of the ladder concept s. Annex III to this submission). In an NGA environment, competitors have already acquired a significant customer base in current generation broadband, in some geographic areas exceeding the incumbent’s share of the market. The argument for imposing parallel access products instead of focusing regulation on the relevant bottleneck therefore appears even weaker in NGA.

In an FTTH context, as long as potential bottlenecks in the terminating segment are addressed, ensuring effective competition at retail level in a given area, it is not necessary to mandate further upstream access remedies such as fibre unbundling in the ‘feeder’ segment. Similarly, in

cases where access to trenches and/or ducts is sufficient to achieve a competitive outcome and is provided in a non discriminatory manner, no further upstream access remedies should be imposed on top of this obligation. Against this background, ETNO is particularly concerned with the draft Recommendation's focus on "fibre unbundling" as a parallel obligation to other access obligations. As described under 2. above, a physical unbundling of fibre networks may not always be an efficient and feasible option for NRAs. The case has also been made that in some markets unbundling of fibre as compared to active remedies may be less conducive to the initial investment in NGA as such a product does normally not allow pricing flexibility in view of differentiated retail products.^{xiv}

The draft Recommendation's approach to impose a range of parallel access obligations contradicts the regulatory approaches adopted by different NRAs in Europe towards NGA. For example, the French and Portuguese regulators, with different nuances, apply a graduated approach to remedies in an FTTH context, putting special emphasis on access to passive facilities such as ducts.^{xv}

- **geographic segmentation should be integral part of Commission NGA guidance**

Directly derived from the EU framework's principle of proportionate gradation of remedies, the Recommendation should ensure that NRAs consider the conditions of competition at national or sub-national level and impose access only to the economic bottleneck facility if needed to ensure effective competition at the retail level in a given geographic area.

There is only a minor mention in the Draft of sub-national geographic markets or remedies – indicating that such considerations might become less relevant owing to NGA deployment. To the contrary, ETNO members believe that geographic differences may become more relevant in the NGA context. NGA deployment often takes place for 'islands' of households that can be covered with lower unit costs or where an operator already has deployed an alternative network. The coverage of alternative infrastructures and the deployments by traditional SMP operators will moreover often concentrate on the same geographic area.

On the level of SMP finding, which is not directly addressed in the draft Recommendation, the Commission seems to assume that there will only be one operator identified as having SMP within a national territory. The Recommendation should clearly recognise the possibility to analyse local markets for SMP status, to provide a level playing field and avoid the risk of a lengthy and complicated process to secure reasonable and effective access to, for example, ducts and pipes deployed by first movers who are

not the incumbent. Cable or fibre-based entrants in several member states possess a far more extensive network of ducts/pipes than the incumbent.

Based on the above, the failure to take into account geographic differences could result in NRAs imposing unilateral obligations on only one of several infrastructure service providers competing on the same market. Thereby the NRA would not support the development of competition on the relevant retail market but instead hinder investment into a competing infrastructure by distorting competition to the detriment of one player.

- **Voluntary commercial agreements preferable to regulation**

In an NGA environment, welfare-enhancing commercial agreements are in principle better suited to market needs than ex-ante economic regulation. In many Member States, investors and competitors are negotiating arrangements for network access and commercial sharing of risk. They should be reassured that their agreements are not substituted by regulation unless they are anti-competitive.

In particular in situations where competitive constraints from a competing platform exist, market conditions determine the right return on investment.^{xvi} Access to networks granted on commercially attractive terms will ensure network utilisation and make the network operator's offers more attractive to wholesale customers.

A regulatory approach for NGA should primarily rely on preserving non-discrimination and only where commercial arrangements cannot be reached grant regulated access to persisting economic bottlenecks.

- **No '2nd mover advantage' for new NGA retail products**

Point 33 should be amended to not grant a "second mover advantage" for new services by mandating a blanket six-months-prior prior availability of wholesale access products for competitors. Access regulation in market 5, where applicable, should not automatically extend to wholesale inputs for new retail offers, unless the need for such access products has been determined by a market analysis (s. chapter 7 below).

In summary,

- The NGA Recommendation should acknowledge the role of commercial agreements on access terms and conditions in an evolving NGA environment, to be preferred wherever possible to prescriptive regulatory solutions.

- The NGA Recommendation should advise NRAs to only impose access obligations where access at the lower network level does not lead to effective competition at the retail level. Points 15, 19, 34, 36 and the corresponding Recitals should be reworded accordingly.
- Access obligations need to respond to the competition problem identified in a specific market analysis. For example, a specific regulated bitstream access product for business services, as mandated in point 36, may be, but will certainly not always be justified in the light of competition conditions.
- An obligation of “fibre unbundling” should be envisaged only within the limits of efficiency of such an obligation in view of the individual NGA deployment and of technical feasibility.
- The Recommendation should require NRAs to fully take account of geographic differences in competition when considering the imposition of access and price control obligations.^{xvii}

5. Flexible pricing of wholesale products

ETNO welcomes the Commission’s positive assessment of enhanced pricing flexibility for an NGA network operator as put forward – in a very limited context – in Rec. 29. ETNO agrees that a limitation of an operator’s pricing flexibility and the restriction of *“its ability to profit from increased consumer willingness to pay for new services, would [...] delay rather than foster the development of networks ...”*

However, the draft Recommendation does not foresee pricing flexibility except in a very specific roll-out scenario – a deployment of multiple fiber lines in the feeder and drop segment combined with co-investment – and as an option in the case of functional separation (s. below).

Value-based pricing – with the value of a product equalling the customers’ willingness to pay for it – leads to differentiated retail prices with different profitability. This in turn enhances overall welfare by promoting further innovations and product development with additional customer value, potentially boosting service innovation and, in turn, network roll-out. This ‘virtuous circle’ of innovation and investment is clearly beneficial for *all* NGA deployment schemes.

- **cost-based pricing inappropriate reference for ‘still-to be built’ networks**

ETNO strongly welcomes Commissioner Reding’s acknowledgement in a recent speech^{xviii} on NGA regulation that

“I hear [...] the wish to institute a regulatory regime which gives cost-oriented access (as today) to whatever network element and wholesale service of an incumbent firm, to any access seeker at any given point in time. The difficulty I have with this argument is that it ignores the fact

that new high-speed networks are not there yet and need to be built in the first place. Investors in these networks therefore need to be able to make financial returns commensurate with the risks they incur. Cost-oriented access as in today's copper world may under these new circumstances need to be modulated, subject of course to the continued possibility of market entry and sustainable new entrant business models."

As has been demonstrated both by regulatory practice - many NRAs in Europe have applied a retail minus pricing logic to bitstream products^{xix} - as well as academic analysis^{xx}, effective competition at retail level can be ensured without cost-orientation of bitstream products.

Where regulation of wholesale broadband access products is justified, effective non-discriminatory access coupled with a pricing constraint (stemming from a competing infrastructure such as cable, a copper local loop product, viable physical access to NGA civil engineering infrastructure or a combination of different factors) makes price regulation for active wholesale products redundant.^{xxi} The same reasoning applies to 'fibre unbundling' (where mandated, s. above), in particular in presence of pricing constraints by a competing platform or successful commercial arrangements over non-discriminatory access to new NGA infrastructure.

Imposing cost-orientation in such cases would unnecessarily undermine the NGA business case of the investor which critically relies on pricing flexibility for new services. Points 36 ff. and 22 ff. should be amended accordingly.

- **functional separation as trigger for pricing flexibility?**

Point 40 of the draft Recommendation, which grants flexibility to NRAs to "*...analyse whether an obligation of cost-orientation on mandated wholesale broadband access is necessary to achieve effective competition in case functional separation or other forms of separation haven proven to guarantee equivalence of input*",

should in our view be thoroughly revised. Firstly, NRAs in each individual case have to analyse whether an obligation for cost orientation is necessary to achieve effective competition. Otherwise, its imposition would be disproportionate. The statement therefore underlines the flawed approach in points 34, 36 of the draft Recommendation which require NRAs to impose cost orientation as a rule (s. above).

Moreover, functional separation is conceived as a remedy to achieve effective enforcement of non-discrimination with the SMP-operator. Any regulatory solution that achieves effective non-discrimination in access should result in the same regulatory conclusion and benefit from similar guidance on pricing flexibility. It appears arbitrary to link pricing freedom for active wholesale products to separation and a specific 'equivalence of input' requirement, while the EU legal framework and other Commission guidance under the framework do not recommend equivalence of input as

a concept. Such indirect guidance in favour of specific types of regulatory outcomes risks undermining the predictability, accountability and transparency of regulation.

To directly link more flexible regulatory conditions to the imposition of functional separation or “other forms of separation” finally creates a bias in favour of a separation of the established operator, even in cases where the imposition of separation is not proportionate or economically efficient. Functional separation can under the current framework agreement only be imposed where it is demonstrated that other remedies, such as non-discriminatory access, have not resulted in effective competition.^{xxii}

Guidance on active wholesale products should be thoroughly revised to allow for wholesale pricing flexibility, at least in the presence of effective non-discrimination and pricing constraints, for example, from lower level access products.

In summary,

- If mandated access is imposed, points 22 and 33-40, as well as the corresponding Recitals, should foresee pricing flexibility for wholesale products covered in these paragraphs, at least in the presence of effective non-discriminatory access and effective pricing constraints against monopoly pricing.
- Pricing flexibility should be applicable in all roll-out scenarios and irrespective of the specific form of enforcement of non-discrimination by NRAs. Point 40 which appears inconsistent with the EU legal framework would then become redundant.

6. Pricing principle and risk: new pricing models and the margin squeeze test

There are a number of inter-related issues regarding the principles for price-regulated access, which are raised separately in the recommendation. These must be treated consistently, if the requisite level of regulatory certainty is to be achieved – and if the pricing framework is to achieve the right balance between encouraging competition and providing the appropriate level of return and flexibility for the operator making the NGA investment. These issues are:

- the risk premium to be incorporated into the Weighted Average Cost of Capital (WACC) used in setting a cost oriented price for wholesale access;
- the risk sharing pricing models between investors and access seekers - by means of either term and volume discounts for committed duration

and scale of wholesale access purchased, or charging an option value for wholesale access provided to an access seeker entering when retail demand has been established;

- The application of an ex ante margin squeeze test as between wholesale access prices and retail service pricing.

ETNO finds that the final recommendation should provide guidance on the factors that the NRAs must consider when linking these issues to provide a coherent framework. It should advise that:

- any margin test apply between retail and wholesale offerings of the investing operator over the life of the investment - rather than over any arbitrarily selected shorter period;
- the margin-squeeze test be applied using the long term business case for an 'equally efficient entrant' (EEO) achieving 25% market share, representing a viable competitor, in the final projected market used in the investor's business plan;
- the wholesale prices included as the input to the new entrant business case are those based on volume and term commitments – and net of any option premiums for late entry or early exit;
- the retail costs for the new entrant in the margin test will be consistent with the investor's retail costs. There may be structural reasons why the access retail costs are lower than the investor's, such as economies of scope through presence in an adjacent market. Under these circumstances the correct margin test would use the lower of the investor and access seeker's retail cost.^{xxiii}

Only if the proposed pricing framework to be implemented by NRAs on identifying SMP is specified in this manner can investors and access seekers make informed decisions on the appropriate level of investment – and timing of entry.

In the following section, we comment in more detail the aspects of (1) long-term pricing and volume discount contracts, (2) the necessity to adapt the margin-squeeze test to the new NGA environment, (3) the role of the risk premium and (4) the pricing principles applied to civil engineering works.

(1) Long-term access pricing and volume discount contracts

ETNO welcomes the integration of investment risk in the Commission draft Recommendation and its attempt to address it through new forms of commercial contracts for risk diversification ('risk sharing') in access pricing (point 7 and 8 of Annex I). However, the draft fails to adapt the

margin-squeeze test to the nascent NGA market to prevent it from undermining future risk sharing arrangements (s. (2) below).

ETNO agrees with the possible existence of secondary trading, which could result from such a type of agreement and which would be beneficial for the overall market and notably for the increase of competition on the wholesale market. We also agree that access seekers' behaviour on the downstream market should not be controlled by the investor, or access provider, through contractual conditions. However, we consider that the statement that new entrants would "acquire full control of physical assets" (point 7, p. 19) is very broad, and unnecessarily restricts the possibilities of risk diversification arrangements. We suggest removing this point from the text.

We also suggest to clarify the statement in Annex I point 7 that: "*Long-term access prices should only reflect the reduction of risk for the investor and therefore cannot be lower than the cost-oriented price to which no higher risk premium reflecting the systematic risk of the investment is added.*" (s. also point 8). This raises the question of the reference price for such a comparison. Is the draft referring to the average price or the top or the bottom of the price scale - and over which period? At a minimum, any comparison should be based on a time period coherent with the length of the contract.

For long-term commitment prices to reflect a reduction of risk for the investor, the new access price structures should be similar to the network cost structure:

- There are fixed network costs, therefore there should be a fixed element in the access prices or, alternatively, a volume reduction;
- Network investment represents a high initial investment and a very long-term commitment for an investor and thus requires revenue streams to be profitable in the long run. Access contracts should be able to reflect these characteristics.

As far as volume discounts are concerned, several pricing models could be used, e.g. a form of 'segmented' access prices, .e.g., decreasing prices on the base of commitment linked to a territorial pattern with possible increasing commitment starting from access to a city, then access to a sub-area, then to buildings. Parties must be able to freely negotiate these technical adjustments in order to find the most efficient solution with the possible support of the NRA. Pre-determining the possible configurations or adjustments would be inappropriate.

One key issue for successful roll out of NGA networks, besides the revenues which can be attained from it, is to achieve a high level of penetration. Remedies which are now considered by the Commission may

easily thwart the flexibility operators need to achieve this. It is therefore of vital importance that the Recommendation allows for innovative wholesale pricing models which can contribute to faster and more ubiquitous penetration of NGA networks. One such example may be to insert incentives via the volume discounts discussed in point 7 of Annex I or by 'kick-backs' on wholesale prices based on achieving a certain threshold of penetration in a relevant roll out area. There may be many other ways to incentivise penetration by operators and ETNO would welcome the Commission to explicitly endorse the use of such instruments.

(2) Adapting the margin squeeze test to NGA to allow market take-up and risk diversification

- guidance on 'ex-ante' price squeeze test

Recital 27 of the draft Recommendation states that in "*the specific context of ex-ante price controls [the] hypothetical reasonably efficient competitor test*" would be more appropriate in an NGA context. ETNO is concerned that the Recital could lead to inappropriate regulation. "*Ex-ante price controls*" in the meaning of retail tariff regulation can only be applied on markets which are included in the Recommendation on relevant markets and/or fulfil the three criteria test. Moreover, the proposed methodology, which differs from the methodology applied by the Court of Justice in recent case law in the electronic communications sector, appears inappropriate in nascent NGA services markets.

The margin-squeeze test is a competition law tool and commonly applied ex post by competition authorities. While specifying the parameters for a margin-squeeze test ex ante can increase predictability for market players, the margin squeeze test must not result in an ex-ante price regulation of retail markets which are not part of the list of relevant markets and therefore not subject to regulation. Ex ante monitoring requires substantial quantities of confidential data and extensive, on-going modelling, and since no specific allegation of a margin-squeeze is made, the test must be undertaken on a hypothetical basis. In competition law practice, the context is typically crucial and the analysis must be based on specific allegations. In immature markets, moreover, unit costs are likely to change significantly as the volume of services provided increased. Applying appropriate parameters thus is even more important in such an environment in order to not jeopardize the market development.

Against this background, a margin-squeeze test should in principle be applied ex post and NRAs should limit its application to services where a need for regulation has been established in a market analysis.

- **preference for ‘REO’ methodology inappropriate in NGA world**

If, by using a margin-squeeze test, the NRA intends to control the wholesale price, Recital 27 obviously also raises an issue of price levels. By using the “hypothetical reasonably efficient competitor test” (REO) as proposed in the draft, the price level will either be higher than with the ‘equally efficient operator’ (EEO), which was the option used in recent European Commission cases against Deutsche Telekom and Telefonica^{xxiv}, or the wholesale price will be determined at a lower level than appropriate. Consequently, use of the REO either lowers penetration by raising retail prices or lowers incentives for investment by artificially lowering wholesale revenues.

The Court of First Instance, in the Deutsche Telekom case^{xxv} found that the Commission was correct to analyse the pricing practices at hand on the basis of the charges and costs of the dominant operator (cf. §193), stating that:

“It must be added that any other approach could be contrary to the general principle of legal certainty. If the lawfulness of the pricing practices of a dominant undertaking depended on the particular situation of competing undertakings, particularly their cost structure – information which is generally not known to the dominant undertaking – the latter would not be in a position to assess the lawfulness of its own activities.” (cf. § 192)

In a nascent market the EEO methodology allows the investing operator to rely on its own costs to calculate prices, leading to more regulatory certainty. ETNO encourages the Commission to recommend to NRAs to apply an EEO test.

- **Definition of margin-squeeze test must be in line with concept of risk diversification**

The effectiveness of future risk diversification / risk sharing agreements, and therefore the benefits for investment which can result from the new pricing models, depend upon an appropriate application of the margin squeeze test.

Annex I point 7 and 8 could be understood in a way that the margin-squeeze test should secure an adequate profit margin for an “efficient operator” even if the operator does not share part of the investment risk engaging, for example by engaging in long term access contracts. The consideration that an “*alternative provider with smaller customer bases and unclear business perspectives ... are unable to commit to purchasing a large number of fibre lines over a long period.*” seems to point in this direction.

If this were the case, the draft Recommendation would effectively undermine the business logic of entering into risk sharing contracts. Taking over part of the investment risk becomes unattractive, if business

models without risk sharing are fully protected by regulation and the price level is determined by the business model without risk sharing. Therefore, the wholesale prices included as the input to the new entrant business case for the purpose of the margin squeeze test should be those based on volume and term commitments – and net of any option premiums for late entry or early exit.

Such differentiation of prices according to objective criteria is not discriminatory. In a scale industry with long-term amortisation of assets, volume and term discounts are common business practice and *a priori* have no anti-competitive effect as they are available to all market participants. It is worth noting that they would also not prevent market entry of ‘smaller operators.’ Risk diversification contracts could be regional or local, and operators, who seem to be “small” on a national scale, might be large players in a regional context, allowing them to engage in risk diversification contracts on that level. Smaller operators may also establish joint purchasing schemes which allow them to profit from enhanced economies of scale. Moreover, as the draft Recommendation points out, holders of long term access contracts are free to engage in secondary trading, which allows entry at any time at true market based prices.

- **Time period for amortisation of costs of fibre networks to be taken into account**

In an NGA context, it is necessary to have an appropriate balance between (1) the constraints of a price squeeze test and (2) the need for selling at an attractive market price to drive service take up at retail level. The margin-squeeze test between retail and wholesale offerings of the investing operator should apply over the life of the investment - rather than over any arbitrarily selected shorter period.

To consider the relevant time period for amortisation of the relevant assets allows assessing the profitability of a product over a period of time that runs parallel with the amortization of such assets. Amortisation periods on fibre are typically around 15-20 years. A time period consistent with such amortisation periods should be considered for determining the costs that access seekers are paying in the context of long term and/or volume commitments. Basing the calculation on shorter periods would risk leading to wholesale prices that are too high to pass a margin-squeeze test with retail prices allowing for service take-up.

Due consideration for the appropriate time periods of amortisation of assets allow NRAs to strike a balance between the need to stimulate penetration as well as network investment. This is also recognized in the most recent ERG report on the application of margin-squeeze tests to bundles^{xxvi} where it is stated that:

“In the case of markets with non stable revenues and costs (for example non mature markets) the static test may not be the best choice. This is because it does not take into account the reasonable short term losses accrued in the launch period of the service and does not consider the risks associated with investments that the company may incur in marketing the offer.” (para 71).

In light of the above, Annex I point 7 and point 8 should be amended to allow reduced wholesale prices not only to reflect the reduction of risk for the investor but also to reflect the longer amortisation period of the assets to which access is requested.

As a general conclusion on margin-squeeze test issues in an NGA context, it should be remembered that a very strong economical element in favour of standard margin-squeeze test does not hold for NGAs:

- under specific conditions, it can be proved that normal profit maximisation behaviours, except anticompetitive ones, are compatible with margin-squeeze test conditions. Therefore, margin-squeeze test conditions keep a market economy as efficient as it should be. These specific conditions are satisfied when access has to be provided on an existing legacy infrastructure with known demand.
- in a NGA context with fixed costs and uncertain demand, normal pro-competitive profit maximisation behaviour, such as penetration pricing or value pricing, cannot be discriminated from anti competitive behaviour through standard margin squeeze test. Therefore, the margin-squeeze test needs to be adapted. Otherwise, the final outcome would be massive economic inefficiency.

(3) Risk premium alone will not solve the lack of incentives for the necessary NGA investments - term and volume discounts allow faster penetration.

The draft Recommendation provides that NRAs should assess whether a higher risk premium should be granted when setting access prices for NGA.

The risk premium as a component of the access price can contribute to addressing risk involved in NGA investment, within and outside long term contract arrangements. However, a risk premium, conceived as a cost-based access price with a somewhat higher WACC, alone does not solve the investment incentive problem for NGA. It maintains the first mover’s strategic disadvantage of assuming high fixed costs whereas subsequent entrants can choose between fixed (own investment) and variable costs (access-based entry). Therefore we have argued for addressing the access price structure and the necessary price flexibility on the retail market by appropriate guidance on risk diversification arrangements and margin squeeze (s. above).

Regarding the impact on retail prices, wholesale prices based on risk sharing bring a larger flexibility on the retail market than a “risk premium” price per access. In the case of a wholesale “risk premium”, the full cost of the infrastructure is contained in the variable price per access of the wholesale offer. The variable wholesale price per access will in that case be very high because the new infrastructure will be unused at the beginning. Due to the likelihood of an overly restrictive application of a margin-squeeze test, this very high wholesale price per access would be included in retail prices of the access beneficiary and of the infrastructure owner, unless the application of the test is carried out as proposed above. Under risk sharing access pricing models, to the contrary, both investor and access seeker can offer cheaper prices in order to foster penetration.

(4) Risk premium and risk sharing must also apply to civil engineering works

ETNO strongly disagrees with the provision in Annex I point 2 that “When setting the price for access to civil engineering infrastructure, NRAs should not consider the risk profile to be different from that of copper infrastructure”

The risk premium should also apply to civil engineering infrastructure, such as ducts and pipes. Even though ducts and pipes may not be replicable, this does not imply that the risk of NGA related ducts and pipes is comparable to the risk associated with conventional access networks. We recall that the Draft Explanatory memorandum published for the first public consultation held in autumn 2008 which found that “civil works represent up to 80% of the total roll-out costs of NGA.” Taking into account this very high proportion of the total investment, which is related to ducts and pipes, a risk premium on the fibre cable only will have a very limited impact on the business case.

For the same reason, it is appropriate and important that risk sharing arrangements are allowed not only for unbundled fibre access or fibre bitstream access but also for access to ducts and pipes.

In summary,

- ETNO welcomes the new possibilities for commercial arrangements for diversification of risk in points 7 and 8 of Annex I.
- The recommendations on an ‘ex-ante’ margin squeeze tests in Recital 27 meet legal and practical concerns and the preference for a “reasonably efficient operator” test is in conflict with competition case law and the regulatory objectives of service penetration and NGA investment.

- To not undermine the effectiveness of risk diversification through long-term contracts and volume discounts, the Recommendation should specify that the 'long-term commitment-price' is the reference for carrying out a margin squeeze test in case of risk diversification arrangements.
- Risk premium and other instruments to take account of increased investment risk should also apply to civil engineering works carried out for the purpose of installing NGA networks.

7. Need for a sound market analysis - option for segmentation according to geographies and capacity/services should be emphasised in the Recommendation

Despite recognising the “important changes in the economics of service provisioning” and significant changes on demand and supply-side in the move to NGA (Recital 7), the draft Recommendation effectively assumes unchanged market definitions compared to the current copper world. It affirms that new NGA-based services will be included in currently existing relevant product market definitions (points 32, 34), requiring the imposition of corresponding wholesale products. It also appears to assume a national geographic market. Consequently, the draft assumes that there will be a single SMP operator for NGA services and that this operator coincides with the SMP operator in current market 4 (cf. Rec. 21, points 19, 21).^{xxvii} ETNO maintains that a proper demand and supply side substitution analysis is required before any conclusions on the scope of the relevant market can be drawn.

The draft Recommendation should recognise that the definition of new, possibly more segmented markets within the scope of current markets 4 and 5 in terms of capacity, pricing or functionality of NGA products may be warranted. NRAs are required to carry out a ‘three criteria test’ before regulatory obligations on new NGA-based service are introduced.

As is the case for current generation broadband, we believe that in an NGA context, platforms competing on broadband services markets at retail level should be fully taken into account in wholesale market definition. This implies that there should be no artificial exclusion of self-supply from markets 4 and 5. The fact that markets 4 and 5 have been ‘created’ by regulation^{xxviii} does not justify permanently limiting their scope to the network on which regulated wholesale services are currently provided. Moving to an NGA environment, where all networks whether based on PON or P2P fibre or DOCSIS 3.0 or other technologies are newly built, a technology neutral wholesale market definition is key to avoid distortions of competition in future broadband markets.

8. Efficient migration to NGA

ETNO agrees that an effective and transparent migration from current generation broadband to NGA is essential to ensure a non-disruptive development of competition. Emerging services based on NGAs will succeed commercially only if competition creates multiple, innovative services, and if new business models flourish. The success of such services provides the best prospect for the recovery of investment in NGAs. Thus, all operators have strong incentives to enter into commercial agreements in order to co-ordinate efficiently the introduction of fibre in access networks.

ETNO agrees with the Commission that, in principle, existing SMP obligations in relation to markets 4 and 5 should remain in place for a reasonable time period and believes that the migration path should be consulted on and notified in good time to the industry as outlined. However, a requirement for an open-ended agreement with multiple access seekers, or alternative operators, may well make it impossible to organise an efficient and expedient transition. Where transition plans are consulted on and shared to a reasonable timescale, SMP-operators should not be responsible for access seekers' transition costs or delays.

SMP-operators and access seekers have gained a long experience of contractual relationships on wholesale access products, which often have duration of two to three years. Commercial and competition laws apply to these contractual relations, and thus provide broad guarantees to all parties. In particular, such provisions ensure that a provider cannot unreasonably interrupt a service if this is critical for the business of the service user.

Accordingly, the Recommendation should clarify that bilateral or multi-lateral commercial agreements regarding the appropriate migration paths, among investing SMP-operators and alternative operators currently enjoying access to the network, are the most efficient means to ensure network evolution.

In the absence of commercial agreement, NRAs should ensure that alternative operators are forewarned of any de-commissioning of points of interconnection, such as the local loop exchange, in a reasonable time period. While a reference time period for the amortization of local exchange equipment is five years, alternative operators may well have made their investments earlier and have already largely written down such investments. As such, ETNO maintains that a blanket "five year period" should not be specified in the Recommendation; NRAs should be allowed discretion to set this period according to market conditions in national and sub-national markets.

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- ⁱ European Council conclusions of 19-20 March 2009, Council Doc. 7880/09, pt. 17.
- ⁱⁱ IDATE, "FTTx: Global operator rankings," IDATE News 469, June 2009.
- ⁱⁱⁱ McKinsey estimate, s. Commission MEMO/08/572, 18th September 2008, p. 3.
- ^{iv} For established operators in some emerging markets there is the added challenge of amortisation of recent heavy investment in copper while already being faced with the need for NGA roll-out.
- ^v For a more detailed discussion of this point, s. ETNO RD 295 (2008/11), p. 10 f.
- ^{vi} Any of the investors listed may have SMP on markets 4 or 5. However, under the current regulatory practice with regard to product and geographic market definition, a SMP-designation in these cases may remain a rare exception.
- ^{vii} Directive 2002/21/EC of 7 March 2002 on a common regulatory framework for electronic communications networks and services (Framework Directive).
- ^{viii} For a detailed discussion of this point, s. ETNO RD 295 (2008/11), p. 10 f.
- ^{ix} IDATE – FTTx leaders chart
- ^x Directive 2002/19/EC of 7 March 2002 on access to, and interconnection of, electronic communications networks and associated facilities (Access Directive).
- ^{xi} Recital 7 of the first draft Recommendation of September 2008.
- ^{xii} The first draft Recommendation of September 2008 (point 15) called for the imposition of dark fibre access only where duct access in market 4 would not lead to effective competition.
- ^{xiii} S. ERG (09) 17, Report on Next Generation Access - Economic Analysis and Regulatory Principles, p. 14.
- ^{xiv} Lewin, D., Williamson, B. and Cave, M. (2008), "Regulating next-generation fixed access to telecommunications services," p. 16. ; on pricing flexibility s. section 3 below.
- ^{xv} Autoridade Nacional de Comunicações (ANACOM) notification to European Commission of 4 December 2008 concerning the review of the markets for wholesale (physical) network infrastructure access at a fixed location and for wholesale broadband access; Décision n° 2008-0835 de l'Autorité de régulation des communications électroniques et des postes (ARCEP) en date du 24 juillet 2008 portant sur la définition du marché pertinent de gros des offres d'accès aux infrastructures physiques constitutives de la boucle locale filaire, sur la désignation d'un opérateur exerçant une influence significative sur ce marché et sur les obligations imposées à cet opérateur sur ce marché; Similarly, the German regulator, Bundesnetzagentur (BNetzA), has imposed access to dark fibre for backhaul for sub-loop unbundling only subsidiary to duct access (see Regulierungsverfügung Markt 11 BK4a-07/002/R , 27 June 2007).
- ^{xvi} S. e.g., IDATE and LECG for the 'Brussels Round Table,' "Telecoms in Europe 2015," 2007.
- ^{xvii} ETNO RD288, "ETNO comments on the ERG draft common position on geographic aspects of market analysis," (2008).
- ^{xviii} Reding, V., "Towards a European Strategy of High Speed Broadband for All: How to Reward the Risk of Investment into Fibre in a Competitive Environment," SPEECH/09/312, 25 June 2009.
- ^{xix} S. ERG (09) 17 "Report on Next Generation Access - Economic Analysis and Regulatory Principles," p. 204 ff. More than a third of NRAs applying price controls on bitstream services used a retail minus or 'eviction pricing' methodology for price control.
- ^{xx} Lewin *et al* (2008).
- ^{xxi} S. Ofcom policy statement "Delivering super-fast broadband in the UK, Promoting investment and competition," (2009), which emphasises the role of functional separation in achieving full non-discrimination. Ex-post price squeeze tests present a further safeguard against any anti-competitive pricing behaviour.
- ^{xxii} cf. Art. 13a of Directive 19/2002/EC as amended in Second Reading by the European Parliament Reference.
- ^{xxiii} ETNO acknowledges that there may be issues of practicality with this implementation as the NRA may not have information on the access seeker costs.
- ^{xxiv} DT case: JUDGMENT OF THE COURT OF FIRST INSTANCE (Fifth Chamber, Extended Composition) 10 April 2008 (*) In Case T-271/03 - point173; Telefonica case: Decision 04.04.2007 case COMP/38.784 – Point 312.
- ^{xxv} *Id.*
- ^{xxvi} ERG (09) 07, "Report on the discussion of the application of Margin Squeeze tests to bundles," 2009.
- ^{xxvii} In several EU member states with high cable penetration ratio, cable operators have already started their Docsis3.0 evolution (Hungary, Belgium, Portugal). These next generation access networks are already in place and are able to deliver the very-high-speed data service; therefore in many cases the current SMP operator on market 4 is not the first mover in NGA.
- ^{xxviii} Regulation (EC) no 2887/2000 of 18 December 2000 on unbundled access to the local loop.

Annex I: Dynamics of NGA infrastructure competition

I.1 Infrastructure-based competition as key objective of European policy

The European regulatory framework for electronic communications sets out the promotion of infrastructure-based competition as one of its objectives, since it enhances competition in the long-term. As per recital 19 of the 'Access Directive'¹:

*“Mandating access to network infrastructure can be justified as a means of increasing competition, but national regulatory authorities need to balance the rights of an infrastructure owner to exploit its infrastructure for its own benefit, and the rights of other service providers to access facilities that are essential for the provision of competing services. (...) **The imposition by national regulatory authorities of mandated access that increases competition in the short-term should not reduce incentives for competitors to invest in alternative facilities that will secure more competition in the long-term.**” [emphasis added]*

This view is consistent both with economic theory and empirical evidence. Competition between operators that own all of their infrastructures -- and specifically their local loops² -- has proven superior where present. In the following sections empirical evidence on the different economic properties of broadband platform competition will be discussed, i.e. its superior social outcomes, its effectiveness and its feasibility for next generation access (NGA) networks in the European Union.

I.2 Infrastructure-based competition yields higher social benefits

Evidence shows that, in the countries or areas in which infrastructure competition is present, the broadband market has yielded higher social benefits than in areas where there is only service based competition over a single local loop. The studies

¹ Directive 2002/19/EC of 7 March 2002 on access to, and interconnection of, electronic communications networks and associated facilities (Access Directive).

² This kind of competition is referred to in literature as “infrastructure competition”, “facilities-based competition” or “platform competition”, as opposed to “services competition,” which is understood to be over a single local access network (or, at least, over local loops owned by a single organisation). All three terms will be used as equivalent in this document.

based on econometric analysis of empirical data show that platform competition drives higher service penetration, investment and innovation.

Empirical studies have found that, *caeteris paribus*, broadband penetration in a market is driven by platform competition. The more developed are alternative networks that own their local loops³, the higher is the take up of broadband services by customers. This has been observed for Europe by Kittl *et al* (2006)⁴, Distaso *et al* (2005)⁵ and Höffler (2005)⁶ and for the United States by Aron and Burnstein (2003)⁷.

Using access regulation which favours service competition over infrastructure competition has also been found to inhibit investment in broadband networks, both by incumbents and alternative operators. Several empirical studies have found this phenomenon in Europe, such as Röller *et al* (2007)⁸ and Waverman *et al* (2007)⁹, and in the United States, such as Crandall *et al* (2004)¹⁰.

The positive effect of infrastructure-based competition is not limited to investment in current networks. Empirical evidence has been recently found that platform competition also increases investment in fibre networks by Wallsten and Hausladen (2009)¹¹

I.3 Evidence of effective infrastructure-based competition

There has been some controversy about the theoretical effectiveness of competition between infrastructure-based telecommunications operators. However, the empirical analysis of the dynamics of competition has shown that the behaviour of

³ Usually cable networks but in some areas also FTTH or wireless.

⁴ Kittl, J., Lundborg, M. and Ruhle E.O., "Infrastructure-Based Versus Service-Based Competition" *Telecommunications, Communications & Strategies*, no. 64, 4th quarter 2006.

⁵ Distaso, W., Lupi, P. and Manenti, F., "Platform Competition and Broadband Uptake: Theory and Empirical Evidence from the European Union," paper presented at the 15th conference of the International Telecommunications Society, 2005.

⁶ Höffler, F., "Cost and Benefits from Infrastructure Competition. Estimating Welfare Effects from Broadband Access Competition," Max Planck Institute for Research on Collective Goods, Bonn, 2005.

⁷ Aron, D. and Burnstein, D., "Broadband Adoption in the United States: An Empirical Analysis," working paper available at Social Science Research Center (SSRC), 2003.

⁸ Roller, L.H., Friederiszick, H. and Grajek, M., "Analysing the Relationship Between Regulation and Investment in the Telecom Sector," ESMT Competition Analysis, Berlin, 2007.

⁹ Waverman, L., Meschi, M., Reillier, B. and Dasgupta, K., "Access Regulation and Infrastructure Investment in the Telecommunications Sector: An Empirical Investigation," LECG, London, 2007.

¹⁰ Crandall, R., Ingraham, A. and Singer, H., "Do Unbundling Policies Discourage CLEC Facilities-Based Investment?" *Topics in Economic Analysis and Policy*, Vol. 4: Issue 1, 2004.

¹¹ Wallsten, S. and Hausladen, S., "Net Neutrality, Unbundling, and their Effects on International Investment in Next-Generation Networks," *Review of Network Economics*, Vol. 8: Issue 1, 2009.

operators is consistent with effective competition in markets in which platform competition has been respected by regulators. Most regulators across the world have concluded that mobile markets characterised by infrastructure competition display effective competition. A recent study by Katz (2008)¹² has arrived to similar conclusions, analysing empirical evidence from quadruple-play markets (fixed voice, mobile, broadband and content distribution) from all parts of the world.

This study reviews the dynamics of the telecommunication markets in a number of countries that have adopted inter-platform competition as a model for organising the industry. Other countries, such as Switzerland, Hong Kong, Portugal, Argentina, Brazil and Mexico, have similar competitive dynamics.

*Industrial organisation in countries with inter-platform competition systems
2007 (*)*

	US	Netherlands	South Korea	Chile	Canada
Landlines telephones	Telco 1 (34%) Telco 2 (24%) Cable (9%)	Telco 1 (55%) Cable (27%)	Telco 1 (91%) Telco 2 (9%)	Telco 1 (66%) Cable (16%) Telco 2 (3%)	Telco 1 (45%) Cable (11%) Telco 2 (20%)
Mobile telephones	Telco 1 (27%) Telco 2 (26%) Telco 3 (11%) Telco 4 (18%)	Telco 1 (48%) Telco 2 (21%) Telco 3 (26%)	Telco 1 (51%) Telco 2 (32%) Telco 3 (17%)	Telco 1 (42%) Telco 2 (40%) Telco 3 (18%)	Telco 1 (31%) Cable (37%) Telco 2 (28%)
Broadband	Telco 1 (20%) Telco 2 (12%) Cable (54%)	Telco 1 (44%) Cable (39%)	Telco 1 (45%) Telco 2 (26%) Telco 3 (10%) Cable (19%)	Telco 1 (50%) Cable (40%) Telco 2 (4%)	Telco 1 (23%) Cable (48%) Telco 2 (12%)
Content distribution	Cable (97%) Telco 1 (1%) Telco 2 (2%)	Cable (81%) Telco 1 (6%)	Cable (78%) Telco 1 (3%) Telco 2 (4%)	Cable (68%) Telco 1 (17%) Telco 2 (4%)	Telco 1 Cable (74%) Telco 2
Enterprises	Telco 1: ATT Telco 2: Verizon Telco 3: T-Mobile Telco 4: Sprint Nextel Cable: Comcast, Cablevision	Telco 1: KPN Telco 2: Vodafone Telco 3: T-Mobile Cable: UPC, Zesko	Telco 1: KT Telco 2: SK/Hanaro Telco 3: LG	Telco 1: Telefónica Telco 2: ENTEL Telco 3: Telmex/Claro Cable: VTR	Telco 1: Bell Canada Telco 2: Telus Cable: Rogers

(*) The figure in brackets corresponds to market share
Sources: FCC, OPTA, CRTC, KT, Subtel, operators' reports

Source: Katz (2008)

The study by Katz also found that, albeit strong cable operators present in those countries, the regulatory authorities did not immediately adopt the inter-platform competition model but did so after experimenting with service-competition models¹³ and identifying their limitations. Katz notes:

¹² Katz, R., "La competencia entre plataformas: teoría y resultados (Platform competition: theory and results)," ENTER, Madrid, 2008.

¹³ This was the case of the United States with local loop unbundling (LLU) in 1996; in Chile, with the announcement of the intention to unbundle networks in 2000; and the introduction of LLU in the Netherlands.

“The industry’s initial response to these regulatory intentions included the entry of a large number of virtual competitors and a reduction in prices but at the same time, a deceleration of investment (as in the US and Chile). However, at the same time, the industry started a process of consolidation giving rise to players who competed in every sector of the industry (primarily, telephony, broadband, mobile and content distribution), demonstrating the actual viability of inter-platform competition. (...)

In view of these events, the regulator recognised that the process for creating strong competitors with good financial health and a capacity for maintaining a certain rate of innovation and investment had to do less with an ‘investment ladder’ and more with the Schumpeterian processes of competition and return to scale that characterise a capital-intensive industry such as telecommunications.”

Katz concludes that *“the fact that, on the basis of different industrial contexts and in the absence of contagion or the ‘export’ of a certain regulatory framework, there is a convergence towards a similar model of competition indicates that the market dynamics and economic structure of the industry play a determinant role in the migration.”*

The study finds that the developments in the analysed markets are consistent with the existence of effective competition between the platform operators, measured by a set of competition criteria:

Characteristic features of inter-platform competition by country

INDICATORS	US	Netherlands	South Korea	Chile
More than one operator (two or three) supplying the same market	YES	YES	YES	YES
Each operator is vertically integrated	YES	YES	YES	YES
Multidimensional competitive dynamics (prices, services, user service quality)	YES	YES	YES	Partial
Stabilisation of end-consumer prices but intense competition in product differentiation	YES	YES	YES	
Competitive encouragement for each operator to increase its level of investment in its own network	YES	YES	YES	YES
Operating benefits as a result of each operator controlling its own infrastructure and supply chain	Partial		YES	YES
Absence of tacit collusion between operators due to a high rate of innovation and competition in service packages	YES	YES	YES	Partial
Reduction of regulatory intervention to solve market failures	Partial	YES	YES	YES

Source: Katz (2008)

Katz maintains that *“[T]hese models will not be adopted by sacrificing the consumer interest in favour of a consolidated industry, but rather end users will benefit from static and dynamic efficiencies provided by healthy competition systems.”¹⁴*

¹⁴ *Op. cit.*

I.4 The economics of NGNs allow for infrastructure-based competition in Europe

As demonstrated in the annex to “ETNO Reflection Document in response to the Commission Recommendation on regulated access to Next Generation Access Networks (NGA)”¹⁵, in many instances the economics of the NGA networks allow for several competitors to deploy their own networks and compete with each other on a sustainable basis:

“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 analysis showed, in particular, that depending on the level of average revenue per user (ARPU), population density and total NGA network uptake, and the pre-existing networks, the number of operators and the technologies they were likely to use varied a lot, but there was room for several competitors even when standalone, greenfield operations are considered.

The table below gives additional evidence that the most significant FTTH/B deployment as of December 2008 has been carried out by alternative operators which currently have not been designated as significant market power (SMP)

¹⁵ ETNO Reflection Document RD295, November 2008.

operators in market 4 or 5. The main actors are six alternatives, six power utilities, one cable operator and one infrastructure joint venture compared to four incumbents.

Countries	Players		Home/Building passed (December 2008)
Denmark	DONG Energy	Power utility	150,000
	Energie Midt	Power utility	75,000
	TRE FOR	Power utility	60,000
Finland	TeliaSonera	Incumbent	400,000
France	France Telecom	Incumbent	500,000
	Iliad/Free	Alternative	300,000
	SFR	Alternative	250,000
	Numericable	Cable operator	3,400,000
Germany	Wilhelm Tel	Power utility	100,000
	M-Net	Power utility	80,000
Italy	Fastweb	Alternative	2,000,000
Netherlands	Reggefiber	Infrastructure operator	350,000
Norway	Lyse	Power utility	170,000
Slovakia	T-COM	Incumbent	200,000
	Orange Slovensko	Alternative	215,000
Slovenia	T2	Alternative	200,000
Spain	Telefónica	Incumbent	250,000
Sweden	B2	Alternative	390,000

Source: IDATE for FTTH Council Europe

Annex II: The impact on network competition of access to leased ducts

In the discussion on investment needed to deploy a modern and capable telecommunications network in Europe, the use of 'passive infrastructure' is critical. Passive infrastructures are ducts, poles, manholes, street cabinets, base station sites and antennae masts used to build a new network and count for most of the investments needed, in particular with regard to next generation access (NGA) networks.

Operators deciding to build a new network are motivated to use existing passive infrastructure to reduce their investments, willing to reimburse the passive infrastructure's owner for the use.¹ As returns on a reduced investment will increase, the market share they need to break even a sustainable business case will be lower and subsequently increase the number of competitors in the market and the competitive rivalry.

When the use of an existing infrastructure is technically feasible, a market for passive infrastructures can develop without regulatory intervention simply because of the economics of their owners' businesses. Since fibre optic, contrary to electrical cables, is a passive medium resistant to moisture and electrical interference, most ducts and way leaves used for other economic or public activities can be used to lay fibre optic cables alongside their ordinary use. Ducts that have already been used to deploy fibre optic cables include electricity cables and poles, sewers, service galleries, water, oil and gas pipes, railway and road tunnels etc. In all of these cases, there is an economic rationale to lease their ducts: (i) ducts are a capital intensive asset with (ii) strong economies of density, and in which, provided there is spare capacity, third party fibre cables can be roomed at (iii) a very low incremental cost. Therefore, any lease revenue will have a strong beneficial impact in the duct owner's margins.

However, in the context of such duct access, one should bear in mind that not all kinds of ducts are suitable for third party access and that moreover ducts suitable for such sharing are not always available. Indeed, in some countries, the traditional (copper) network is historically composed of copper cables directly dug into the ground (and not inserted in ducts). Therefore, in the absence of such pre-existing ducts, the traditional network architecture cannot simply be 're-used' for purposes of optical fibre deployment.

¹ By "reasonable" we mean a price that allows the infrastructure owner to cover all its costs (including costs of capital) but not to make a super-normal profit on infrastructure leases.

Recently, we have seen several examples of operators all over Europe in leasing ducts to deploy fibre networks that compete with incumbent telephone and cable companies, such as Fastweb in Italy or Free in France. For example, Fastweb deployed its fibre optic network in Milan by using the rights of way of utility company AEM, and Free is using municipal ducts alongside tramway tracks in Montpellier.

Telecommunications regulatory authorities may also impose a mandate to lease space in ducts to competing fibre operators as a remedy to operators that have been found to have significant market power (SMP) in a relevant market.

Several economic studies based on cost modelling show that, if a suitable offer to lease passive infrastructure is in place, the number of sustainable competitive NGAN infrastructure operators is significantly increased. For the sake of the economic argument, it makes no difference whether this offer is a commercial one or has been imposed to telephone operators or other utilities by regulators.

In the following, the results of modelling several scenarios using the COSTA cost model (COSTes de Redes de Acceso de Nueva Generación) from the Universidad Politécnica de Madrid² are summarised.

To focus specifically on NGA networks, it is assumed that there is user demand by a given customer segment for services and applications that require 100 Mbps both downlink and uplink. This demand is met by operators using FTTH GPON network architecture. For the sake of simplicity, potential supply by cable operators using DOCSIS 3.0 is not included, but taken into account when considering total FTTH service take up. To test the impact of duct access in the degree of competitive rivalry in the market, the COSTA model was run to find the break even point of fibre operators, i.e. the minimum percentage of premises in a given area that an operator needs to have as customers in order to become net present value (NPV) positive in a 15 year period in different geographic settings and average revenue per user (ARPU) levels³. Leasing costs were input at the rates currently set by the Spanish regulator, the Comisión del Mercado de las Telecomunicaciones (CMT), to access Telefónica's ducts in Spain. After this result, the maximum number of operators⁴ that a service area can sustain is calculated for several service take up levels.

The results from the COSTA model show that the number of operators significantly increases with access to duct leasing across all ARPU scenarios.

² <http://www.gtlic.ssr.upm.es/costa/costa.html>

³ Three ARPU levels are considered: "premium" (customers which make full use of advanced services enabled by fibre that yield a wholesale ARPU of 50 euro); "medium" (customers that value the enhanced performance of fibre to deliver the current broadband service suite at 40 euro); "basic" (other customers at 30 euro).

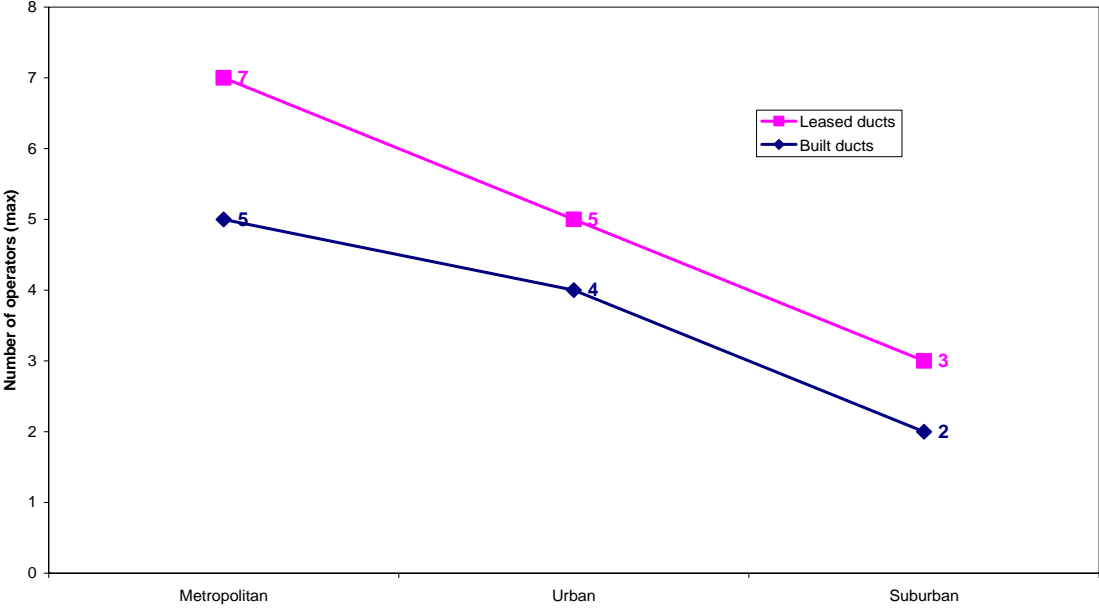
⁴ Assuming that all operators have equal market shares.

In the **premium ARPU scenario** (see figure below) shows that the market can sustain two more operators in dense urban areas in the case that fibre services become mainstream. In the case of urban areas, the impact is also noticeable, because there would be room for one or two additional operators, depending on overall service take up. For suburban areas, the absolute increase in the number of competitors is lower, but the competitive impact of duct leasing is likely to be stronger, because of the higher relative increase.

A similar effect to that which happens with population density for a given ARPU level can be observed for different ARPU levels in the same geographic area. As ARPU levels decrease, the number of potential sustainable competitors becomes lower. The availability of duct leasing allows fewer additional competitors to enter the industry at lower ARPU levels, but their relative impact is greater. These results are summarised in the following figures. In them, it has been assumed a service take up level of 50% of premises, which is similar to the current average broadband penetration levels in Europe⁵.

For premium ARPU, as it has already been mentioned, duct leasing increases the number of competitors across the board, bringing markets that already had the potential to be competitive to a high degree of intra-modal competitiveness.

100 Mbps, FTTH GPON, premium ARPU, 50% penetration

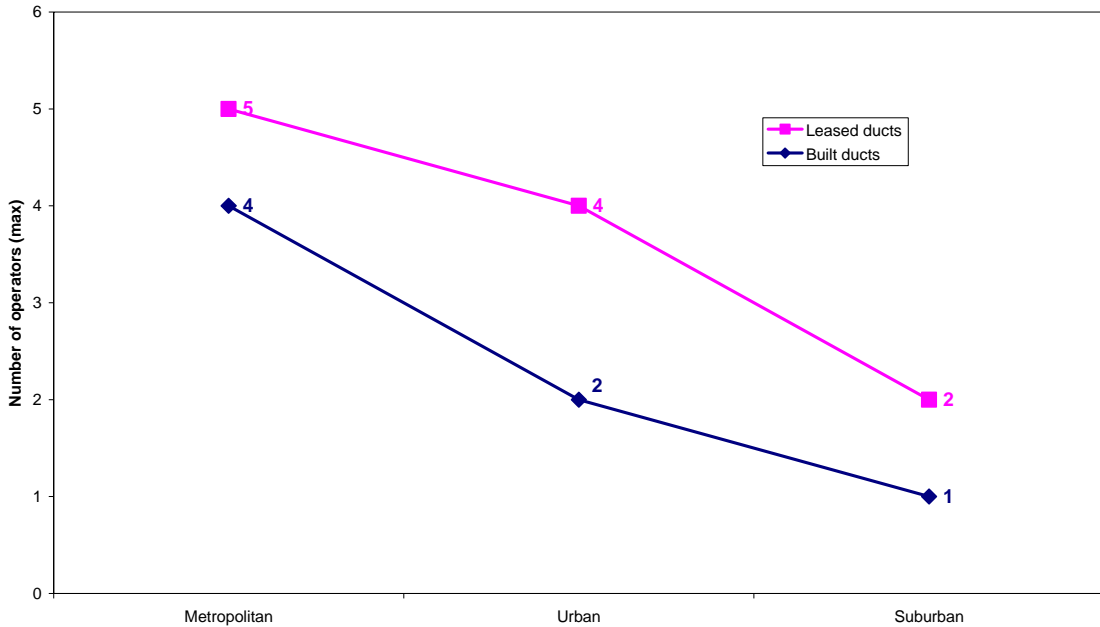


In the **medium ARPU scenario** (see figure below), duct access may bring competition to suburban areas where fibre would have otherwise competed only

⁵ The rest of households are supposed to either use mobile-only broadband access, cable modem access, legacy DSL access where available, or to not use broadband at all.

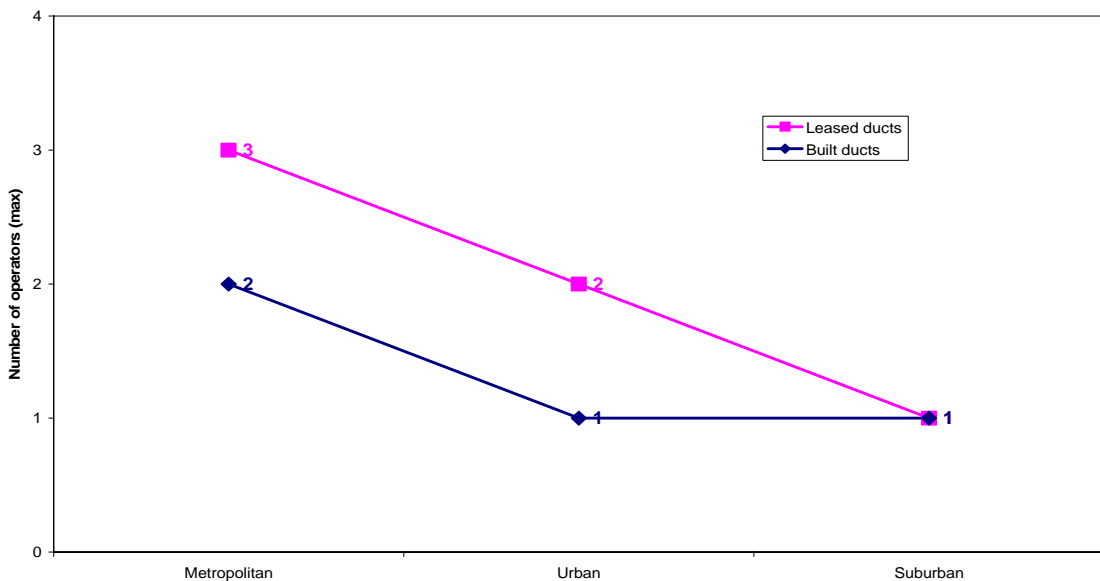
with high speed cable and wireless broadband and may also greatly enhance the competitive effectiveness of urban areas.

100 Mbps, FTTH GPON, medium ARPU, 50% penetration



In the **basic ARPU scenario** (see figure below), the business case for investing in fibre networks would be more difficult to be profitable, but the competitive impact of having ducts for lease would be greater than in the previous cases. Urban areas would sustain several fibre operators (in addition to the cable one) and dense urban areas could justify investment by three fibre operators.

100 Mbps, FTTH GPON, basic ARPU, 50% penetration



These findings are consistent with other recent studies. For example, the CMT has recently released a study⁶ from the engineering and consulting firm ISDEFE, which finds that:

- up to six infrastructure-based fixed NGA operators could compete in the two largest cities (Madrid and Barcelona): Telefónica, the cable operator and up to four alternative fibre operators;
- two to four infrastructure-based fixed NGA operators could compete in cities and towns down to 1,000 inhabitants: Telefónica, one fibre alternative, the cable operator, and a second fibre alternative in large cities.

⁶ ISDEFE, "Final report on the results of the deployment model for FTTH/GPON networks in Spain," May 2009.

Annex III: The ‘ladder of investment,’ a concept unsuited for NGA competition

The draft Recommendation proposes to impose on operators, which have been designated by national regulatory authorities as having significant market power (SMP) in relevant markets, a series of parallel remedies at all network levels. Although no specific economic justification is stated, this proposal is consistent with the idea of offering new entrants and other players a ‘ladder of investment’ to progressively develop their own networks.

In this Annex, three issues will be addressed:

- The theoretical foundations of the ladder of investment concept;
- The empirical evidence of the impact of ladder of investment regulation in the markets in which it has applied;
- Whether the economic properties of next generation access (NGA) networks meet the requirements for the ladder of investment concept to be of applied to them.

III.1 Theoretical foundations of the ladder of investment concept

The ladder of investment concept was embraced by policy makers in the telecommunications sector in the late-1990s as a regulatory approach to facilitate the supposedly efficient entry of alternative players and to promote (early) retail competition. This assistance was intended to be transitory, allowing the entrants to establish a revenue-generating customer base to fund infrastructure investments. Once a so-called ‘level playing field’ was established, asymmetric access regulation would be seen as no longer necessary and withdrawn.

However, as argued by Régibeau (2009)¹, the ladder of investment concept is not a new one but is the more recent relabeling of the old “infant industry” argument, which has been a staple of the international trade and development literature for at least 50 years. In this traditional version, local firms or local industries need to be protected from foreign competition so that they have time to become effective competitors who can survive in unregulated market conditions. As is now

¹ Régibeau, P., “Broadband Access in Belgium: Some Policy Considerations,” paper commissioned by Belgacom, 2009.

generally accepted, there are two main problems with this line of reasoning. Firstly, for the argument to have any intellectual coherence at all, one needs to identify a significant market failure that would prevent the local firm from willingly investing in an initial period of learning – when they make losses – in order to reap benefits later. While such failures might be identified relatively easily in a developing economy, it is less clear what they would be in the context of the telecom industry. Secondly, accumulated experience shows that there is an alarming tendency for those “infants” to simply refuse to “grow up”.

Proponents of the ladder of investment argued that their proposal could tackle with both problems. First, at the moment of liberalisation, they claimed that there was a clearly identified and very specific market failure in the telecommunications market in Europe. There was an incumbent company that owned a network with universal coverage, high fixed costs and low variable ones, that had been financed in privileged terms (either by monopoly profits and/or taxpayer funding) and that had already as customers virtually all potential users. Second, economists that advocated the ladder of investment concept proposed that it should be transitory. Access prices should be low only for the minimum time necessary for an efficient new entrant to build their business and customer base. The prices of the lower rungs should eventually be raised to provide an incentive for efficient entrants to invest in their own facilities -- and for inefficient entrants to consolidate or exit the market. After a reasonable period of time, all rungs of the ladder should be removed, as it should have met its goal to allow the development of infrastructure based competition.

III.2 The performance of ladder of investment regulation has been weak in terms of investment

Regulatory regimes implementing the ladder of investment concept have been instituted in many countries, such as most of EU member states, the United States and Canada. Their results have not been what their proponents expected.

Entrants that have made use of regulated access have largely not invested in fully facilities based networks. Actually, rather than complements, access services by the incumbent are often considered as substitutes for entrants’ own investments. Access regulation seems to have had a chilling effect on investments by entrants, rather than the facilitating effect expected by the ladder of investment theory.

Empirical evidence shows that low regulated access prices have discouraged investment by new entrants: Röller *et al* (2007)², Gruber (2007)³, Crandall *et al* (2004)⁴. Other empirical studies have found that entrants which avail of regulated access do so as a substitute rather than as a complement to their investments, like Hausman and Sidak (2005)⁵. The effect of disincentives has also been found for incumbent investments by Hazlett (2005)⁶ and Crandall and Sidak (2007)⁷.

Moreover, the behaviour of facilities based competitors has challenged the presumption that the incumbents' position was unassailable without regulatory protection. In addition to the upgrade of existing analogue cable networks, facilities based new entrants have decided to go straight for full network build out rather than climbing the investment ladder. In Europe, for example, Fastweb has deployed a FTTH network in Milan, Italy, and Spanish cable companies have covered 50% of Spanish households building their networks from scratch after liberalisation in 1998. In South Korea, the most developed broadband market in the world, local loop unbundling (LLU) was only introduced in 2002, after several infrastructure based competitors had build networks that covered the whole country⁸.

Conversely, ladder of investment-type regulation has also had a freezing effect on such investments by facilities based new entrants. Hausman and Sidak (2005) found that alternative infrastructure build out in the UK predated the introduction of unbundling, and that in the United States new players were increasingly relying on unbundling⁹. Waverman *et al* (2007)¹⁰ found that, also in Europe, investment by cable operators was negatively affected by lower LLU prices and, conversely, Crandall *et al* (2004) found in the United States that facilities-based line growth

² Roller, L.H., Friederiszick, H. and Grajek, M., "Analysing the Relationship Between Regulation and Investment in the Telecom Sector," *ESMT Competition Analysis*, Berlin, 2007.

³ Gruber, H., "European sector regulation and investment incentives for broadband communications networks," European Investment Bank, working paper series, 2007.

⁴ Crandall, R., Ingraham, A. and Singer, H., "Do Unbundling Policies Discourage CLEC Facilities-Based Investment?," *Topics in Economic Analysis and Policy*, Vol. 4 : Issue 1, 2004.

⁵ Hausman, J. and Sidak, G., "Did Mandatory Unbundling Achieve Its Purpose? Empirical Evidence from Five Countries," *Journal of Competition Law and Economics*. Vol. 1, No. 1, 2005.

⁶ Hazlett, T.W., "Rivalrous Telecommunications Networks with and without Mandatory Sharing," AEI-Brookings Joint Center for Regulatory Studies, Working Paper 05-07, 2005.

⁷ Crandall, R. and Sidak, G., "Is Mandatory Unbundling the Key to Increasing Broadband Penetration in Mexico? A Survey of International Evidence," working paper available at Social Science Research Center (SSRC), 2007.

⁸ Hausman, J., "Competition and Regulation for Internet-related Services: Results of Asymmetric Regulation," in Crandall and Alleman (Eds.) *Broadband: Should We Regulate High-Speed Internet Access?*, AEI-Brookings Joint Center for Regulatory Studies, 2002.

⁹ This finding refers to the period prior to broadband deregulation by the Federal Communications Commission.

¹⁰ Waverman, L., Meschi, M., Reillier, B. and Dasgupta, K. "Access Regulation and Infrastructure Investment in the Telecommunications Sector: An Empirical Investigation," LECG, London, 2007.

relative to LLU growth was faster in states where regulated LLU rates were higher relative to the cost of facilities-based investment.

III.3 NGAN markets are not suited to have ladder of investment access regulation

As discussed above, the protection supposedly warranted for new entrants, which the ladder of investment provides, would be justified only when there is a significant market failure that prevents new entrants to compete with incumbent firms until they become effective competitors.

Not only have many empirical studies demonstrated the lack of efficiency of the ladder of investment theory, but theoretical arguments justifying the ladder of investment are not appropriate to the NGA context. Indeed there are several well-established competitors in place in every European country¹¹, whose combined networks match the coverage of the incumbent operator and who have sizable customer bases in some geographic areas exceeding the incumbent's. With several networks in place, sunk costs are no longer limited to the incumbent, and, with the advent of fibre technologies, there is no longer a decisive cost advantage -- in particular, in the presence of a wholesale market for access to ducts and similar facilities. Incumbent operators have also renewed their networks with commercial market financing.

Therefore, the rationale to grant special protection to alternative operators in the form of a parallel availability of a range of access products is even less present in an NGA environment.

In an article on the subject, Cave (2007)¹² concludes:

*“Thus current ADSL competitors will be shortly be confronted by the challenge of new network architectures based on IP and fibre. Access options will change, possibly offering a difficult choice between reverting to something akin to resale (which might be withdrawn) or a major investment in a competing fibre. **It would be a mistake for regulators to perpetuate the current known world of bitstream, full loop unbundling etc. in the presence of such a disruptive change.**”*

¹¹ Cable, fibre, mobile, LLU and other wireless operators.

¹² Cave, M., “The regulation of access in telecommunications: a European perspective,” Revised, April 2007, Warwick Business School, University of Warwick, UK, 2007.

These circumstances imply a policy of facilitating fuller infrastructure competition, by freeing spectrum, removing any disadvantages cable companies face, and possibly considering mandating access to basic infrastructure such as ducts rather than traditional communications assets, such as copper or fibre.” [emphasis added]

In the context of the practical impact on investment that ladder of investment-type regulation has had in the current telecommunications markets, the imposition of such a regime for NGA infrastructure could be expected to reduce or remove incentives to invest not only by the established operator but also by facilities-based alternative operators. Moreover, given that even the original assumptions held by advocates of the ladder of investment are not relevant in a NGA context (s. above), the concept should no longer be seen as a valid regulatory approach for the sector – especially in a NGA environment.