Commission for
Communications Regulation

Preliminary Consultation

Next Generation Access (NGA) Remedies in Wholesale Regulated Markets

Wholesale Physical Network Infrastructure Access (WPNIA) and Wholesale Broadband Access (WBA) Remedies in an NGA Environment

Document No:	**11/40**
Date:	**26 May 2011**

All responses to this consultation should be clearly marked:- "**Reference: Submission re ComReg 11/40**" as indicated above, and sent by post, facsimile or e-mail to arrive on or before **17.00hrs on 11 July 2011** to:

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Please note ComReg will publish all respondents submissions with the Response to this Consultation, subject to the provisions of ComReg's guidelines on the treatment of confidential information – ComReg 05/24

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Foreword

The communications sector is on the brink of significant change. The arrival of new technologies that can offer higher speed and better quality broadband and other services for consumers across a number of wired and wireless platforms has the potential to alter the market dynamics, and lead to a new era in the provision of electronic communications services. Incumbent operators throughout Europe, faced with an increasing threat of competition from wireless and cable platforms are facing critical investment and commercial decisions about how to confront the challenges that come with the advent of Next Generation Access (NGA).

The Irish communications market is also confronted with such challenges. Eircom, the dominant operator in two wholesale broadband access markets, has signalled its intention to commence a NGA fibre network pilot and expects to launch services later this year. UPC has already deployed fibre deeper into many parts of its cable network and, following the upgrade to the DOCSIS 3.0 standard, can now offer very high speed broadband services in many parts of the main urban centres.

Mobile operators are also upgrading their respective networks to meet customer-demand for higher speed and improved quality mobile broadband services. Commercial success and the development of a vibrant and competitive market will depend on the ability of operators to adapt to the changing technological environment and, in doing so, to make sound strategic investment decisions. Such decisions will undoubtedly involve choices about which technology to deploy, in which locations to invest and the timing of such investment.

At the same time, Ireland is confronting an economic recession that may impact on the ability of operators to access capital markets, constrains consumer spending and, as a result, brings uncertainty regarding the financial returns potentially available on foot of investment in communications infrastructure.
In such challenging times, it is important that market participants have clarity on the regulatory rules that will apply in this developing environment. While regulatory certainty will not, in itself, spur investment in NGA networks, it can serve to bring welcome clarity to market participants by signalling in advance how wholesale access and associated pricing regimes will operate in an NGA environment. This poses new regulatory challenges. The framework to date has largely being applied to the historically built copper access networks of dominant service providers, with the investment in such networks having already been made. Investment decisions are now being made regarding the transition from old copper technologies to new fibre based IP networks and market participants require certainty how the regulatory framework will evolve.

ComReg has already published a number of consultative documents within which it has already set out the high level principles as to how the regulatory framework will operate in an NGA environment.

The recent publication by the European Commission of a recommendation on the regulatory treatment of NGA is a further step in providing regulatory certainty to communications operators throughout Ireland and Europe. National Regulatory Authorities such as ComReg are required to take the utmost account of this

guidance when developing national regulatory policy. The NGA Recommendation offers some flexibility as to how it can be applied in light of national circumstances. Having regard to conditions in the Irish market, ComReg will explore in this paper how the guidelines should be applied in a way that best meets the regulatory objectives of promoting effective competition and efficient investment in Ireland, and thereby advancing consumer interests.

While this paper is necessarily detailed in the range of issues and questions raised – in line with the NGA Recommendation itself – ComReg is conscious of the need to be proportionate and justified its approach to regulation and hence to impose regulatory remedies that are warranted in light of the relevant market circumstances.

With that in mind, the purpose of this preliminary consultation paper is to seek the views of industry participants, stakeholders and other interested parties on the development of an appropriate NGA regulatory framework in Ireland having regard to the guidance provided in the European Commission's NGA Recommendation. ComReg will consider the views submitted in response to this paper, and will take these into account when consulting on its regulatory proposals later this year, leading ultimately to their finalisation in early 2012.

Alex Chisholm
Chairperson

1 Introduction and Background

Purpose

1.1 In September 2010 the European Commission published a Recommendation on regulated access to NGA networks[1] (the 'NGA Recommendation'). The scope of this Recommendation primarily covers remedies (or obligations) that can be imposed by National Regulatory Authorities (NRAs) upon operators designated[2] with Significant Market Power (SMP) and one of its stated objectives is:

> *"… to promote efficient investment and innovation in new and advanced infrastructure, taking due account of the risks incurred by all investing undertakings and the need to maintain effective competition, which is an important driver of investment over time."*[3]

1.2 NRAs, in imposing remedies upon SMP operators, are seeking to foster the development of conditions that could potentially allow regulated markets to become effectively competitive over time. In doing so, NRAs seek to balance the promotion of competition, facilitate efficient investment in networks and protect consumer interests. Once markets begin to tend towards effective competition, the rationale for regulatory intervention starts to diminish.

1.3 Through its NGA Recommendation, the European Commission provides guidance to NRAs, such as ComReg, on the application of regulatory remedies in an NGA setting. While providing guidance regarding the NGA policies to be followed, it is up to NRAs to take the utmost account of the NGA Recommendation in their analysis when applying the guidance in light of national circumstances. In doing so, the onus is on ComReg to clearly specify the reasons why it would deviate from the European Commission's recommended approach, were it to do so.

1.4 The objectives of the NGA Recommendation are consistent with those set out in the Access Directive.[4] The Access Directive sets out objectives that national regulatory authorities ('NRAs') should follow with regard to access and interconnection, and lays down procedures to ensure that obligations imposed by NRAs are reviewed and, where appropriate, withdrawn once the desired objectives have been achieved. Broadly speaking, ComReg's role is to encourage, and where appropriate to ensure, adequate access and interconnection, and interoperability of services in a way that promotes efficiency (including investment), sustainable competition, and gives maximum benefit to end users.

1.5 While the deployment of NGA networks in Ireland is still at an early stage, the purpose of this preliminary consultation is to seek views from interested parties on the application of the European Commission's NGA Recommendation in an Irish

[1] European Commission Recommendation on regulated access to Next Generation Access Networks, 20 September 2010, (2010/572/EU). Available HERE.

[2] An SMP designation is made on the basis of a market analysis procedure carried out by National Regulatory Authorities (NRAs) under Article 16 of the Framework Directive, 2002/21/EC.

[3] Paragraph 2 of the NGA Recommendation.

[4] Directive 2002/19/EC of the European Parliament and of the Council of 7 March 2002 on access to, and interconnection of electronic communications networks and associated facilities as amended by Directive 2009/140/EC (Access Directive)

regulatory context. This paper represents the first stage in a process that will culminate in the publication of a further consultation paper later this year which will set out, in detail, ComReg's proposed regulatory approach on NGA.

1.6 While being guided by the NGA Recommendation, ComReg is conscious of the risks and costs that are associated with regulation of NGA. While fully understanding the importance of upholding the broad objectives set out in the Access Directive, ComReg is also mindful that the perceived costs of regulation may act to disincentivise investment in NGA infrastructure. In that regard, it is important that regulatory obligations are proportionate and avoid unnecessarily imposing burden on operators. With that in mind, ComReg welcomes submissions that are practical, reasonable, specific, and supported by evidence where possible.

1.7 ComReg will take into account respondents' views to this paper in issuing more detailed proposals on specific regulatory remedies, which it expects to be in a position to do in Q4 2011. In doing so, ComReg will be mindful of the need to encourage efficient investment and at the same time seeking to ensure the development of effective competition.

1.8 The output from this paper will, therefore, be a further consultation later in 2011 on specific NGA remedies in the markets for Wholesale Physical Network Infrastructure Access and Wholesale Broadband Access. This will be followed by a final decision in these matters. ComReg also intends to publish non-confidential aspects of all responses and, in this regard, attention is drawn to section 7 dealing with the submission of responses. This, in turn, will feed into the development of detailed proposals which will be published later this year on the detailed specification of remedies.

1.9 Such proposals will likely take the form of a public consultation and draft decision instrument setting out ComReg's preliminary views on specific NGA remedies in the WBA and WPNIA markets. On foot of this consultation and in light of the consideration of responses received, ComReg would expect to publish its final decision in Q1 2012.

Description of Next Generation Access

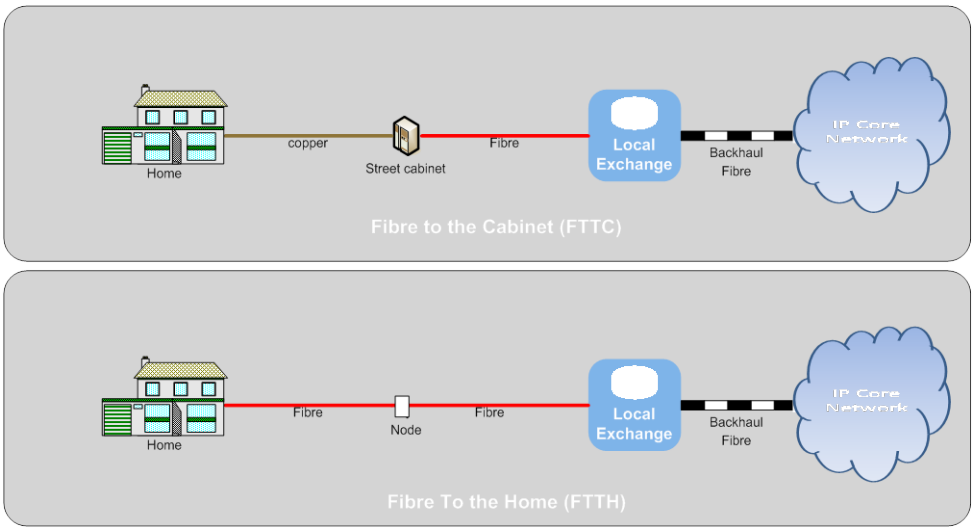
1.10 Next Generation Access (NGA) networks facilitate the provision of very high speed broadband (and other) services. While a range of infrastructures/technologies could potentially be classified as NGA networks[5], for the purpose of this preliminary consultation paper the focus is largely the following types of wired networks: Fibre-To-The-Home (FTTH) and Fibre-To-The-Node (FTTN)/Fibre-To-The-Cabinet (FTTC).

1.11 As shown in Figure 1 below, a FTTH network involves the deployment of an optical fibre from the local exchange (or equivalent) all the way to the customer's premises/home. On the other hand, a FTTC/FTTN network involves the deployment of optical fibre from the local exchange (or equivalent) to a street

[5] The NGA Recommendation defines NGA as follows: "Next generation access (NGA) networks (NGAs) means wired access networks which consist wholly or in part of optical elements and which are capable of delivering broadband access services with enhanced characteristics (such as higher throughput) as compared to those provided over already existing copper networks. In most cases NGAs are the result of an upgrade of an already existing copper or co-axial access network."

cabinet located close to the customer's premises/home, with the remainder of the connection made up of copper infrastructure (or cable).

Figure 1: FTTC and FTTH



Legal and Regulatory Background

EU Policy and Regulatory Context

1.12 NRAs are required by the EU regulatory framework to encourage efficient investment, promote competition and protect consumers in markets where an operator is found to have significant market power.

1.13 Having regard to the regulatory framework as established by the European Commission in various directives, NRAs are required to analyse specific electronic communications markets. Such markets are specified in a European Commission recommendation[6] that identifies relevant markets that are susceptible to ex ante regulation (the 'Relevant Markets Recommendation'). The market analysis[7] to be carried out by NRAs involves defining relevant markets in a national context (based on those identified in the Relevant Markets Recommendation), assessing competition within these markets, and in the absence of effective competition, designating an operator(s) as having Significant Market Power (SMP).

1.14 NRAs can impose *ex ante* regulatory obligations/remedies[8] on such SMP operators in order to address market failures and to stimulate competition. Remedies imposed must be based on the nature of the competition problem identified, and must be proportionate and justified. Access and price control remedies must be designed

[6] European Commission Recommendation of 17 December 2007 on relevant product and service markets within the electronic communications sector susceptible to *ex ante* regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services (OJ L 344, 28.12.2007, p. 65).

[7] A market analysis exercise is carried out pursuant to Article 7 of Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services ('Framework Directive').

[8] See Articles 9 to 13 of Directive 2002/19/EC of the European Parliament and of the Council of 7 March 2002 on access to, and interconnection of, electronic communications networks and associated facilities (Access Directive).

and imposed in a manner that encourages investment in infrastructure (thus securing competition in the longer term).

1.15 There are two markets which have been identified by the European Commission in the Relevant Markets Recommendation that are most closely identified with NGA developments:

- wholesale physical network infrastructure access ('WPNIA'), being Market 4 identified in the Relevant Markets Recommendation, and
- wholesale broadband access (WBA), being Market 5 in the Relevant Markets Recommendation.

1.16 The WPNIA and WBA markets are those most closely related with the provision of wholesale inputs to support the provision of retail broadband and other services. Eircom, the SMP operator, is deploying next generation network infrastructure (currently geographically limited and to be launched as a product pilot) in order to enhance its provision of broadband and other services. These upgrades will improve the speed and quality of broadband services in Ireland at both the retail and wholesale levels. It is, therefore, important that the wholesale implications for NGA are considered, particularly with a view to ensuring that those operators competing with Eircom in retail markets have access to a set of effective and efficiently provided wholesale products.

1.17 The NGA Recommendation has been published by the European Commission as a harmonisation measure in accordance with Article 19 of the Framework Directive[9] and, as noted above, ComReg is required to take the utmost account of it when undertaking its market analysis role and establishing remedies in Markets 4 and 5.

1.18 Ultimately, ComReg is required to notify its proposed NGA remedies to the European Commission.

Irish Policy and Regulatory Context

1.19 The Department of Communications, Energy, and Natural Resources (DCENR) and ComReg have already published a number of policy and regulatory documents which provide a broader context for the future development of the regulatory framework governing NGA in Ireland. The most relevant of these documents are as follows:

- "*Next Generation Broadband: Gateway to a Knowledge Ireland*"[10], a policy paper published by the Department of Communications, Energy and Natural Resources' (DCENR) which identified high speed broadband services as being critical in attaining the Government's twin goals of becoming a 'Smart Economy' and a 'Knowledge Society'.

[9] Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services as amended by Directive 2009/140/EC and Regulation 544/2009 (Framework Directive).

[10] See DCENR website www.dcenr.gov.ie

- "Next Generation Broadband in Ireland – promoting the timely and efficient development of high speed broadband infrastructure and services"[11], an Information Notice published by ComReg which set out general principles which would guide ComReg's approach in establishing the regulatory framework governing access to NGA networks.
- Department of Communications Energy and Natural Resources Consultation Paper "Recommendations For Open Access Fibre Ducting and Interior Cabling for New Residential Buildings Making Homes Fibre Ready"[12]

1.20 ComReg has also considered the impact of NGA networks in its analysis of the WPNIA market and is currently considering its position with respect to the WBA market.

1.21 In May 2010 ComReg completed its analysis of the WPNIA market (previously known as Local Loop Unbundling or LLU market). This resulted in the publication of a WPNIA Decision Document[13], which designated Eircom as having SMP in this market. The WPNIA market was defined such that it included wholesale physical access products provided over the copper network as well as NGA fibre overlays to it.

1.22 ComReg differentiated its approach in imposing remedies on Eircom in relation to next generation fibre based WPNIA products (NG WPNIA) and current generation copper based WPNIA products. While detailed remedies were imposed concerning products to be provided by Eircom over its copper network, insofar as its NG WPNIA products are concerned, ComReg mainly set out the principles of remedies that would apply. This approach provided clarity to industry that its NG WPNIA products would be regulated while at the same time providing flexibility as to how they would be regulated.

1.23 The approach on remedies allowed an opportunity for the market, in the first instance, to decide upon the specific type and nature of NG WPNIA products to be supplied and also provided for account to be taken of the European Commission's NGA Recommendation once finalised. At the time of publication of the WPNIA Decision Document, ComReg indicated that it would engage in further public consultation to further specify other details and further implementation of the NGA remedies.

[11] See ComReg Document 09/88 at http://www.comreg.ie/_fileupload/publications/ComReg0988.pdf, 24 November 2009 ('NGB Information Notice').

[12] Department of Communications Energy and Natural Resources Consultation Paper "Recommendations For Open Access Fibre Ducting and Interior Cabling for New Residential Buildings Making Homes Fibre Ready", 31 March 2011. Available at: http://www.dcenr.gov.ie/NR/rdonlyres/31113BCF-785A-42EC-99D1-99460E017520/0/Consultation_Paper_Recs_For_Open_Access_Fibre_Ducting_and_Interior_Cabling_for_New_Residential_Buildings.pdf

[13] See ComReg Document 10/39, Market Review: Wholesale (Physical) Network Infrastructure Access (Market 4) - Further Response to ComReg Document No. 08/104, Response to ComReg Document No. 09/42 and Decision" (the 'WPNIA Decision Document'). Document available at http://www.comreg.ie/_fileupload/publications/ComReg1039.pdf.

1.24 In October 2010 ComReg also published its preliminary views on its analysis of the WBA market[14]. ComReg is currently considering responses received to this consultation and expects to issue its final decision in the coming weeks. The proposed approach in this market is similar to that adopted in the WPNIA market. ComReg has proposed that the WBA market is defined in such a way that includes non-physical access products provided over copper and relevant NGA infrastructure. The approach proposes to re-designate Eircom as having SMP, with detailed remedies being specified for copper-based WBA products on the SMP operator's network. Once again, high level remedies have been proposed for NGA WBA products, and ComReg has indicated that it would engage in further public consultation to further specify other details and further implementation of such remedies.

1.25 Article 12(2) of the Access Directive stipulates that national regulatory authorities should take account of the following factors when assessing the proportionality of access remedies:

(a) the technical and economic viability of using or installing competing facilities, in the light of the rate of market development, taking into account the nature and type of interconnection and/or access involved, including the viability of other upstream access products such as access to ducts;

(b) the feasibility of providing the access proposed, in relation to the capacity available;

(c) the initial investment by the facility owner, taking account of any public investment made and the risks involved in making the investment;

(d) the need to safeguard competition in the long term, with particular attention to economically efficient infrastructure-based competition;

(e) where appropriate, any relevant intellectual property rights;

(f) the provision of pan-European services

1.26 These factors must also be considered in light of the objectives set out in Article 8 of the Framework Directive.

Retail trends

1.27 Recent trends observed in the retail market provide a context for forces driving wholesale demand for network infrastructure access and wholesale broadband access. In recent years, the following trends have been observed:

- a dramatic increase in internet penetration and usage;
- a shift from narrowband to broadband access, to the point where narrowband access may be seen as a legacy product, and a shift in consumer usage from lower to higher broadband speeds;

[14] Market Review: Wholesale Broadband Access (Market 5). Consultation and Draft Decision, ComReg Document No. 10/81" (the 'WBA Draft Decision').

- the development of applications that require faster speeds, such as music and movie downloads, and online gaming;
- the development of products which meet these needs, particularly in the shift towards higher broadband speeds and increased download allowances;
- substantial increases in the geographic reach and penetration of existing broadband platforms, such as DSL, cable and FWA (albeit with the market share of the latter declining in recent quarters), and limited developments of alternative FTTx operators;
- the launch and notable expansion of mobile broadband services;
- mobile operators entering the fixed market and, to a lesser extent, the converse;
- the development of bundled offerings of voice, data and entertainment.

1.28 These factors provide an insight into the retail demand characteristics that may influence the investment decisions of operators in the relevant markets. ComReg anticipates that internet penetration and usage will continue to grow into the future. Demand is likely to be driven by the continual development of 'every-day' internet-based applications that require more bandwidth and drive higher traffic volumes. However, the precise level of demand, and the willingness of consumers to pay for emerging services, is difficult to predict.

1.29 Perhaps the most profound impact of NGA from a regulatory perspective is the potential for voice, data, television and other services to be migrated onto single high speed fibre broadband (IP) networks, which may ultimately result in the convergence of several individual product markets into clustered markets. A change of this nature, when it emerges, could impact on the competitive dynamic in upstream wholesale markets.

1.30 The trend towards faster broadband speeds and the roll-out of NGA networks may, however, be constrained by the current low levels of consumer confidence present in Ireland. It is unclear what additional and enhanced services may be available on NGA broadband networks and whether consumers would be willing to pay a premium for these.

NGA Developments in Ireland

1.31 Over the last number of months, Ireland has started to see the emergence of some potentially significant NGA related developments. The most notable developments are discussed below and relate to:

- the launch by UPC of consumer broadband products with speeds of up to 100Mbps in certain areas of Dublin using a DOCSIS cable network[15].
- the announcement[16] by Eircom (the SMP operator in the WPNIA and WBA markets) of an NGA FTTH and FTTC pilot in Wexford, Sandyford (Dublin) and other exchange locations.

[15] See www.upc.ie

[16] See www.eircomwholeslae.ie

1.32 It is also recognised that other small scale and geographically confined developments of fibre access networks have also occurred (note that these competing operators have not been designated with SMP in any market).

Eircom - The SMP operator

1.33 In June 2010 Eircom announced that it planned to invest €20m in a FTTH pilot at the Sandyford and Wexford exchange locations. This FTTH pilot, as originally announced, intended to see broadband speeds of up to 150 MB per second made available to approximately 10,000 homes. However, the FTTH pilot has since been expanded to include FTTC technologies and, as a consequence 8,000 premises are to be served by each of the FTTH and FTTC pilot (16,000 premises in total).

1.34 At the wholesale level, Eircom has indicated that it is developing the pilot on an open access basis and has provided an opportunity for industry to participate in discussions regarding the development of NGA wholesale products and, indeed, in the launch of the pilot itself. Eircom has also stated that the pilot is an opportunity for industry players to decide upon and deploy their own services over the Eircom network, and to gain access to direct commercial, technical and end-user insights.

1.35 Eircom convened a Fibre Industry Leadership Group (FILG) in August 2010 to facilitate the developments associated with the pilot roll-out. The FILG includes eircom retail as well as representatives from a number of competing operators. ComReg has also attended the meetings as an observer. The FILG meets periodically to discuss issues relating to Eircom's fibre pilot. Details on the FILG and its work are available on Eircom's website www.eircomwholesale.ie/.

1.36 The nature and the design of the wholesale products to be offered by Eircom has not been fully finalised as of yet, but Eircom has proposed to offer both passive (WPNIA) and active (WBA) access options. We return to some of the specific details of these products and their relationship with the future regulatory framework in sections 3, 4 and 5.

Alternative operators' (non-SMP) fibre access networks

1.37 UPC has invested substantially in network upgrades and can now offer broadband at up to 30Mb in some areas. UPC has also recently introduced a 100Mbps product using the next generation cable broadband standard DOCSIS 3.0. These upgrades involve the deployment of fibre deeper into the access network. However, ComReg understands that fibre will not be extended to the customer premises under current plans (only to the co-axial distribution cabinet). ComReg understands that UPC does not intend to offer wholesale access to this network.

1.38 There are two alternative operators that have deployed FTTP access networks in Ireland – Smart Telecom and Magnet Communications. The coverage of these networks is extremely limited and geographically dispersed. The networks are spread across approximately 30 locations, typically relatively new suburban residential developments (green field sites). There are no wholesale products available on these fibre networks.

2 Facilitating competition and encouraging efficient investment

Facilitating competition and encouraging efficient investment

2.1 The EU regulatory framework, *inter alia*, requires NRAs to encourage efficient investment and promote competition. In order to assist in achieving these primary objectives, the Explanatory Note[17] to the European Commission's NGA Recommendation identifies further objectives, such as:

- to provide re-configured access products in an NGA setting to allow LLU and bitstream operators to continue to compete.
- to set appropriate access prices so as not to distort alternative operators' make-or-buy decisions and to foster efficient network duplication.
- to ensure transparency of changes in network topologies and reasonable periods of transition.

2.2 In the absence of effective competition, an NRA can impose regulatory remedies on SMP operators which aim to address the market failures (after conducting a thorough market review in accordance with Article 7 of the Framework Directive).

2.3 The European Commission's NGA Recommendation identifies that NRAs, in establishing the appropriate national regulatory framework, should act to:[18]

- create regulatory certainty and predictability
- avoid insufficient regulation which could harm competition and alternative investment in NGAs
- avoid insufficient regulation which could harm existing competition based on the unbundling of legacy networks (LLU)
- avoid inappropriate regulation which could delay or forestall incumbent operators' investment in NGA networks

2.4 With this in mind, the remedies that are established by the NRA must be based on the nature of the problem identified, proportionate and justified. Furthermore, *ex ante* access and price regulation must be set up in such a way that it does not negatively influence investment incentives for market players and encourages companies to ascend 'the investment ladder'. This is particularly pertinent in a sector that is on the crux of the emergence of a new generation of technology.

2.5 Developing an appropriate regulatory framework to meet these multiple-objectives is challenging. In doing so, ComReg must recognise that there is a number of market participants, each facing a different (and sometimes conflicting) set of investment and other incentives. ComReg must encourage competition while at the same time considering the incentives faced by the SMP operators, those purchasing wholesale LLU and bitstream services from SMP operators and investments made by other service providers in their own network, such as by cable network operators

[17] European Commission Staff Working Document- accompanying document to the Commission Recommendation on regulated access to Next Generation Access Networks. SEC(2010) 1037 final (Explanatory Note).

[18] Ibid, page 16 of the Explanatory Note.

and various other fibre and wireless broadband providers. All such market participants' investment decisions can be affected by the regulatory approach adopted by ComReg.

2.6 In ensuring the development of effective competition, the market should also be conscious of proportionality, efficiency and other considerations when it comes to the development of specific remedy based wholesale product requirements, including any impact of demand on associated wholesale pricing arrangements.

2.7 The regulatory approach should also be sensitive to any changes that the evolution towards NGA networks may have on the competitive landscape, including its impact on existing wholesale services. For example, the European Commission, in the Explanatory Note[19] accompanying the NGA Recommendation notes that:

> *"…barriers* [to entry] *may even become more pronounced in an NGA setting. For instance, while today an LLU competitor can connect its own network to the incumbent's access network at the local exchange (unbundling at a distance of several kilometres from the end-user's premises), such interconnection will as a general rule no longer be possible in an NGA setting. Alternative operators would have to install their equipment in street cabinets or manholes much closer to the end-user's premises, rendering alternative business cases more challenging than in the past (rather than connecting to one local exchange today they will have to connect to thirty street cabinets tomorrow)."*

2.8 In light of the above, this section considers the approach to setting NGA regulatory remedies in the WPNIA and WBA markets (if Eircom continues to have SMP), in particular, against the specific objective of encouraging long-term infrastructure based effective competition by allowing the potential for operators to ascend the so called 'ladder of investment', a concept explained further below. The section also introduces some of the access, pricing and other regulatory remedies (or 'tools') that are available to ComReg as a means of setting appropriate investment signals for market participants, thereby contributing towards the objective of ensuring the development of effective competition.

The ladder of investment

2.9 The European Commission emphasises the importance of competition in bringing about choice and affordable prices for consumers, and in the long-run also for promoting efficient investment. Therefore, in markets where an operator is found to have SMP, ComReg will continue, where appropriate, to impose access remedies that address competition problems and ultimately drive infrastructure-based effective competition. The European Commission points to a set of access and other remedies available to NRAs that are designed to facilitate competition via the 'ladder of investment' principle.

2.10 The ladder of investment principal revolves around the concept that retail service providers competing against a vertically integrated SMP operator on the same downstream (retail) markets will initially avail of low value-added wholesale products (for instance by reselling telephone lines of the SMP operator) as a means

[19] Page 9 of the Explanatory Note to the NGA Recommendation.

of entering the market and building a retail customer base. Such entry to the retail market via the lowest resale 'rung' of the ladder reduces the barriers to entry for new entrants (which would otherwise be high, given significant upfront investment costs and initially low economies of scale) and, as a result, reducing demand-risk in the initial market entry phases. Once the service provider develops scale economies via a customer base it can then work its way up the investment ladder by building their own infrastructure, typically closer to the end-user's premises, and gradually reducing their reliance on elements of the SMP operator's wholesale infrastructure. In doing so, the service provider will typically avail of passive infrastructure based wholesale products such as LLU which, although requiring much more significant investment, allow the service provider much greater freedom at the retail level to differentiate and control their service offerings.

2.11 Through the current policy approach of imposing remedies based on the ladder of investment, competition can take place, in the initial stages, using wholesale access products that are geared more towards the service level. Gradually, as service providers build and use their own infrastructure along-side Eircom's passive wholesale access products purchased from the SMP operator, a more sustainable form of competition will emerge thereby allowing service providers to bring their own differentiated services and products to the market in an attempt to attain competitive advantage.

2.12 A high-level overview of the various "rungs" of the ladder of investment is set out in the European Commission's Explanatory Note to the NGA Recommendation and is summarised below.[20] A more detailed description in the context of specific wholesale access products in the WPNIA and WBA markets and their relevance in an Irish context is discussed later in Sections 3, 4 and 5.

- **Resale:** where an operator acts as a "middle-man". The operator purchases a wholesale input and resells the service to retail customers under their own brand name;
- **Bitstream:** where an operator has wholesale broadband access. The operator uses the equipment of the "first-mover"/incumbent operator to provide services to end-customers;
- **Shared Access:** where an operator is present at the local exchange with its own network (i.e. infrastructure) but relies on the sharing of lines with the "first-mover"/incumbent to provide services to end-customers;
- **Unbundling:** which can occur in two forms; (i) local loop unbundling ("LLU") and (ii) sub-loop unbundling. LLU is where an operator rents the entire access line running from the local exchange to the end customer. Sub-loop unbundling is where an alternative provider does not rent the entire local loop but just the sub-loop to the end-customer;
- **Own infrastructure:** where an alternative provider has invested in its own infrastructure to provide services to end-customers; and
- **Access to ducts:** where an alternative provider has invested in its own infrastructure in the access network but uses the existing ducts of the "first-mover"/incumbent SMP operator.

[20] See page 13 of the Explanatory Note.

2.13 At noted above, new entrants moving into retail markets are typically starting off with a small customer base, and will seek to develop economies of scale/density before developing their own infrastructures. This is partially due to the degree of uncertainty or risk involved in entering the retail market, particularly with respect to demand and the large upfront investment costs. A significant proportion of the investment required to enter these markets could be sunk, and would be irrecoverable if demand failed to materialise as expected. Service providers also need to achieve a critical mass of customers in order to achieve the minimum efficient scale necessary to support the relevant business case for the investment being made. For this reason, the 'lower rung' wholesale products on the 'ladder' such as resale or bitstream services allow for alternative operators to reduce their own initial exposure to risk by gauging consumer demand and establishing an initial customer base via access options that require less up-front investment (and utilise the SMP operator's existing infrastructure, which is subject to lower risk given the investment is already sunk).

2.14 Those entrants who are successful in gaining a reasonably significant customer base (and hence economies of scale and density) are then able to ascend the investment ladder, by deploying physical infrastructure up to a point which closer to the end customer's premises. This in turn enables alternative operators to have greater independence from the SMP operator, and more freedom to design products and offer flexible retail pricing.

2.15 This ladder of investment principle underpins, for example, the broadband related markets identified by the European Commission in its Relevant Markets Recommendation, namely markets 4 and 5 (WPNIA and WBA respectively). The intention is that as competing operators can enter the broadband market and over-time (as they gain a deeper understanding of the consumer base), operators can move up the value chain from 'pure resale' to WBA based access to WPNIA based access.

2.16 The application of the ladder of investment principle is based on the assumption that:[21]

> *"…ultimately competition is the main driver of investment, and that appropriate access products are a pre-condition for competition in an industry still characterised by the continued dominance of incumbent firms as well as by large economies of scale."*

2.17 The ladder of investment is set out in the European Commission's Explanatory Note[22] to the NGA Recommendation and is replicated in Figure 2 below.

[21] Page 27 of the Explanatory Note

[22] See page 14 of the Explanatory Note.

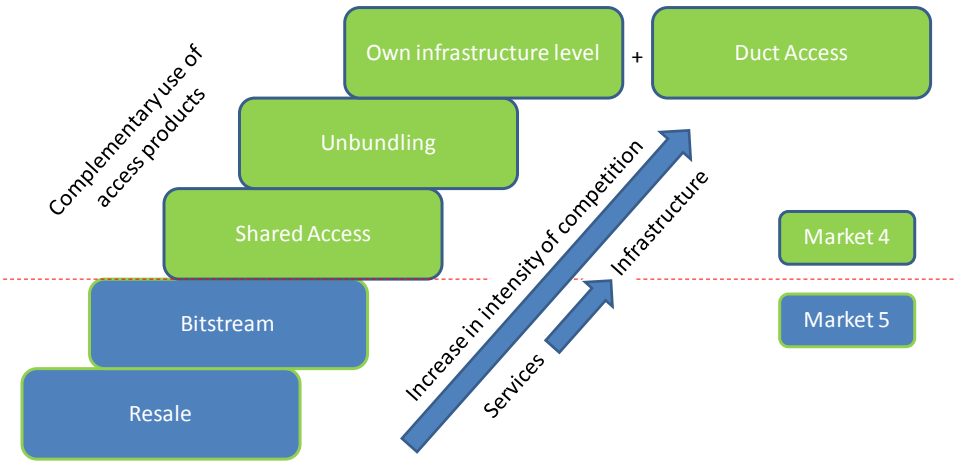


Figure 2: ***Rungs of the ladder of investment***

2.18 It is important to acknowledge that the advent of NGA introduces a new set of circumstances that may require regulatory and commercial sensitivity in terms of how this principle is applied. First, NGA networks offer a different commercial proposition from the perspective of a WPNIA or WBA access seeker. Related access products may rely on new distribution points in the network, lending to different economic drivers and impediments underpinning WPNIA and WBA services. These differences, combined with advanced service characteristics and additional cost-drivers, necessitate NGA-specific access remedies. Secondly, the infrastructure in question does not yet exist, or is in the early stage of build. Any operator, including the access provider (SMP operator) itself, may face a higher degree of risk when efficiently investing in NGA infrastructure. As such, ComReg is required to develop a set of remedies that, on the one hand, addresses barriers to entry for new entrants and alternative operators, whilst at the same time ensuring that any operator considering investment in NGA infrastructure can be confident that they will be rewarded adequately for the associated efficiently incurred investment-risk.

2.19 Having regard to the European Commissions NGA Recommendation, the challenge facing ComReg is to design an appropriate set of wholesale access and other remedies in an NGA environment that promotes effective competition, facilitates efficient investment and protects users.

Identifying and quantifying investment risks

2.20 The European Commission notes[23] that:

> *"Investments in NGA networks are risky, because investing undertakings cannot be sure that today's capital outlays will be recouped over time, and, even if re-coupment occurs, that returns on these capital outlays will be superior to the returns of cash, low-risk bonds or alternative investment projects."*

2.21 Understanding the risks associated with investment in NGA infrastructure is one important first step in designing effective wholesale access remedies. Risks

[23] Page 28 of the Explanatory Note to the NGA Recommendation.

influence the commercial decisions made by access seekers and access providers on whether, and to what extent, to invest in NGA infrastructure. Failure to account for such risks proportionately when developing wholesale access remedies could undermine incentives to invest, and lead to less competitive. The purpose of this section is to attempt to identify and assess the scale of the risks associated with NGA investment.

2.22 The European Commission notes that NRAs should take into account the following uncertainties:[24]

> *"(i) uncertainty relating to retail and wholesale demand; (ii) uncertainty relating to the cost of deployment, civil engineering works and managerial execution; (iii) uncertainty relating to technological progress; (iv) uncertainty relating to market dynamics and the evolving competitive situation, such as the degree of infrastructure-based and/or cable competition; and (v) macro-economic uncertainty.*

2.23 The European Commission further elaborates on its discussion of these risks in the Explanatory Note[25]:

> *"Uncertainty arises in terms of several dimensions. First, as with any business activity, there is execution risk. Second, investment in networks may be risky because most of it is sunk, i.e. cannot later be re-deployed for other purposes. Third, there is a risk on the demand-side that consumers might not wish to subscribe to new services or that consumers' willingness to pay for new services (on which recoupment of the original investment might depend) could turn out to be less than expected. Fourth, for SMP-undertakings, there is also regulatory risk, i.e. the problem that regulators might not be able to commit over time to firm regulatory terms and conditions. Fifth, there are macro-economic uncertainties related to future growth of the economy and of consumption of electronic communications services. Sixth, there are uncertainties regarding technological evolution, such as the future upgrade path from chosen fibre topologies. Seventh, there are uncertainties over future competitive pressures, such as from mobile broadband or even from entirely new platforms. Finally, there are also uncertainties connected to projected deployment costs, as current investment experience is still limited."*

2.24 These factors are all taken into account explicitly in the weighted average cost of capital (WACC), which is used by ComReg when costing products provided by Eircom on its network. The factors are discussed under broad headings below:

Demand uncertainty

2.25 It may be difficult for operators to precisely predict the level of consumer demand for next generation retail products. As noted by the European Commission, any operator investing in NGA infrastructure faces the risk that consumer demand for related services and their associated willingness-to-pay will be less than expected

[24] Annex 1 of the NGA Recommendation

[25] Footnote 40, page 28 of the Explanatory Note to the NGA Recommendation.

and, as a result, will not be sufficient to allow the investing operator to recoup its capital outlay.

2.26 When deciding on where to invest capital, investors will weigh up the risk of investment in NGA infrastructure against the likely returns of alternative investment strategies or portfolios. Given the particular degree of uncertainty around consumer demand and willingness-to-pay for next generation products, NGA deployment projects may only attract investment capital by offering investors an additional incentive/compensation compared with less risky alternative investment propositions.

2.27 However, demand uncertainty is not constant and as was seen from the evolution of first generation broadband deployments, tends to reduce over time as operators are able to observe consumer behaviour (from competitors or overseas) and gather information about the willingness of consumers to pay for new services and adopt new technologies. This uncertainty can encourage operators to delay investment by adopting the 'wait-and-see' approach and there may also be a value in doing so.

2.28 Demand uncertainty is perhaps the most prevalent risk in relation to investment in NGA infrastructure. This is because there is limited information available to investors regarding the appetite of consumers for high-speed broadband and the types of services that would be delivered over NGA networks.

2.29 Indeed, Eircom is attempting to gather further information on consumer demand by conducting its fibre network pilots in Wexford town and Sandyford, Co. Dublin. These pilots will go some way to informing its views on demand side risks.

Sunk investments and the cost of deployment

2.30 Large sunk-investments typically involve a capital outlay that, once incurred, cannot be recovered or deployed for alternative purposes. These costs are synonymous with network industries such as telecommunications.

2.31 The 'sunk' nature of the costs involved in deploying NGA infrastructure can increase the level of risk faced by investors. NGA infrastructure deployment involves a significant capital outlay, which is likely to be largely irrecoverable. The sunk costs involved in deploying these networks carry a degree of risk for investors.

2.32 Investors may, given the perceived risks, place a value on a 'wait and see' option and defer any investment until further clarity on the level and timing of any risks emerge.

Technological uncertainty

2.33 NGA investors may face the risk that future progress in technology will undermine the value of current investment. For example, as global demand for NGA infrastructure (such as optical distribution frames and splitters) increases over time, international technology vendors achieve economies of scale, which may in turn lead to cost savings being passed on to customers. The implication here is that there may be merit for an operator to adopt a wait and see approach – if competitive conditions permit. There also exists technological uncertainty around the future evolution of technologies, and around the choice of technology made by operators. First-mover technology adopters face the risk that their choice of technology will fail to become main-stream and evolve into a successful service-delivery platform.

2.34 This risk is often a factor in the electronic communications sector (particularly in the wireless domain), where technology is fast-moving and economies of scale play a significant factor. However, in this case Irish telecommunications providers who can be largely classed as technology takers will benefit from being relatively late adopters of NGA technology, and therefore have the benefit of observing technological developments and models used in other countries.

Uncertainty around competitive pressures

2.35 Potential investors face uncertainty around future competitors eroding their ability to recover a return on their capital outlay. Operators face this risk in respect of existing infrastructure/capital investment as well as for future NGA investment.

2.36 However, any network operator with an existing capital outlay faces this risk, regardless of whether or not they choose to invest in NGA infrastructure and upgrades. While capital investment in NGA infrastructure would increase an operator's exposure to risk (because it requires additional capital outlay), it also potentially improves that operator's ability to capture demand and compete with other networks, thereby reducing the actual risk itself.

2.37 While competitive pressure is likely to be present in some geographic areas of Ireland, the scope of this competitive threat is relatively predictable (compared to overall demand uncertainty). Ireland has a low population density, with 39% of the population living in rural areas with a population density of less than 60 people per square kilometre[26]. Given the relatively sparse population spread in Ireland, the replication of fixed NGA networks is unlikely outside medium to high density areas (at least in the short to medium term). The threat of competition from wireless technology is present, but ComReg's market analysis has indicated that such products are emerging as complementary technology rather than as substitutes for fixed access. Nevertheless, such wireless technologies may lead to a more cost effective and efficient deployment of higher speed broadband services in less densely populated areas.

Macro-economic uncertainty

2.38 There exist macro-economic uncertainties related to future growth of the economy and the resultant impact on the consumption of electronic communications (and other) services. Macro-economic conditions have a direct impact on future demand and willingness to pay for services, and therefore on the ability of an operator to recover a return on investment in NGA infrastructure.

2.39 The limited growth outlook and the resultant impact on consumer and business confidence in the Irish economy is likely to impact any demand side risks associated with the uptake of NGA services. Such risks are faced by all investors with respect to existing and future networks, and are captured within the cost of capital faced by firms within the industry. Any impact of the macro-economic uncertainty may fall to be considered as part of the future examination of the WACC.

[26] Source: World Development Indicators 2007.

Execution risk and projected deployment costs

2.40 Information available to operators about the costs of rolling out NGA networks has started to become clearer over time as rollouts have been undertaken in other countries. This information should provide a degree of certainty around the actual costs of deployment, the scale of the task, and help investors to foresee problems upon project execution. Improved knowledge of the operating costs post-deployment in turn reduces the execution risk. Therefore while investors may face uncertainty when projecting the total cost of deploying NGA networks, this risk lessens over time.

Regulatory risk

2.41 This form of risk exists when a lack of clarity or certainty about the intended or future regulatory approach in NGA leads to uncertainty around the level and timing of investment decisions. In particular, a regulated operator may face the risk that future access and price regulation might undermine its ability to recover an appropriate return on investment. Regulatory risk may act to discourage investment in new technology.

2.42 Regulatory risk cannot be completely eliminated due to the long useful life of the assets concerned and the timeframe over which a return-on-investment can be recouped. However, ComReg's approach to date has been to provide certainty that NGA provided by SMP operators will be regulated and through this preliminary and subsequent consultation process intends to establish the regulatory terms and conditions surrounding NGA in order to provide further clarity to the market.

2.43 It should also be recognised that the publication by the European Commission of its NGA Recommendation may help bring regulatory certainty by establishing the high level principles that may ultimately form the basis of the regulatory approach to be adopted by NRAs across the EU.

Q. 1. Do you consider that the risks identified above are those most closely relevant to investment in NGA? What might be the degree of impact of such risks, how might they change over time and how might they be quantified? Please explain your reasoning.

2.44 We return to the issue of risk in the context of the discussion of an appropriate price control remedy later in section 5.

3 Remedies for Next Generation Wholesale Physical Network Infrastructure Access

3.1 As noted in paragraphs 1.21 to 1.23 ComReg has completed its analysis of the WPNIA market and has designated Eircom as having Significant Market Power. While detailed remedies were imposed concerning wholesale products to be provided by Eircom over its copper network, insofar as its next generation fibre WPNIA products (NG WPNIA) are concerned, ComReg mainly set out the principles of remedies that would apply.

3.2 In this section ComReg considers the more detailed development of NG WPNIA remedies, taking the utmost account of the European Commission's NGA Recommendation (with WBA remedies dealt within Section 4). Before doing so it is worth noting the details of the wholesale unbundled access products that Eircom proposes to offer during its FTTx pilot.

Eircom's proposed NG WPNIA Products

3.3 As noted in paragraphs 1.33 to 1.36 Eircom has announced plans to commence a FTTH and FTTC pilot in Sandyford and Wexford exchanges. This pilot may ultimately form part of Eircom's long term plan to upgrade its access network across Ireland. In doing so Eircom has opted for a particular network topology and technology which may or may not be that which is ultimately deployed as apart of a broader development of its access network. The nature of this network topology /technology can impact the nature of wholesale access that could be offered.

3.4 The precise nature and the design of the NG WPNIA wholesale products to be offered by Eircom has not been finalised as of yet, but as of today the proposed product offerings under consideration are generally described below. Further details of these products and their proposed pricing can be found on www.eircomwholesale.ie.

Wholesale Unbundled NGA Products

3.5 Eircom's NGA FTTH, FTTC unbundled portfolio comprises a number of products. We have not sought to comment in detail on specific product aspects. Rather, the focus is on the network architecture. At the time of writing, these products are at a pre-pilot phase and Eircom have stated that the pilot may give rise to issues from which may lead to product amendments. ComReg understands that the issues likely to arise during the pilot will, in general, relate to operational aspects of service delivery and assurance and the nature of the service offering etc. However, ComReg understands that the topology and wholesale products are the outcome of an analysis and design process undertaken by Eircom and are therefore representative of Eircom's current thinking on Next Generation Access. The relationship between the terminology[27] used in the European Commission's NGA Recommendation and the architecture that Eircom intend to deploy as part of its NGA pilot are generally explained below. This does not necessarily represent ComReg's definitive view on these matters but is merely presented as an aid to discussion in the paper.

[27] See paragraph 11 of the NGA Recommendation for definitions.

Wholesale Unbundled FTTH High-Level Architecture Description

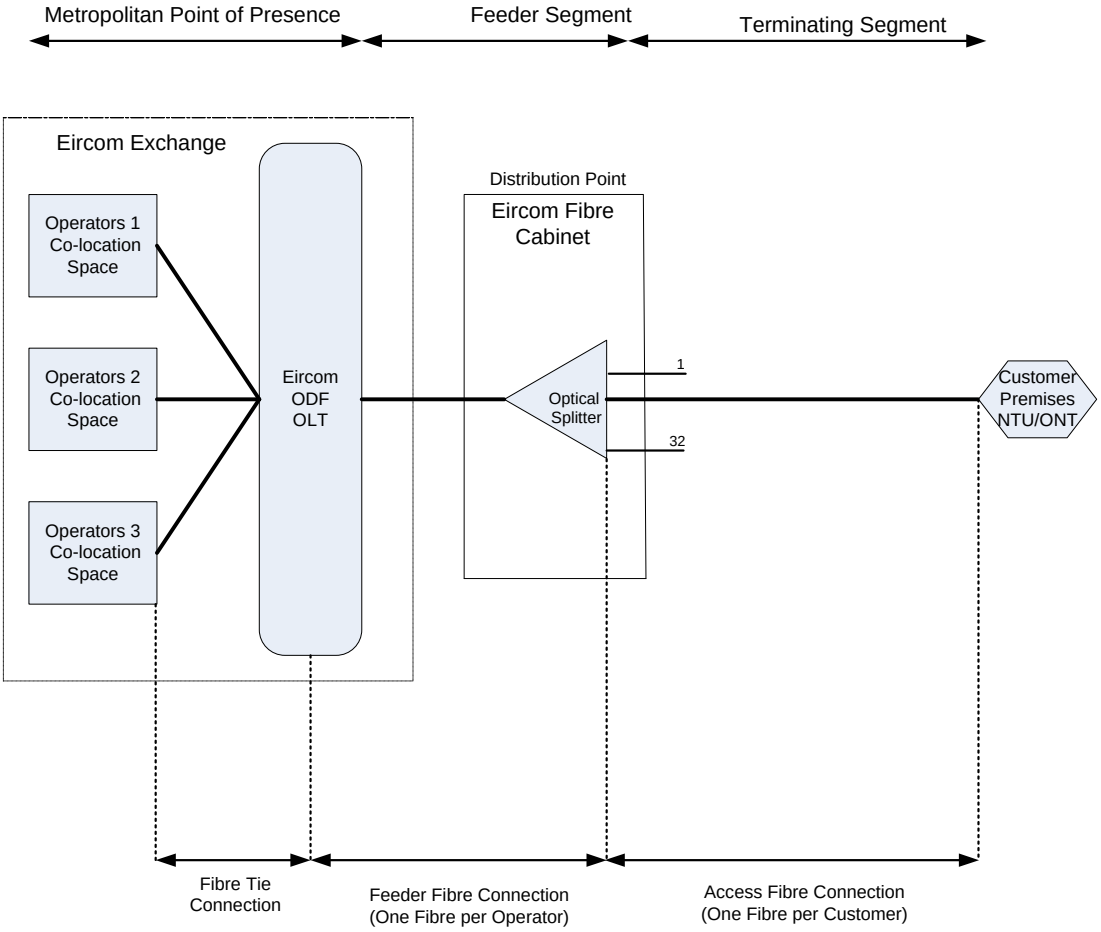


Figure 3: Eircom's Unbundled FTTH Architecture Overview

3.6 The FTTH pilot network architecture outlined in Figure 3 above is based on a point-to-multipoint GPON architecture that connects a retail customer's Network Termination Unit (NTU) to the unbundling operator's Optical Line Terminal (OLT) equipment co-located in the eircom exchange (MPoP) via the Optical Distribution Frame (ODF) and a fibre cabinet. Each unbundling operator's equipment is linked to the ODF with a fibre tie which in turn is linked to the fibre cabinet (the distribution point) with a feeder fibre. The fibre cabinet contains several 1:32 optical splitters, with each unbundling operator having access to one or more dedicated splitters. The NTU in the customer's premises is connected to a patch panel in the fibre cabinet. The NGA fully unbundled local loop is completed when the fibre from the NTU in the customer's premises is cross patched/jumpered to the operator's optical splitter in the cabinet.

Unbundled FTTC High-level Architecture Description

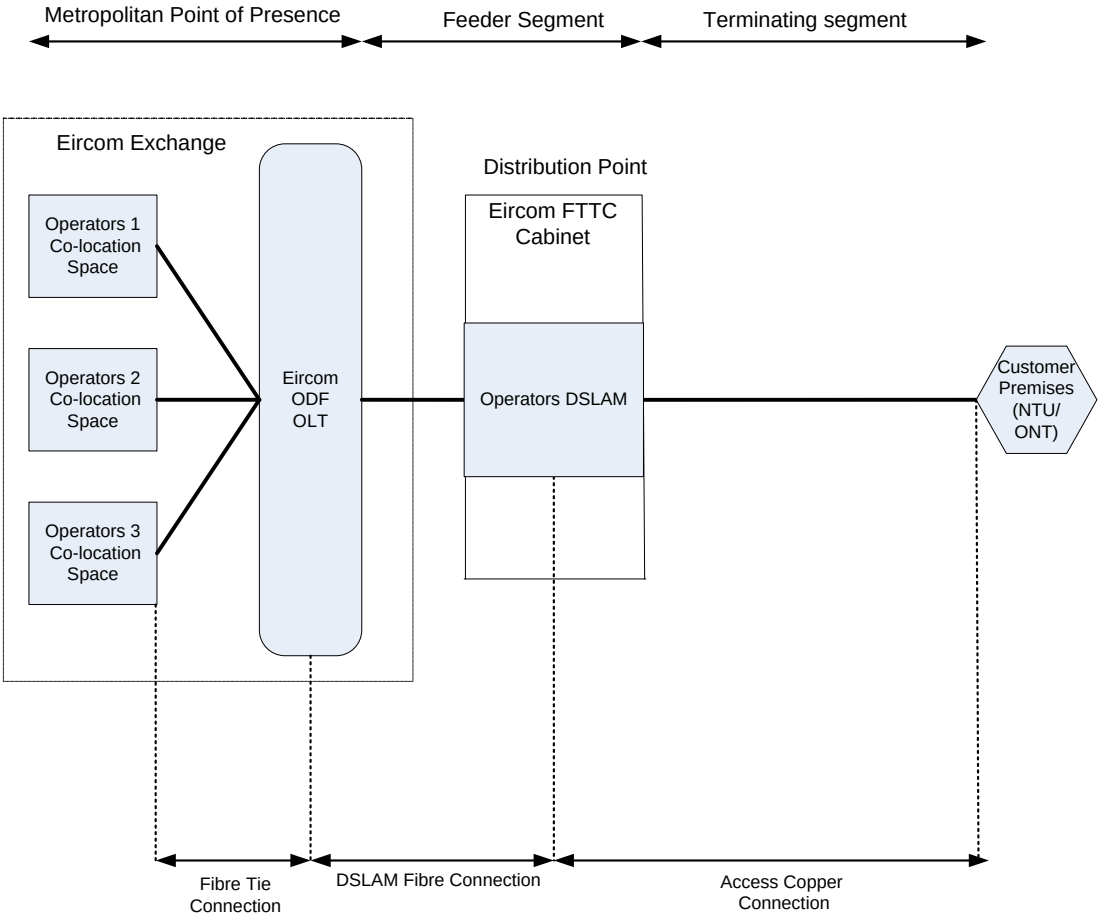


Figure 4: Eircom's Unbundled FTTC Architecture Overview

3.7 The FTTC trial network architecture outlined in Figure 4 above is based on a hybrid fibre/copper access product. The unbundling operator's equipment co-located in the exchange (MPoP) is connected, by fibre, to the unbundling operator's DSLAM equipment in a kerbside FTTC cabinet (also the distribution point). A copper pair connects customer's NTU to the distribution frame located within FTTC cabinet. After the fibre connection from the exchange to the cabinet (feeder segment) is complete the DSL service is ready for enablement when the local access copper pair is jumpered to the copper frame in the street cabinet.

Q. 2.	**Do you consider that, in the context of the terminology set out in the NGA Recommendation, the above Figures 3 and 4 provide an accurate representation of Eircom's proposed network architecture? Please explain your reasoning.**
Q. 3.	**Do any of Eircom's proposed pilot wholesale products align to the potential access remedies set out in NGA Recommendation? Please explain your reasoning? This question should be addressed in light of the following discussion on WPNIA NGA and WBA NGA.**

Next Generation WPNIA Remedies

3.8 The European Commission's NGA Recommendation specifies the range of wholesale physical access products that can be made available through the imposition of remedies in the WPNIA market. Such NG WPNIA remedies include access to ducts, terminating segments, sub-loops, and the fibre loop. The NGA Recommendation also specifies the approach to be adopted with respect to the application of non-discrimination, pricing, transparency and other obligations.

3.9 This development of NG WPNIA remedies in an Irish context is discussed below having regard to the European Commission's NGA Recommendation.

Civil engineering infrastructure of the SMP Operator

Access Remedies

3.10 The NGA Recommendation notes that access to civil engineering infrastructure is crucial for the deployment of parallel fibre networks. Access to civil engineering infrastructure represents the highest rung on the ladder of investment representing the deepest level of infrastructure competition available through wholesale access. An operator which avails of access to the SMP operator's civil engineering infrastructure for the purpose of competing in downstream (retail) broadband (or other) markets would first need to make significant upfront investment in the development of its own infrastructure.

3.11 Civil Engineering Infrastructure is defined[28] in the NGA Recommendation as follows:

> *"…physical local loop facilities deployed by an electronic communications operator to host local loop cables such as copper wires, optical fibre and co-axial cables. It typically refers, but is not limited to, subterranean or above-ground assets such as sub-ducts, ducts, manholes and poles."*

3.12 The NGA Recommendation essentially states that where access to duct capacity is available, access to civil engineering infrastructure should be mandated.

> *"Where duct capacity is available, NRAs should mandate access to civil engineering infrastructure. Access should be provided in accordance with the principle of equivalence as set out in Annex II."*[29]

3.13 This implies that where duct capacity is available, or could become available (for example, by means of cable recovery), then ComReg should mandate that access to civil engineering infrastructure such that duct capacity can be provided to third party access seekers.

3.14 Furthermore, the NGA Recommendation also states[30] that NRAs should, in accordance with market demand, encourage the SMP operator, when building its civil engineering infrastructure, to install sufficient capacity for other operators to make use of these facilities. This is with a view to allowing alternative operators

[28] Paragraph 11 of the NGA Recommendation.

[29] Paragraph 11 of the NGA Recommendation.

[30] Paragraph 16 of the NGA Recommendation.

the possibility of deploying their fibre networks at the same time as Eircom and, in doing so, sharing the costs of civil engineering works.

3.15 It is unclear at this point in time whether demand for access to civil engineering infrastructure, including duct access exists in Ireland, or is likely to exist in the medium to long term. However, the NGA Recommendation suggests that duct access should be made available where capacity exists. Establishing a general remedy to provide such access could ultimately enable access seekers to understand whether they would demand access to civil engineering infrastructure, having regard to their overall business case.

3.16 Having regard to the above and, the WPNIA products proposed by Eircom as part of its pilot (discussed in paragraphs 3.5 to 3.7) please consider the questions below.

Q. 4. Are there any circumstances in which regulated access to civil engineering infrastructure would not be required? Please explain your reasoning.

Q. 5. Having regard to market demand, technical, economic and other considerations, is there a requirement for a duct access remedy? Please explain your reasoning.

Q. 6. What are the most relevant factors identified in Article 12(2) of the Access Directive (and set out at paragraph 1.25 of this paper) when assessing proportionality considerations with respect to any remedy governing access to civil engineering infrastructure?

Q. 7. Should ComReg encourage Eircom to build additional duct capacity for use by third parties and, if so, how? Please explain your reasoning.

Non-discrimination and Transparency Remedies

3.17 The NGA Recommendation states that access to civil engineering infrastructure will only be effective if the SMP operator provides equivalent access to that provided to its own downstream arm and to third-party access seekers. To this end, Annex II of the NGA Recommendation clearly specifies the equivalence principles which are to be applied regarding access to the civil engineering infrastructure of the SMP operator. The main aspects set out in these equivalence principles include:

- the need for the SMP operator to provide third-party access seekers with the same level of information on its civil engineering infrastructure and distribution points as is available internally. Details regarding the level of information and the manner within which it is to be provided are specified.
- provisions governing the efficient ordering and provisioning of access, in particular, the requirement to provide third-party access seekers with end-to-end ordering, provisioning and fault management systems equivalent to those provided to internal access seekers (i.e. that supplied to itself). Also of note is the need for the SMP operators to have measures in place aimed at de-cluttering currently used ducts.
- the requirement for service level indicators and associated targets to transparently demonstrate that access to civil engineering infrastructure is provided by the SMP operator on an equivalent basis.

- the requirement to publish a reference offer within six months of receipt of a request for such from an access seeker. Details regarding the level of information to be contained in the reference offer and the manner within which it is to be provided are specified. Internal access provision by the SMP operator should be based on the same terms and conditions as contained in the reference offer provided to third-party access seekers.
- safeguards to protect the SMP operator's knowledge of third-party access seekers' deployment plans and the use of such information.

3.18 Insofar as access to civil engineering infrastructure and distribution points are concerned, the above principles suggest a very strict level of equivalence is to be applied such that Eircom's provision of such to access seekers would largely be carried out in at least the same way as it supplies such access to itself.

Q. 8. If a remedy requiring the provision of access to civil engineering infrastructure were to be appropriate, are measures to implement each of the principles set out in Annex II of the NGA Recommendation necessary and, if so, how might each be appropriately stated and implemented? Would a risk premium be warranted? Please provide a reasoned response for each of the principles.

Pricing Remedies

3.19 A price control remedy has already been imposed following the conduct of ComReg's analysis of the WPNIA market which culminated in the publication of the WPNIA Decision Document in May 2010.

3.20 In this section we consider what form this price control obligation for access to civil engineering infrastructure should take. While this section is concerned specifically with access to civil engineering infrastructure, the principles discussed below apply to all forms of access. Although the points are not repeated in other sections (to avoid repetition), respondents may wish to address them in those questions.

3.21 The NGA Recommendations states that NRAs should ensure that access to civil engineering infrastructure is provided at cost-oriented prices in accordance with the principles specified Annex I, part 2. These principles specify that NRAs should

- regulate access prices to civil engineering infrastructure consistently with the methodology used for pricing access to the unbundled local copper loop.
- ensure that access prices reflect the costs effectively borne by the SMP operator and should, in particular, take into account actual lifetimes of the relevant infrastructure and possible deployment economies of the SMP operator.
- when setting the price for access to civil engineering infrastructure, should not consider the risk profile to be different from that of copper infrastructure, except where the SMP operator had to incur specific civil engineering costs — beyond the normal maintenance costs — to deploy an NGA network.

3.22 It is also worth noting that cost-oriented prices imply a reasonable return on capital employed. When investments in non-replicable physical assets such as civil engineering infrastructure are not specific to the deployment of NGA networks

(and do not entail a similar level of systematic risk), their risk profile, according to the NGA Recommendation, should not be considered to be different from that of existing copper infrastructure.

3.23 In general Eircom's dominance in the Market for WPNIA and Wholesale Broadband Access (currently under review) suggests that excessive pricing in these markets may be a problem. However as against that one might take the view that the commercial realities of NGA roll out, the lack of clarity in relation to consumer demand and the national interest in encouraging such investment may lead one to use a price control other than strict cost orientation.

3.24 One possibility might be to apply either a retail minus price control, as has been used in the Wholesale Broadband Access market for a number of years or, alternatively, rely on margin squeeze tests. This may be a suitable remedy in particular in the case of Wholesale Broadband Access services where it may be easier to determine a direct relationship between retail and wholesale products. It does not, on the other hand, seem feasible to construct a retail wholesale split - on which a retail minus control depends – in the case of passive wholesale services such as duct access. This is because duct access will not be sold at the retail level. On the other hand it may be possible to construct a margin squeeze test which could possibly determine a ceiling for wholesale prices. However, this is also likely to be a complex exercise.

3.25 Another possibility is to allow operators to negotiate access rates with the incumbent – possibly by providing a window for this to happen before formal regulatory intervention. The difficulty here is this takes no account of the existence of market power. Also providing a window before regulatory intervention may simply create a regulatory overhang which would serve only to delay and create uncertainty.

3.26 Finally, there is the option of cost orientation, possibly modified, as the NGA Recommendation suggests, by allowing for a premium to offset any specific and quantifiable risk associated with certain NGA fibre based investments.

3.27 A second general question is whether regulated price minima are required. This might arise, for example, in the relative pricing of wholesale broadband access services compared to the price of unbundled or passive access services.

3.28 Consideration must also be given as to whether margin tests between retail and wholesale services, in the first instance, and between different types of wholesale access are, or will be, required.

3.29 These issues are addressed in detail in Section 5. This section asks what type of price control may be appropriate for access to civil engineering infrastructure.

3.30 The NGA Recommendation suggests that NRAs have little discretion regarding the pricing methodology to be adopted for pricing access to existing civil engineering infrastructure, namely that a cost oriented approach would apply.

3.31 Section 2 of this paper has already outlined some of the factors which potentially affect the NGA investment risk profile. The NGA Recommendation is clear that when investment in non-replicable physical assets such as civil engineering infrastructure is not specific to the deployment of NGA networks (and does not entail a similar level of systematic risk), the risk profile should be synonymous with that of existing copper infrastructure. For example, the risk profile associated

with existing trenches or ducts used in rolling out an NGA network is not likely to have a materially different risk profile given the related costs are already sunk.

3.32 However, the NGA Recommendation also recognises that in some cases the risk profile may differ where investments are made into civil engineering infrastructure that is specifically associated with NGA networks. In this case, the European Commission indicates that the additional risk associated with such investments could be factored into the access price.

3.33 There are a number of ways in which the price of access to NGA civil engineering infrastructure could be determined. For example, ComReg might consider the following options:

- Allowing a period of time for commercial negotiation of NGA wholesale access to take place (in the first instance)
- Applying a cost-oriented benchmark based on the determinations of other European NRAs
- Using some form of cost model and applying a risk-premium where it is warranted

Q. 9. What form of price control would be the most appropriate and proportionate means of establishing the price of access to civil engineering infrastructure? E.g. cost model (cost plus or retail minus), cost-oriented benchmark, or allowing for commercial negotiation. Please explain your reasoning.

3.34 We return to a more detailed discussion on the detailed methodology for an appropriate price control remedy, particularly in the presence of specific and quantifiable risk (for a range of wholesale access products) in section 5 of this paper.

Access to the terminating segment in case of FTTH

Access Remedies

3.35 Access to the terminating segment of a FTTH network (typically between the end-user premises and the nearest distribution point) represents the next rung on the ladder of investment.

3.36 The terminating segment is defined[31] in the NGA Recommendation as follows:

> *"….the segment of an NGA access network which connects an end-user's premises to the first distribution point. The terminating segment thus includes vertical in-building wiring and possibly horizontal wiring up to an optical splitter located in a building's basement or a nearby manhole."*

3.37 Alternative operators availing of access to the terminating segment will need to interconnect at a distribution point in the fibre access network, and install equipment at the end-user premises. As noted in paragraph 3.7 Eircom are proposing to provide unbundled access from the cabinet in a FTTC scenario during its pilot.

[31] Paragraph 11 of the NGA Recommendation.

3.38 Generally speaking, although the costs associated with such access are substantial, they are typically less than those faced by operators who have chosen to avail of access to civil engineering infrastructure, particularly given potential costs associated with the self-provision of a terminating segment (or sub-loop) are avoided. In this regard, the NGA Recommendation recognises that in a FTTH scenario the duplication of the terminating segment will normally be costly and inefficient. To allow for sustainable infrastructure competition, it states that it is therefore necessary that access is provided to the terminating segment of the fibre infrastructure deployed by the SMP operator. Furthermore, to ensure efficient entry, it is important that access is granted at a level in the network of the SMP operator which enables entrants to achieve the minimum efficient scale necessary to support effective and sustainable competition. To address this bottleneck, the NGA Recommendation states[32] that:

> *"Where an SMP operator deploys FTTH, NRAs should, in addition to mandating access to civil engineering infrastructure, mandate access to the terminating segment of the access network of the SMP operator, including wiring inside buildings. For this purpose, NRAs should oblige the SMP operator to provide detailed information on its access network architecture and, following consultation with potential access seekers on viable access points, determine where the distribution point of the terminating segment of the access network should be for the purpose of mandating access, in accordance with Article 12(1) of Directive 2002/19/EC."*

3.39 The clear view expressed in the NGA Recommendation suggests that access to the terminating segment (including internal wiring) of Eircom's FTTH network should be mandated as a remedy. Furthermore, it suggests that ComReg should, following consultation, determine where an appropriate distribution point should be in accordance with Article 12(1)[33] of the Access Directive[34] and, in doing so ComReg should take into account the fact that any distribution point will need to host a sufficient number of end-user connections to be commercially viable for the access seeker.

3.40 The NGA Recommendation also indicates that the selection of an appropriate distribution points for wholesale access to terminating segments should be determined in a manner that accounts for both technical and commercial factors. For example, a particular distribution point may be technically convenient from the

[32] Paragraph 18 of the NGA Recommendation.

[33] As noted in paragraph 1.25, Article 12(1) of the Access Directive essentially provides that amongst to be considered by ComReg in requiring that access to the terminating segment is provided include, *inter alia*, the technical and economic viability of using or installing competing facilities, in the light of the rate of market development, taking into account the nature and type of interconnection and/or access involved, including the viability of other upstream access products such as access to ducts; the feasibility of providing the access proposed, in relation to the capacity available; the initial investment by the facility owner, taking account of any public investment made and the risks involved in making the investment; the need to safeguard competition in the long term, with particular attention to economically efficient infrastructure-based competition.

[34] Directive 2002/19/EC of the European Parliament and of the Council of 7 March 2002 on on access to, and interconnection of, electronic communications networks and associated facilities as amended by Directive 2009/140/EC ('Access Directive').

SMP operator's point of view, but may not be commercially viable for third party access seekers (or vice versa).

3.41 The NGA Recommendation also notes that multiple fibre lines could be deployed in the terminating segments at a marginally higher cost than a single-fibre network and that

> *"NRAs should, in accordance with market demand, encourage, or, where legally possible under national law, oblige the SMP operator to deploy multiple fibre lines in the terminating segment."*

3.42 Having regard to the above and, the WPNIA products proposed by Eircom as part of its pilot (discussed in paragraphs 3.5to 3.7) please consider the questions below.

Q. 10. **Having regard to market demand, technical, economic and other considerations, is there a requirement for a remedy mandating access to the terminating segment? How might this be achieved in light of Eircom's proposed or alternative network architectures? Please explain your reasoning.**

Q. 11. **What are the most relevant factors identified in Article 12(2) of the Access Directive (and set out at paragraph 1.25 of this paper) when assessing proportionality considerations with respect to any remedy governing access to the terminating segment?**

Q. 12. **Where is an appropriate distribution point to which access to the terminating segment should be provided, particularly given the need to ensure that it host a sufficient number of end-user connections to be commercially viable for an access seeker.**

Q. 13. **Should ComReg seek to encourage Eircom to deploy multiple-fibre lines in terminating segments and, if so, how? Please explain your reasoning.**

Non-discrimination and Transparency Remedies

3.43 The NGA Recommendation states[35] that transparency and non-discrimination obligations are required to ensure the effectiveness of access to the terminating segment and, where so requested, the publication by the SMP operator of an adequate reference offer within 6 months is necessary in order to allow access seekers to make investment choices. It further stipulates that the SMP operator should be obliged to provide access to distribution points in accordance with the principles set out in Annex II of the NGA Recommendation. These principles were discussed in the previous section at paragraph 3.17.

Q. 14. **If a remedy requiring the provision of access to the terminating segment were to be appropriate, are measures to implement each of the principles set out in Annex II of the NGA Recommendation necessary and, if so, how might each be appropriately stated and implemented? Please provide a reasoned response for each of the principles?**

[35] See Recital 17 and paragraph 14 of the NGA Recommendation.

Pricing Remedy

3.44 As noted in paragraph 3.19, a price control obligation has already been imposed in the WPNIA market. In this section we consider what type of price control obligation is appropriate for access to the terminating segment.

3.45 As noted in paragraphs 3.24 to 3.26, there are various ways in which the price of access to the terminating segment could be determined. The NGA Recommendation states that a cost oriented wholesale price should be established for access to the terminating segment in accordance with the principles set out in Annex I. It states that this should be consistent with the methodology used for pricing of access to the unbundled local copper loop and that NRAs should ensure that access prices reflect the costs effectively borne by the SMP. However, in this case the NGA Recommendation states that NRAs should account for the additional quantifiable risk associated with NGA investments, and to adjust the access price accordingly.

3.46 It also suggests that the pricing of termination segments should also uphold the necessary incentives for third party operators to invest further in their own NGA infrastructure (to ascend the ladder of investment).

Q. 15. What form of price control would be the most appropriate and proportionate means of establishing the price of access to the terminating segment? e.g. cost model (cost plus or retail minus), cost-oriented benchmark, or allowing for commercial negotiation. Please explain your reasoning.

3.47 We return to a more detailed discussion on the detailed methodology for an appropriate price control remedy, particularly in the presence of specific and quantifiable risk (for a range of wholesale access products) in section 5 of this paper.

Unbundled access to the fibre loop

3.48 The unbundled fibre loop essentially represents the link between a metropolitan point of presence (MPoP[36]) and the end-user's premises. It includes access to the fibre terminating segment, as well as to the fibre link between the distribution point and the MPoP.

Access Remedies

3.49 The NGA Recommendation states[37] that, in accordance with the principles provided for in the Access Directive:

> *"….where the SMP operator deploys FTTH, NRAs should in principle mandate unbundled access to the fibre loop. Any exception could be justified only in geographic areas where the presence of several*

[36] The NGA Recommendation defines the MPoP as "….the point of inter-connection between the access and core networks of an NGA operator. It is equivalent to the Main Distribution Frame (MDF) in the case of the copper access network. All NGA subscribers' connections in a given area (usually a town or part of a town) are centralised to the MPoP on an Optical Distribution Frame (ODF). From the ODF, NGA loops are connected to the core network equipment of the NGA operator or of other operators, possibly via intermediate backhaul links where equipment is not co-located in the MPoP."

[37] Paragraph 22 of the NGA Recommendation

> *alternative infrastructures, such as FTTH networks and/or cable, in combination with competitive access offers is likely to result in effective competition on the downstream level."*
>
> And
>
> *"…Obligations imposed under Article 16 of Directive 2002/21/EC are based on the nature of the problem identified, without regard to the technology or the architecture implemented by an SMP operator. Therefore the fact of whether an SMP operator deploys a point-to-multipoint or point-to-point network topology should not as such affect the choice of remedies, keeping in mind the availability of new unbundling technologies to deal with potential technical problems in this respect. NRAs should be able to adopt measures for a transitional period mandating alternative access products which offer the nearest equivalent constituting a substitute to physical unbundling, provided that these are accompanied by the most appropriate safeguards to ensure equivalence of access and effective competition (1). In any event, NRAs should in such cases mandate physical unbundling as soon as technically and commercially feasible."*

3.50 As noted in paragraph 1.21, ComReg has already defined a national WPNIA market and has found Eircom to have SMP. The NGA Recommendation implies that Eircom should, therefore, be obliged to provide unbundled access to the fibre loop. The NGA Recommendation also states[38] that an obligation to provide access to the unbundled loop should also be accompanied by remedies providing access to associated facilities such as co-location and backhaul, since these facilities enable the effective use of the unbundled fibre loop by alternative operators. Access should also be given at the most appropriate point in the network, which is normally the metropolitan point of presence (MPoP).

3.51 The NGA Recommendation implies that the MPoP (or local exchange) would normally be the most appropriate point in the network for gaining access to the fibre loop, whilst not necessarily restricting this to be the only access point.

3.52 The European Commission also recommends that NRAs should mandate unbundled access to the fibre loop irrespective of the network architecture and technology implemented by the SMP operator. If the chosen network architecture or technology restricts the choice of remedies (i.e. access points), the NGA Recommendation states that NRA may mandate alternative access products which offer the nearest equivalent constituting a substitute.

3.53 This latter principle was emphasised by the European Commission recently in their comments on the German NRA's (BNetzA) notification of its analysis of the WPNIA market, in particular, concerning BNetzA's specification of a remedy for 'access to the unbundled fibre loop':[39]

> *"…an access obligation which is entirely dependent on the network design chosen by the dominant operator could run the risk of*

[38] Ibid.

[39] European Commission letter concerning case DE/2011/1177, SG-Greffe (2011) D/2850, letter to BNetzA, Germany, 24 February 2011. See part III.

encouraging the incumbent to make architectural choices with a view of possible regulatory consequences. In this regard the Commission underlines that the obligations should be imposed in a technology-neutral way, without regard to a specific technology or architecture implemented by the incumbent operator."

Q. 16. Having regard to market demand, technical, economic and other considerations, is there a requirement for a remedy mandating access to the unbundled fibre loop? How might this be achieved in light of Eircom's proposed or alternative network architectures? Please explain your reasoning.

Q. 17. Are obligations to provide access to associated facilities necessary and, if so, what should these encompass? Please explain your reasoning.

Q. 18. What are the most relevant factors identified in Article 12(2) of the Access Directive (and set out at paragraph 1.25 of this paper) when assessing proportionality considerations with respect to any remedy governing access to the unbundled fibre loop and associated facilities?

Q. 19. What do you consider to be an appropriate point in Eircom's network for the provision of unbundled access to the fibre loop in a FTTH scenario? Please explain your reasoning, including views on associated technical and commercial considerations.

Q. 20. If it is not possible for commercial or technical reasons to provide for unbundled access at this time, what factors might change this over time? What measures should ComReg take on a transitional basis to provide for the nearest equivalent alternative constituting a substitute to physical unbundling and what other safeguards might be necessary?

Non-discrimination and Transparency Remedies

3.54 The European Commission recommends that the existing LLU reference offer should be updated to include unbundled access to the fibre loop and be complemented as soon as possible. It also emphasises the importance of the timeliness in the publication of a reference offer for unbundled access by the SMP operator and the minimum subject areas to be covered within it. Specifically, the European Commission notes[40] that:

"The existing LLU reference offer should be complemented as soon as possible to include unbundled access to the fibre loop. Directive 2002/19/EC Annex II sets a minimum list of conditions that must be part of the reference offer for LLU, and which should apply mutatis mutandis to unbundled access to the fibre loop. The reference offer should be in place as soon as possible and in any case not later than 6 months after an NRA has imposed the obligation to grant access."

[40] Paragraph 24 of the NGA Recommendation.

3.55 The NGA Recommendation therefore suggests that Eircom should be obliged to prepare an updated reference offer for access to the unbundled fibre loop within six months of the remedy being established and that it must at least contain the minimum conditions[41] specified in Annex II of the Access Directive.

3.56 According to Annex I of the NGA Recommendation, under the principle of non-discrimination, the price charged to the SMP operator's downstream arm should be the same as the price charged to third parties.

3.57 Other non-discrimination obligations relating to access to the unbundled fibre loop are not discussed in any great detail, however, non-discrimination obligations covered by Article 10 of the Access Directive can also be imposed.

Q. 21. Is a remedy requiring the development and publication of a reference offer for the provision of access to the unbundled fibre loop and associated facilities necessary and what specific issues should be detailed within it? Please explain your reasoning.

Q. 22. What arrangements should be put in place for the publication of a reference offer and how should it be kept updated in light of ongoing developments? Please explain your reasoning.

Q. 23. What specific non-discrimination remedies are required with respect to the provision of access to the unbundled fibre loop and associated facilities? Please explain your reasoning.

Pricing Remedy

3.58 As noted in paragraph 3.19, a price control obligation has already been imposed in the WPNIA market. In this section we consider what type of price control obligation is appropriate for access to the unbundled fibre loop.

3.59 As noted in paragraphs 3.24 to 3.26, there are various ways in which the price of access to the unbundled fibre loop could be determined. The European Commission's NGA Recommendation states[42] that:

> *"The price of access to the unbundled fibre loop should be cost-oriented. NRAs should duly take into account additional and quantifiable investment risk incurred by the SMP operator when setting the price of access to the unbundled fibre loop. In principle, this risk should be reflected in a premium included in the cost of capital for the relevant investment as set out in Annex I."*

3.60 Overall, this suggests that some form of cost orientation obligation should be imposed.

3.61 According to paragraph 26 of the NGA Recommendation NRAs are also required to assess pricing schemes proposed by the SMP operator that attempt to diversify the risk of investment. NRAs should only agree to such schemes where all relevant information related to the investment has been provided and only if such schemes do not have discriminatory or exclusionary effect. The Recommendation notes that:

[41] Such conditions include supply (including financial) conditions and provisions governing co-location services, access to information systems

[42] Paragraph 26 of the NGA Recommendation.

> *"The deployment of FTTH will normally entail considerable risks, given its high deployment costs per household and the currently still limited number of retail services requiring enhanced characteristics (such as higher throughput) which can only be delivered via fibre. Investments into fibre depend for their amortisation on the take-up of new services provided over NGA networks in the short and medium terms. The costs of capital of the SMP operator for the purpose of setting access prices should reflect the higher risk of investment relative to investment into current networks based on copper."*

3.62 Separately the NGA Recommendation also states:

> *"Cost-oriented prices imply a reasonable return on capital employed. When investments in non-replicable physical assets such as civil engineering infrastructure are not specific to the deployment of NGA networks (and do not entail a similar level of systematic risk), their risk profile should not be considered to be different from that of existing copper infrastructure."*

3.63 This raises the question as to whether a risk premium should be applied to FTTH investments and if so to what elements of the roll out. For example the Recommendation appears to envisage that only specifically fibre related investments would attract a risk premium. However, this raises the question as to whether certain expenditures (for example duct remediation for the purposes of allowing fibre pull through) should also attract a premium.

3.64 As noted previously, ComReg reviewed the WPNIA market in 2010 and defined a national WPNIA market based on the competitive conditions that were present at the time. Based on information currently available to ComReg, there do not appear to be strong signals in the Irish market at present that NGA co-investment opportunities may arise. However, ComReg remains open to any such developments and ComReg will review the position should matters change.

3.65 The NGA Recommendation also makes certain observation in relation volume discounts, up front commitments and margin squeeze. We return to a more detailed discussion on these issues and a detailed methodology for an appropriate price control remedy, particularly in the presence of specific and quantifiable risk (for a range of wholesale access products) in section 5 of this paper.

Q. 24. What form of price control would be the most appropriate and proportionate means of establishing the price of unbundled access to the fibre loop? e.g. cost model (cost plus or retail minus), cost-oriented benchmark, or allowing for commercial negotiation. Please explain your reasoning.

Q. 25. Should any cost oriented price for FTTH based services attract a risk premium in principle? If so, to what types of network assets/investments should any premium apply and why?

Multiple Fibre Lines

3.66 The Recommendation also notes that:[43]

[43] Paragraph 28 of the NGA Recommendation.

> *"Where the conditions of competition in the area covered by the joint deployment of FTTH networks based on multiple fibre lines by several co-investors are substantially different, i.e. such as to justify the definition of a separate geographic market, NRAs should examine, in the course of their market analysis, whether, in the light of the level of infrastructure competition resulting from the co- investment, a finding of SMP is warranted with regard to that market. In this context, NRAs should in particular examine whether each co-investor enjoys strictly equivalent and cost-oriented access to the joint infrastructure and whether the co-investors are effectively competing on the downstream market. They should also examine whether the co-investors install sufficient duct capacity for third parties to use and grant cost-oriented access to such capacity."*

3.67 ComReg notes that any multiple fibre deployment that significantly alters the competitive landscape within a given geographic area would trigger a review of the relevant markets.

3.68 Furthermore the European Commission's Explanatory Note to the NGA Recommendation notes:

> *"…This is not to say that NRAs cannot gradate remedies so as not to truncate unreasonably the returns on incumbent investment. For instance, if the presence of cable (or even mobile platforms) were to engender strong competitive pressures and sufficient consumer choice, access to the unbundled fibre loop might render the continued imposition of bitstream access on market 5 unnecessary. Similarly, if competitive pressures from sizable alternative undertakings were found to be very strong in certain geographic segments of a market, the least-intrusive remedy of duct access might suffice to ensure a level-playing field and drive infrastructure-based competition."*

Q. 26. What types of co-investment arrangements might warrant a separate regulatory treatment in terms of remedies. Please address in your answer the types of commercial relationships and the type of control over physical infrastructure by multiple operators that you think would be necessary for ComReg to consider this option. If possible, please state if you think such an outcome is feasible or desirable.

Q. 27. Do you have any views as to how ComReg should view the evolution of the market for NGA services particularly in the presence of a rival cable network and its impact in supporting effective competition in downstream markets? How should remedies and regulation generally evolve over time and what criteria should ComReg apply to such decisions?

Obligations in the case of FTTN

3.69 As noted in paragraph 1.11 in some cases the SMP operator may opt to adopt a FTTC/FTTN network topology which involves the deployment of optical fibre from the local exchange/MPoP (or equivalent) to a distribution point (usually a street cabinet or other point closer to the customer) located close to the end-user's premises/home, with the remainder of the connection made up of copper

infrastructure (or cable). Eircom is deploying a FTTC network as part of its pilot. Alternative operators may seek unbundled access to the access path between the MPoP and the end-user's premises and, in doing so would typically co-locate their own active equipment in the local node or street cabinet. The unbundled path would include the copper terminating segment, as well as to the fibre backhaul link between the street cabinet and the operator's equipment at the MPoP.

Access Remedies

3.70 The NGA Recommendation states[44] that:

> *"NRAs should impose an obligation of unbundled access to the copper sub-loop. A copper sub-loop unbundling remedy should be supplemented by backhaul measures, including fibre and Ethernet backhaul where appropriate, and by ancillary remedies ensuring its effectiveness and viability, such as non-discriminatory access to facilities for co-location, or in their absence, equivalent co-location. The reference offer should be in place as soon as possible and in any case not later than 6 months after an NRA has imposed the obligation to grant access."*

3.71 ComReg has, through its WPNIA Decision Document already required Eircom to provide unbundled access to the copper sub-loop (supplemented by associated remedies including backhaul and co-location). However, this obligation relates to its existing current generation copper access network. Eircom has published a reference offer[45] for this wholesale sub-loop unbundling product, but to date no operator has availed of it. There may be potential demand for unbundled access to the copper sub loop in a FTTN scenario.

3.72 The NGA Recommendation suggests that ComReg should require Eircom provide access to its copper sub-loop in a FTTN scenario and that this remedy should be supported by the availability of appropriate backhaul. Of note in this regard is the following:

> *"NRAs should assess the costs of sub-loop unbundling. NRAs should, where appropriate, organise a prior consultation of alternative operators potentially interested in sharing street cabinets, and on this basis determine where street cabinets should be adapted and how costs should be allocated.*
>
> *When imposing sub-loop unbundling remedies, NRAs should adopt appropriate backhaul measures to make such remedies effective. Access seekers should be able to select the solution best fitting their requirements, whether dark fibre (and where relevant copper), Ethernet backhaul or duct access. NRAs could, where necessary, take measures pertaining to the adequate size of the street cabinets owned by the SMP operator."*[46]

[44] Paragraph 29 of the NGA Recommendation.

[45] http://www.eircomwholesale.ie/Reference-Offers/ARO/ (See Annex C, Service Schedule 104)

[46] Recital 29 and 30 of the NGA Recommendation.

Q. 28. **Having regard to market demand, technical, economic and other considerations, is there a requirement for a remedy mandating access to the unbundled copper sub-loop and associated facilities (including backhaul and access to street cabinets) in a FTTN scenario? How might this be achieved in light of Eircom's proposed or alternative network architectures? Please explain your reasoning.**

Q. 29. **What type of backhaul solutions do you consider are appropriate in an FTTN scenario?**

Q. 30. **What are the most relevant factors identified in Article 12(2) of the Access Directive (and set out at paragraph 1.25 of this paper) when assessing proportionality considerations with respect to any remedy governing access to the unbundled fibre loop and associated facilities.**

Non- discrimination and Transparency Remedies

3.73 The NGA Recommendation suggests that ComReg should establish ancillary remedies ensuring the effectiveness and viability of sub-loop unbundling, such as non-discriminatory access to facilities for co-location, or in their absence, equivalent co-location. It also suggests that Eircom should put in place a reference offer as soon as possible and, in any case, not later than 6 months after any remedy requiring such access has been imposed. The NGA Recommendation also states[47] that

> *"When NRAs impose copper sub-loop unbundling, the SMP operator should be required to complement the existing LLU reference offer with all necessary items."*

3.74 This is further underpinned in the NGA Recommendation where it states[48]:

> *"The transparency of access conditions to sub-loops can best be ensured by their inclusion in the existing LLU Reference Offer. It is important that this transparency requirement applies to all items necessary for the provision of sub-loop unbundling, including backhaul and ancillary services to allow continuity of existing competitive offerings. The reference offer should incorporate all pricing conditions to allow entrants to calculate the business case for sub-loop unbundling."*

Q. 31. **Is a remedy requiring the development and publication of a reference offer for the provision of access to the copper-sub loop necessary and what specific areas should be detailed within it? Please explain your reasoning.**

Q. 32. **What arrangements should be put in place for the publication of a reference offer and how should it be kept updated in light of ongoing developments? Please explain your reasoning.**

Q. 33. **What specific non-discrimination remedies are required with respect to the provision of access to the copper sub-loop, including those associated with co-location? Please explain your reasoning.**

[47] Paragraph 30 of the NGA Recommendation.

[48] Recital 31 of the NGA Recommendation.

Pricing Remedy

3.75 As noted in paragraph 3.19, a price control obligation has already been imposed in the WPNIA market. In this section we consider what type of price control obligation is appropriate for access to the copper sub-loop.

3.76 As noted in paragraphs 3.24 to 3.26 there are various ways in which the price of access to the copper sub-loop could be determined.

3.77 The price of access to all items associated with copper sub-loop unbundling is required by the NGA Recommendation to be cost-oriented in accordance with Annex I[49], in particular:

> *"NRAs should impose cost-based access to all items necessary to allow sub-loop unbundling, including backhaul measures and ancillary remedies, such as non-discriminatory access to facilities for co-location, or in their absence, equivalent co- location.*
>
> *Regulated access prices should not be higher than the cost incurred by an efficient operator. For this purpose, NRAs may consider to evaluate these costs using bottom-up modelling or benchmarks, where available.*
>
> *When setting the price for access to the copper sub-loop, NRAs should not consider the risk profile to be different from that of existing copper infrastructure."*

3.78 It also notes that access to copper sub-loops in a FTTN scenario should not allow for a risk premium, since there is no additional risk associated with legacy infrastructure. However, a risk premium may be applied to NGA infrastructure that is provided as an associated facility, such as fibre backhaul.

3.79 Recital 32 of the NGA Recommendation also notes that:

> *"Consistent with the pricing of local loop unbundling, the pricing of all items necessary for the provision of sub- loop unbundling is to be cost-oriented and in line with current methodologies used for pricing access to the unbundled copper loop. The replacement of copper by fibre up to an intermediary distribution point represents an important investment entailing some risk, even though the risk is deemed to be lower than for FTTH networks, at least in densely populated areas, in view of the relative deployment costs per household involved and the uncertainty of demand for improved or up-graded services."*

3.80 We return to a more detailed discussion on the detailed methodology for any appropriate price control remedies, particularly in the presence of specific and quantifiable risk (for a range of wholesale access products) in section 5 of this paper.

Q. 34. What form of price control would be the most appropriate and proportionate means of establishing the price of access to the copper sub-loop? E.g. cost model (cost plus or retail minus), cost-oriented benchmark, or allowing commercial negotiation. Please explain your reasoning.

[49] Part 5, Annex 1 of the NGA Recommendation

Q. 35.	**Should fibre or Ethernet backhaul associated with the provision of access to the copper sub-loop attract a risk premium? How might a risk profile associated with specific costs relating to such access to be determined in light of the principles set out in Annex I of the NGA Recommendation, and how should any difference in risk be reflected in a pricing methodology? Please explain your reasoning.**

4 Remedies for Next Generation Wholesale Broadband Access

4.1 The Wholesale Broadband Access (WBA) market encompasses non-physical (virtual) wholesale access to the SMP operator's services. WBA access could take various forms in an NGA environment.

4.2 As noted in section 2, ComReg recently published[50] its preliminary views on its analysis of the WBA market. ComReg has proposed only high-level principles for NG WBA remedies.

4.3 In this section we consider the more detailed development of Next Generation (NG) WBA remedies, taking the utmost account of the European Commission's NGA Recommendation. It should be noted, however, that any remedies to ultimately be imposed in the WBA market are strictly dependent on any finding of SMP in this market.

Eircom's proposed NG WBA products

4.4 As noted in paragraph 1.33, in May 2010 Eircom announced plans to commence a FTTH and FTTC pilot in the Sandyford and Wexford exchanges. This pilot may ultimately form part of Eircom's long term plan to upgrade its access network across Ireland. In doing so Eircom has chosen a particular network topology which may or may not be that which is ultimately deployed as apart of a broader development of its access network. The nature of network topology and the capabilities and design of the underlying technical architecture can impact on the nature of wholesale broadband access products provided to access seeker's and, consequently on the retail broadband services they provide to consumers.

4.5 Since the announcement of the pilot, Eircom has hosted a number of industry meetings to discuss its pilot plans which include both a FTTH and FTTC Bitstream product offering, including a multicast variant. The precise nature and the design of the NG WPNIA wholesale products to be offered by Eircom has not been finalised as of yet, but as of today the proposed product offerings under consideration are generally described below. Further details of these products and their proposed pricing can be found on www.eircomwholeslae.ie.

WBA Products

4.6 Eircom has proposed to supply various virtual wholesale broadband access products as part of its pilot in the Sandyford and Wexford exchange areas. Figure 5 below describes the general network architecture supporting these WBA products. It is not meant to be a definitive explanation of all product aspects.

[50] Market Review: Wholesale Broadband Access (Market 5). Consultation and Draft Decision, ComReg Document No. 10/81" (the 'WBA Draft Decision').

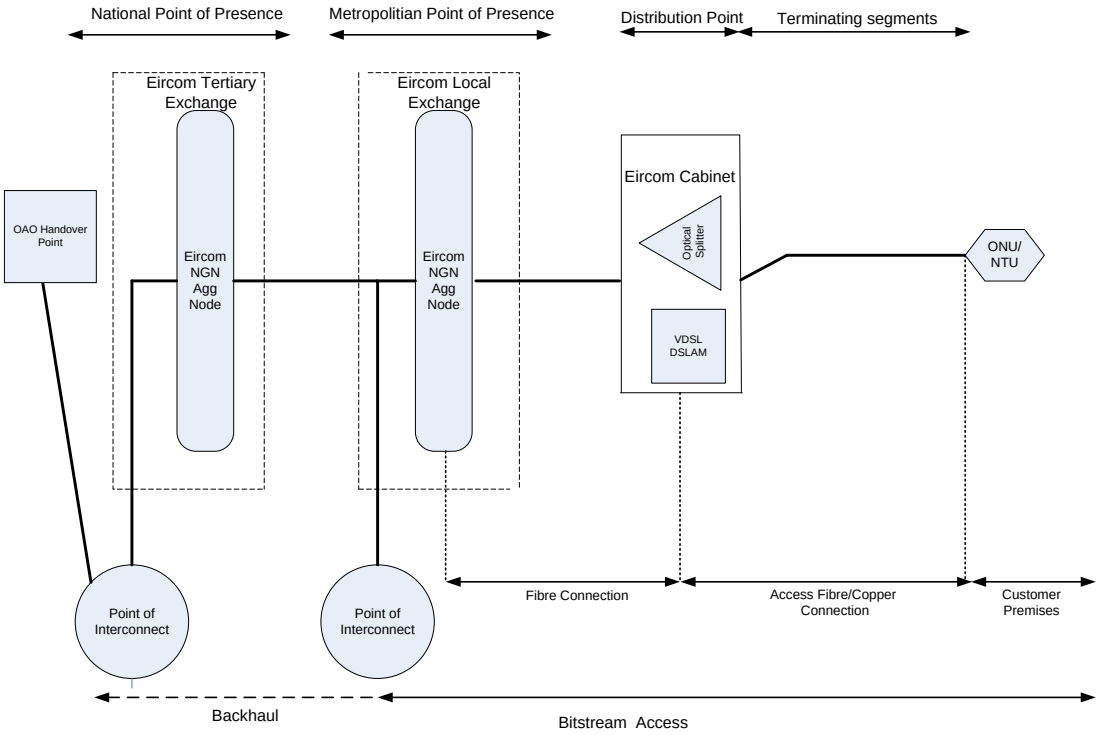


Figure 5: Eircom's WBA Network Architecture

4.7 The WBA (Bitstream) FTTH/C pilot network architectures outlined in Figure 5 above are based on 2 distinct network schemes. One is based on a Fibre-To-The-Home (FTTH) point-to-multipoint GPON (Gigabit Passive Optical Network) architecture whereby Eircom's OLT (Optical Line Terminal) equipment in the exchange is connected to an optical splitter within the street cabinet which in turn is connected to up to 32 customer premises. An ONT (Optical Network Unit) is installed in each customer premises.

4.8 The second network scheme is based on a hybrid fibre-copper FTTC (Fibre-to-the Cabinet) arrangement where the exchange based OLT is connected via fibre to a VDSL DSLAM[51] (Very High-Speed Digital Subscriber Access Mulitplexor) sited within the street cabinet. The customer premises is then connected via the existing copper sub-loop.

4.9 The NGA Bitstream products are comprised of a broadband access path between the local Eircom NGN Aggregation Node (which can be in the local exchange) and the customer premises. A wholesale customer (OAO) purchasing NGA Bitstream can build its own backhaul infrastructure up to the local Eircom NGN Aggregation Node or it can choose to purchase a bitstream backhaul product to connect its local handover point to an Eircom NGN Aggregation Node.

Next Generation WBA Remedies

4.10 The European Commission's NGA Recommendation specifies the range of wholesale non-physical access products that can be made available through the imposition of remedies in the WBA market. Such NG WBA remedies include the provision of access to a range of differently configured bitstream products,

[51] Note that the VDSL DSLAM is only present in the street cabinet in the case of a FTTC network architecture.

supported by the application of non-discrimination, pricing, transparency and other obligations.

4.11 The application of the European Commission's NGA Recommendation to NG WBA remedies in an Irish context is discussed below. It is worth noting at the outset that it allows NRAs a certain amount of flexibility in designing WBA remedies in certain circumstances, in particular, where

> *"…there is a proven track record that functional separation or similar arrangements have resulted in fully equivalent access to NGA networks by alternative operators and the downstream arm of the SMP operator, and where there are sufficient competitive constraints on the SMP operator's downstream arm, NRAs have more flexibility when designing remedies for wholesale broadband access."*[52]

Access Remedies

4.12 The discussion of WBA remedies in the Explanatory Note to the NGA Recommendation suggests that access to WBA products is likely to be an important step on the ladder of investment in an NGA environment. It is envisaged that access to WBA will provide an important stepping stone for operators wishing to enter retail broadband markets and potentially invest in WPNIA and ultimately their own NGA infrastructure.

4.13 The NGA Recommendation states[53] that, insofar as WBA access remedies are concerned, that:

> *"NRAs should mandate the provision of different wholesale products that best reflect in terms of bandwidth and quality the technological capabilities inherent in the NGA infrastructure so as to enable alternative operators to compete effectively, including for business grade services."*

4.14 Other aspects of the NGA Recommendation also inform the potential nature and specificity of WBA access remedies.

> *"It is expected that wholesale broadband access products based on fibre may be technically configured in ways that allow for more flexibility and enhanced service characteristics compared to copper-based bitstream products. To foster retail product competition it is important that such different service characteristics are reflected in various regulated NGA-based products, including business grade services.*
>
> *Different bitstream products, capable of being distinguished downstream in terms of for instance bandwidth, reliability, quality of services or other parameters, might be delivered via a given NGA network.*
>
> *New access remedies will need to be carefully specified, for instance with respect to technical protocols and interfaces serving the interconnection of optical networks or the scope and characteristics of new bitstream remedies."*[54]

[52] Recital 39 to the NGA Recommendation

[53] Paragraph 33 of the NGA Recommendation.

[54] Recitals 34 to 36 of the NGA Recommendation.

4.15 The only apparent discretion for NRAs to defer from imposing a WBA access remedy is in circumstances where they

> *"… consider that, in a given geographic area, there is effective access to the unbundled fibre loop of the SMP operator's network and that such access is likely to result in effective competition on the downstream level."* [55]

Q. 36. What circumstances (i.e. degree of availability of effective access to the unbundled loop), would warrant the lifting or variation of WBA access obligations within a given geographic area? Please explain your reasoning.

Q. 37. Having regard to market demand, technical, economic and other considerations, is there a requirement for a remedy mandating access to WBA products and associated facilities (including backhaul) in a FTTH and FTTC scenario? Please explain your reasoning.

Q. 38. In a FTTH or FTTC environment, what technical or enhanced service characteristics might need to be reflected in WBA access products? Please explain your reasoning including views on the extent, if any, to which product differentiation is a necessary characteristic of WBA access products.

Q. 39. What are the most relevant factors identified in Article 12(2) of the Access Directive (and set out at paragraph 1.25 of this paper) when assessing proportionality considerations with respect to any remedy governing access to WBA products and associated facilities?

Q. 40. How should the issue of technical protocols and interfaces serving the interconnection of optical networks be approached? Please explain your reasoning.

Non-discrimination and Transparency Remedies

4.16 The NGA Recommendation states[56] that NRAs should oblige SMP operators to make new wholesale broadband access products available, in principle, at least 6 months before the SMP operator (or its retail subsidiary) markets a NGA retail service, unless there are effective safeguards to guarantee non-discrimination.

4.17 Eircom competes with its own wholesale WBA access seekers in the retail broadband market given such seekers also use eircom's WBA products to provide retail broadband. The NGA Recommendation suggests that WBA access seekers should be granted access to WBA on equivalent conditions to those experienced by Eircom's retail division, so that OAOs are able to effectively compete in downstream markets.

4.18 The NGA Recommendation seeks to limit the SMP operator from exploiting first mover advantage through the withholding information about new products or changes in existing products from access seekers and recommends that NRAs require SMP operators to provide at least 6 months advance notice of any changes

[55] Paragraph 37 of the NGA Recommendation.

[56] Paragraph 32 of the NGA Recommendation.

(to the product processes or network) that would allow it to modify/enhance its own retail products in the downstream market. On the other hand, such an approach may dampen product innovation.

Q. 41. Do you think that a requirement for the SMP operator to notify purchasers of WBA 6 months in advance of its launch of a retail products based on NGA inputs is necessary or adequate and, if so, how might it operate in practice? Please explain your reasoning.

Q. 42. What effective access, transparency or other safeguards are necessary to guarantee non-discrimination and how might such safeguards impact the need for of level of advance notification discussed above? Please explain your reasoning.

Q. 43. What specific non-discrimination remedies are required with respect to the provision of wholesale broadband access? Please explain your reasoning.

Q. 44. Is a remedy requiring the publication of reference offers for specific NG WBA products necessary and if so, what should be contained within such a reference offer? Please provide reasons for your answer

Q. 45. What arrangements should be put in place for the publication of a reference offer and how should it be kept updated in light of ongoing developments? Please explain your reasoning.

Pricing

4.19 As noted in paragraph 3.24 to 3.26 there are various ways in which the price of access to NGA WBA products could be determined. In this section we consider what would be an appropriate price control obligation for access to the WBA products and associated facilities.

4.20 The NGA Recommendation states that:

> *"NRAs should in principle impose cost orientation on mandated wholesale broadband access products in accordance with Annex I, taking into account differences in bandwidth and quality of the various wholesale offers."* [57]

4.21 Annex 1 of the NGA Recommendation suggests that ComReg should allow the SMP operator to retain a risk premium that reflects the additional investment risk faced by investors in NGA infrastructure.

4.22 The NGA Recommendation also considers scenarios where national circumstances might negate the need for the regulation of WBA pricing (or in fact the entire access remedy) for NGA networks. For example, paragraph 36 of the NGA Recommendation states that:

> *"NRAs should 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 have proved effectively to guarantee equivalence of access. In the*

[57] Paragraph 35 of the NGA Recommendation

absence of cost orientation NRAs should monitor the SMP operator's pricing behaviour by applying a properly specified margin-squeeze test."

4.23 As it currently stands, Eircom is not functionally or otherwise separated and, in light of this, guarantees regarding the equivalence of access are not present or likely to be present in the short to medium term. ComReg has determined that geographic scope of the WPNIA and WBA markets remains national.

4.24 ComReg acknowledges that if in the future, circumstances negate the need for price controls in the WPNIA and WBA markets, there is potential for cost-orientated pricing obligation to be removed from certain geographic areas or indeed eliminated entirely. However, even under such circumstances a margin squeeze test may still be required.

Q. 46. What form of price control would be the most appropriate and proportionate means of establishing the price of WBA access? e.g. cost model (cost plus or retail minus), cost-oriented benchmark, or allowing for commercial negotiation. Please explain your reasoning.

Q. 47. If an effective internal separation of Eircom were to be implemented how should this impact on ComReg's regulatory approach?

4.25 We return to a more detailed discussion on the detailed methodology for any appropriate price control remedies, particularly in the presence of specific and quantifiable risk (for a range of wholesale access products) in section 5 of this paper.

5 Price controls for NGA Wholesale Products

Introduction

5.1 In Sections 3 and 4, ComReg discussed the remedies specific to WPNIA and WBA products and sought views as to what price control remedy is necessary in general terms. This section examines in further detail the options available when setting wholesale regulated prices, in the case where a cost-oriented price control is considered appropriate. Before considering whether (and how) a risk premium should be applied to wholesale access product pricing, and how such a risk premium might be calculated. This takes into account ways in which the investment-risks might be mitigated by the SMP operator, and how this could impact the setting of regulated wholesale prices.

5.2 The European Commission has expressed a general preference for the application of cost-oriented access prices for NGA networks and products. If ComReg considers it appropriate to use a cost-orientation price control, then it would also need to determine a costing methodology that, amongst other things, establishes appropriate investment incentives for the market. Failure to set the correct pricing incentives (e.g. sufficient economic space between different wholesale products), or to provide regulatory certainty to potential NGA investors, could lead to an under-investment in NGA infrastructure.

5.3 The NGA Recommendation cites the following 'Common principles for the pricing of NGA Access', which should underpin the pricing methodology for all of NGA wholesale products established by ComReg:[58]

- NRAs are to promote competition in the provision of electronic communications networks, electronic communications services and associated facilities and services, *inter alia*, by encouraging efficient investment in infrastructure.
- In determining the cost base for cost-orientation, the NRA should consider whether duplication of the relevant NGA access infrastructure is economically feasible and efficient. Where this is not the case, the overriding aim is to create a genuine level playing field between the downstream arm of the SMP operator and the alternative network operators. This may, therefore, result in the use of different cost bases for the calculation of cost-oriented prices for replicable versus non-replicable assets (or at least adjusting the underpinning parameters)
- NRAs should assess whether the cost of capital reflects the higher risk of investment relative to investment into current networks based on copper.
- Additional mechanisms (other than cost of capital adjustments) could be used to allocate the investment risk between investors and access seekers, such as long-term access pricing or volume discounts.
- NRAs should impose accounting separation measures, in order to enforce cost-orientation obligations. These measures should allow the NRA to identify the cost of all relevant assets for the determination of access prices (including depreciation and valuation changes), and to monitor effectively whether the

[58] Annex 1 of the Recommendation, 1. Common principles for the pricing of NGA

SMP operator meets equivalence obligations (such monitoring may include the application of margin squeeze tests).

- NRAs should estimate the incremental costs required to provide access to the facilities concerned (i.e. costs associated with provisioning and ordering, operating costs and IT systems), and should allocate these costs on a proportionate basis between all undertakings enjoying access, including the downstream arm of the SMP operator.

5.4 With these guiding principles in mind, the purpose of this section is to assess some of the more detailed elements of a cost orientation calculation, were one to be imposed. In particular:

- Selecting a costing methodology;
- Choosing a suitable costing methodology for NGA;
- Defining a WACC and Risk premium to account for additional risks associated with NGA investment;
- Margin squeeze tests.

5.5 In deciding upon an approach to determining access pricing, ComReg should be mindful of the importance of establishing appropriate incentives to invest in the replacement of copper-based networks with NGA. This involves understanding and addressing the risks that are particular to NGA, ensuring that additional risks are accounted for by a risk premium where appropriate, and considering how this might be done.

5.6 ComReg intends to use the information provided in response to the questions in this section to assist in the development of appropriate NGA remedies (later in 2011).

Background to ComReg's previous use of cost-based price controls

5.7 In the WPNIA market, ComReg has, to date, regulated the traditional copper local loop and sub loop through the imposition of the cost orientation obligation on Eircom. The implementation of the cost orientation obligation was reviewed in detail during 2008 and 2009 by ComReg, which resulted in revised LLU and SLU monthly rental charges, published in ComReg Document No. 10/10 (Decision No D01/10[59]) in February 2010. The current maximum charges for LLU and SLU monthly rentals have been set for a period of three years, at which point ComReg will undertake a review to ensure the regulatory objectives, as set out previously in this paper, are achieved. For example, where it is clear that alternative investment in broadband infrastructure is not taking place or consumers are not benefiting from greater direct access competition, at that point ComReg may need to review the methodologies adopted and bring them in line with its objectives. However, to date the evidence is positive towards the decisions made.

5.8 Much of the LLU cost model review remains relevant in the current context and indeed going forward in the context of determining the relevant NGA costing

[59] Response to Consultations and Final Decision: Local loop unbundling ("LLU") and Sub loop unbundling ("SLU") Maximum Monthly Rental Charges, 9 February 2011.

approach. Many of the assets valued as part of the exercise will be re-used in an NGA context.

5.9 ComReg modelled the cost of the loop and sub loop based on the modern equivalent asset basis, that is, the model reflects the cost of building an access network today. The methodology adopted, a BU-LRAIC methodology, was used to ensure that alternative platform investment, for example, cable and fixed wireless was not impeded or dis-incentivised where such investment was likely. Therefore, ComReg was trying to ensure that the correct "build/buy" signals were in place.

5.10 Also as part of the modelling exercise, ComReg gained a good understanding, from Eircom of the likely problems encountered when building/repairing the access network. Issues such a way-leaves, council taxes on new builds, cost of contractors, etc. were discussed and assessed as part of the review. ComReg also gained a good understanding of the operating cost savings that can accrue where a new network is in place rather than the older legacy network, which is very prone to high levels of faults giving rise to high operating costs (mainly pay costs). There are also fewer opportunities to provide high speed broadband over the old network due to the quality and length of copper deployed over the years.

5.11 In the past, the volume of copper loops active remained relatively stable. However, like many sectors this trend has now reversed and the volumes of active copper loops have been in decline in recent times for a variety of reasons. In an environment where volumes are in decline and given the level of uncertainty it is difficult to identify the true unit cost over the long term. In the context of NGA where volume demand is uncertain (currently there is only evidence from the cable network), identifying the likely unit cost of a loop using fibre may be difficult.

Choosing a suitable costing method for NGA

5.12 ComReg has not decided as to whether a cost orientation obligation should apply in the context of NGA. However in order to help us evaluate the various possibilities this section seeks views as to how such an obligation would be applied- were it to be chosen.

5.13 ComReg has a number of options available to it in terms of how it achieves its regulatory objectives which take into account the current demand and supply situation in the relevant market(s), technological advancements and the data available to ComReg. ComReg is of the view that the relevant options to determine an appropriate costing methodology in the context of NGA should be discussed under the following headings:

- How should assets be valued?
- Which type of cost model should be used to assess costs?
- Which accounting methodology is the most appropriate?
- Overview of possible costing methodologies.

How should assets be valued?

5.14 Deciding on an approach for the valuation of assets is an important precursor to determining wholesale regulated charges. The two options available to ComReg are:

- historic costs
- current cost equivalents.

5.15 ComReg believes that the objectives of promotion of competition and the interests of end-users are of paramount importance when deciding the relevant cost base for valuing assets.

5.16 Under the historic cost basis, assets are valued based on the actual cost of the assets on the date at which they were acquired. The values of assets are then adjusted over time to reflect changes in the prices of the asset. Under the historic-cost approach, the operator recovers the costs actually incurred in providing the products, services or associated facilities, plus a normal rate of return on the investment.

5.17 The historical cost accounts ("HCAs") is based upon the actual reported financial results of an operator for a given period which has expired. The results from the HCAs should be directly reconcilable with the actual (sometimes historic) statutory financial statements of the operator.[60]

5.18 The historic-cost basis has the advantage that there is no risk of an undertaking being paid for services it did not provide, or being over-compensated for the provision of services.

5.19 The disadvantage of the historic-cost approach is that a wholesale charge calculated solely on the basis of historical costs may not incentivise operators to reduce costs and may fail to offer alternative operators a relevant reference point against which they can compare their possible investment decisions.

5.20 The European Regulators Group ("ERG")[61] recommends that historic costs are not generally satisfactory for regulatory decision making.

5.21 The current cost approach is based on what would be paid for assets if they were acquired today (the assets are re-valued on an annual basis). Given that the telecommunications industry is driven by technological improvements and change, many of the assets concerned have decreased in value since being acquired. As such, the current cost is likely to be lower than the historic cost basis. This is especially true of core network and data intensive applications. On the other hand most of the cost of the access network is related to construction expenditure and is not particularly sensitive to technological innovation.

5.22 In the context of NGA it is notable that the cost of provision will be composed of a mixture of the depreciation of legacy assets such as trench or duct: the incremental cost of remediation of these legacy assets and expenditure on new equipment, fibre optic cable etc. It is also notable that initially, at least, there will be no difference between the current cost and historic cost of the two latter asset categories.

Which type of cost model should be used to assess costs?

5.23 Another key regulatory decision to consider in determining regulated wholesale access charges is selecting the modelling approach to use. This choice should be

[60] However, one of the problems with the historic cost approach is the lack of granularity of the data available in financial statements.

[61] ERG Common Position: Guidelines for implementing the Commission Recommendation C (2005) 3480 on Accounting Separation and Cost Accounting Systems under the regulatory framework for electronic communications ('ERG Common Position').

guided by the regulatory objectives, and should take account of current and prospective market conditions.

5.24 In general, there are two options available for cost models:

- A Top Down ("TD") model; or
- A Bottom Up ("BU") model.

5.25 A TD model typically relies on the costs actually incurred by the operator to estimate the costs of services.

5.26 The advantage of this model is that all costs incurred in providing the relevant service are accounted for (critics of BU models argue that certain cost categories are erroneously ignored), and that the model upholds incentives for SMP investment, since the operator retains confidence that costs incurred will generally be allowed to be recovered.

5.27 This approach is also consistent with the use of HCA.

5.28 The main disadvantage of the TD approach is that it requires a significant amount of detail from the operators accounting systems and on the inventory of the operator's network. The TD information relies heavily on the robustness of the data provided by the operator. The TD approach implies that the reference point is the operator's actual set of accounts. The main issue in this regard is that the TD approach is a backward-looking approach. This can potentially yield inefficient market outcomes by providing the wrong "build/buy signal" to the industry. For example, TD models might provide the SMP operator with incentives to over-invest, since incurred costs are generally allowed to be recovered.

5.29 Since BU models do not depend as heavily as TD models on complex accounting data and account for legacy network costs, BU models can better reflect the choices of a hypothetical, forward-looking efficient operator from both a technical and an operational point of view. For the same reasons, BU models are generally easier to develop and maintain.

5.30 BU models are better suited than TD models to provide an appropriate "Build/Buy signal" to the market. This point may be particularly relevant for the transition from copper to fibre, since the BU model more closely reflects the costs of a new entrant in the infrastructure market. Therefore, the BU option would be more consistent with the regulatory objectives of encouraging infrastructure investment.

5.31 It is also important, when choosing a cost model, to give due consideration to the network topology and to consider whether a "scorched node" or "scorched earth" approach should be applied. A scorched node approach takes the existing network topology as a given in the model, and then determine the costs of an efficiently run network based on that topology. The scorched earth approach takes account of the costs that would be incurred by an efficient network operator using an ideal network topology.

5.32 The costing of networks and services through the use of these models can be difficult in cases where there is significant uncertainty around future demand and volumes. For this reason, some commentators have discussed an alternative approach to costing NGA networks. Namely, the discounted cash flow approach ("DCF").

5.33 The objective of a DCF model is to take account of the multi-year cost recovery over the economic life of assets for NGA. A DCF model may be appropriate in the context of costing fibre-based services, due to the demand uncertainty surrounding NGA networks (and also the likelihood of low initial demand combined with large up-front investment requirements). In particular, there is likely to be uncertainty over demand-volumes and the appropriate price on which to stimulate demand for NGA-based services.

5.34 Under those conditions, the DCF approach might best achieve the goal of overall cost recovery, while recognising the interdependence of the need for a commercially viable price and uncertain volume assumptions. A DCF model would require a forward looking view of capital and operating costs as well as demand requirements over the lifetime of the investment. However, a DCF approach would require a separate calculation of joint and common costs to determine fibre access prices. A DCF approach can provide a strong degree of transparency and commitment, as it provides a clear profile for the recovery of costs over time and effectively shifts the recovery of cost to later periods when the volume of services are able to support the cost of the network.

Which accounting methodology is the most appropriate?

5.35 Two alternative regulatory accounting methodologies may be used to determine the cost of access services.

5.36 The options are as follows:

(a) FDC, also known as Fully Allocated Cost ("FAC").

(b) Forward Looking Long-run Average Incremental Costs ("FL-LRAIC").

5.37 This choice affects the type of costs that are taken into account, and the way costs are assessed (costs historically incurred or forward looking costs).

5.38 The FDC methodology allocates all the operators' costs present in their financial information to all the services, products or regulated operations of the company. Therefore, the FDC methodology can be used only with a TD model. However, FDC is not limited to historic costs because adjustments can be made from historic to current costs. Such adjustments involve using the current prices of the assets in the model instead of the actual costs in the accounts. The costs of a product consist of direct variable costs, direct fixed costs and a share of joint and common costs. Several allocation rules of joint and common costs are available and are described in the ERG Common Position (summarised in Appendix B).

5.39 The FL-LRAIC methodology "calculates the cost of providing a defined increment of output, on the basis of forward looking costs incurred by an efficient operator"[62]. The increment is defined by the ERG's Common Position as *"the additional cost a firm incurs in the long run in providing a particular service as a whole, assuming all its other production activities remain unchanged"*. The concept of incremental cost is similar to that of marginal cost, but differs in that the incremental cost approach includes fixed costs (i.e. volume independent costs) whereas the marginal cost approach does not. The key distinction between marginal costing and LRAIC

[62] ERG Common Position: Guidelines for implementing the Commission Recommendation C (2005) 3480 on Accounting Separation and Cost Accounting Systems under the regulatory framework for electronic communications.

costing is that when applying a LRAIC approach, a sufficiently long time horizon is chosen over which all costs are variable. The inclusion of the fixed costs with the incremental costs gives the term "average incremental costs", since the total cost of the increment is divided by the number of units in question to give a unit cost. A BU-LRAIC cost modelling approach was used to determine the relevant costs of the local loop copper network or LLU.

5.40 An alternative approach called the "LRAIC plus" approach, was considered by ComReg in the context of setting leased line charges in the market for wholesale terminating segment of leased line. This cost accounting methodology includes all of the average efficiently incurred variable and fixed costs that are directly attributable to the activity concerned, plus an apportionment of joint and common costs. 'LRAIC plus' includes appropriate amounts of variable, fixed and common costs, which is the calculus faced by any operator when deciding to enter or expand. 'LRAIC plus' is a mark up to allow recovery of fixed and common costs often using an equi-proportionate mark up ("EPMU").

5.41 The LRAIC cost accounting methodology does not include a mark-up for joint and common costs. One of the key questions when identifying the cost of the roll-out of fibre is whether the roll out is seen as a replacement to the existing copper network, whereby the cost is the same except for any architectural changes of delivery and therefore the overall volumes available for service are considered to be consistent with the copper network going forward. If this view was taken, the incremental cost of building the fibre network may no longer be material to the overall capital cost of the network. If this was the case, then the unit-costs as modelled for Eircom's copper network may be close to the appropriate NGA wholesale access prices.

5.42 Another alternative to ComReg's existing LLU and SLU modelling approach would be to identify those areas where NGA investment is planned over the next three to five years, and to establish wholesale prices based on the network cost in those areas. Over that period of time, NGA is likely to be deployed only in urban areas with high population density. The current copper loop and sub loop wholesale prices reflect the costs associated with a national network, which exhibits different overall cost characteristics from the NGA deployments that are likely to occur in the relevant timeframe.

5.43 ComReg should ensure that the chosen methodology allows the SMP operator to fully recover the costs of proving the regulated product, without being able to over-recover. It is important that the SMP operator is not over-compensated in the NGA access price for costs that it already recovers in the provision of other wholesale and retail products. For example, Eircom must not be over-compensated for the cost of a specific asset that is used to provide multiple products (i.e. where it is already fully recovering the costs of the specific asset/infrastructure through its retail products and LLU products). This point is particularly relevant where networks are running in parallel, are fixed and involve shared common costs, and where eventually one network will replaced by the other.

Summary of available costing methodologies

5.44 In summary, there are *five* possible options for setting cost oriented charges for NGA products and services. These are as follows:

- The combination of historic costs, TD and FDC methodologies commonly called Historic Cost Accounting ("HCA")

- The combination of current costs, TD and FDC methodologies commonly called Current Cost Accounting ("CCA")
- The combination of current costs, TD and FL-LRAIC methodologies commonly called TD LRAIC ("TD LRAIC")
- The combination of current costs, BU and FL-LRAIC methodologies commonly called Bottom-Up LRAIC ("BU LRAIC").
- A combination of the current BU-LRAIC modelling approach used to determine the cost of the copper local loop while using a DCF modelling approach to determine the cost of fibre.

Q. 48. Do you believe that the costing methodology options for determining NGA charges as outlined above are relevant and appropriate? Please provide reasons for your response. Which is the most appropriate methodology and why?

Q. 49. Should ComReg distinguish between new investment (such as NGA specific equipment) and legacy assets (such as trench) which are used in the provision of NGA services? Please explain your reasoning.

Q. 50. What pricing issues might arise where the SMP operator is providing services over both coper and NGA networks concurrently? For example, duplicating infrastructure in the same geographic area for a temporary period or in different geographic areas. Please explain your reasoning.

Risk Premium and the WACC

5.45 As part of this preliminary consultation, ComReg is also seeking views on an appropriate treatment of investment risk as part of any price control obligation for NGA wholesale access products. We also ask if, as is suggested by the Recommendation, risk sharing measures may be appropriate and how this might be achieved in practice.

5.46 The risks faced by operators investing in NGA are largely commercial in nature (aside from the aforementioned regulatory risk). Many of these risks are independent of the actions of the regulator, and relate to commercial factors including a lack of certainty around consumer demand and willingness to pay for retail services, the threat of competition and the prevailing economic climate.

5.47 In particular NGA investments present extra risk in that they will likely be large and "lumpy". Once made they will be irrecoverable and therefore sunk.

Guidance from the European Commission

5.48 The European Commission recommends designing and imposing access obligations that take account of the investment risk associated with building NG networks. This is to ensure that regulation acts as a driver of competition and investment, rather than an inhibitor. The European Commission's Explanatory

Note suggests that such the policy for developing remedies should rest on five pillars:[63]

> *"….first, the principle of facilitating market entry and competition by means of a proportionate application of the ladder of investment principle and a full range of wholesale access products at the regulator's disposal (though not all would have to be imposed in each case); second, the principle that for specific physical bottlenecks symmetric access obligations imposed on all undertakings could complement asymmetric obligations; third,* ***the principle that investment risk should be rewarded by means of a risk premium incorporated in the regulated costs of capital****, and by means of* ***selective risk-sharing pricing mechanisms****; fourth, the principle that differences in conditions of competition between geographic areas should be taken into account; and fifth, the principle* ***that certain co-operative arrangements resulting in increased investment in NGAs and competition are desirable****."*[emphasis added]

5.49 The European Commission also notes[64] that a vital component of this approach is the proportionate application of the ladder of investment principle, which relies on risk premia being applied, as appropriate, across a range of access remedies in the WPNIA and the WBA markets. ComReg recognises the importance of appropriately taking account of relevant investment-risk when designing access and pricing remedies, and notes the European Commission's recommendation[65] that:

> *"Investment risk should be rewarded by means of a risk premium incorporated in the cost of capital."*

5.50 At the same time, ComReg believes that consideration should also be given to the potential for risk-sharing or risk-mitigation measures amongst industry participants to emerge, provided these do not undermine the development of effective competition.

5.51 The NGA Recommendation notes[66] that NRAs should apply a pricing methodology for access to the fibre distribution point that is consistent with:

> *"…the methodology used for pricing access to the unbundled local copper loop."*

5.52 As discussed above, the current LLU monthly rental charge is derived based on a cost orientation obligation and is adjusted to allow for a return on investment (which incorporates a risk premium in the weighted average cost of capital ("WACC") calculation). The objective of including the WACC is to allow a sufficient return to investors and to provide an incentive for current or potential investment. In ComReg Document No. 08/35[67] ComReg set out the cost of capital for Eircom at a rate of 10.21%. It is worth noting that, in setting this WACC, ComReg had already factored in the need to provide an incentive for investment in next generation networks.

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[63] Page 20 of the Explanatory Note

[64] Page 26 of the Explanatory Note

[65] Page 18 of the NGA recommendation

[66] Page 17 of the NGA Recommendation

[67] ComReg Document No 08/35, Response to Consultation and Decision Notice on Eircom's Cost of Capital (Decision No D01/08); published on 22 May 2008 ('2008 WACC Decision Document')

5.53 The NGA Recommendation also specifies that:[68]

> *"…access prices reflect the cost effectively borne by the SMP operator, including due consideration of the level of investment risk."*

5.54 ComReg considers that the access price and any incorporated risk premium should allocate market risks appropriately, rather than insulating any given operator against all risks. The access price should not reward/ compensate operators for poor investment decisions. This view is supported by the NGA Recommendation, which states that:[69]

> *"[t]he return of capital allowed...should strike a balance between on the one hand providing adequate incentives for undertakings to invest and promoting allocative efficiency, sustainable competition and maximum consumer benefit on the other".*

The weighted average cost of capital

5.55 These principles of policy are applied to the pricing mechanism through the application of a Weighted Average Cost of Capital ('WACC'). It has been ComReg practice to reflect the WACC in wholesale prices which are subject to a cost orientation obligation. The WACC should reflect the rate of return that the regulated firm (in this case Eircom) is required to pay in order to secure investment for the financing of investments.

5.56 For this reason, where Eircom is subject to a cost orientation obligation, the allowable costs include a WACC. The WACC is currently estimated to be 10.21%. This allowable WACC rate was decided in the 2008 WACC Decision Document.

5.57 In this decision, ComReg made it clear that the objective when setting this rate took into account the incentives to invest in next generation networks. A lower range of 7.77% and an upper range of 11.08% were cited as being an appropriate minimum and maximum based on the profile of the Eircom group (which includes network as well as retail activities, both of which carry varying degrees of risk).

5.58 A split WACC was also considered at the time to take into account the different characteristics of the business, however, it was decided a single WACC was more pragmatic and appropriate at that time. The WACC of 10.21% also took into account the financial turmoil up to 2008. ComReg did, however, note at the time of that decision that it would consider whether an alternative split WACC would be required where the extent and risk of NGA investment became clear.

5.59 The WACC provides a measure of the appropriate rate of return on capital or investment employed by Eircom in the execution of its regulated fixed line services. It is calculated by taking the weighted average of its estimated cost of equity and its cost of debt. The cost of equity was estimated using the Capital Assets Pricing Model ("CAPM") while the cost of debt was estimated using a notional (as opposed to actual) level of gearing of 40% (see 2008 WACC Decision Document for details).

5.60 The central tenet of the CAPM is that investors hold a broad portfolio of assets which removes, by diversification, the company-specific risk of each asset in the

[68] Page 5 of the NGA Recommendation

[69] Annex I, part 6 of the NGA Recommendation

portfolio leaving only non-diversifiable or systematic risk. Investors are only remunerated for systematic risk as measured by the equity Beta (β) value.

5.61 It is not the purpose of this paper to conduct an assessment of the appropriate WACC for Eircom. However, some consideration is required in the context of NGA.

5.62 In this regard, it should be noted that the calculation of the existing WACC in 2008 already factored in the need to encourage efficient investment in NG infrastructure.

5.63 Nevertheless the question arises, assuming one accepts that the risk profile of NGA is different to traditional copper based access networks, as to the implications for Eircom's existing WACC and any WACC to be applied to NGA investments, if different.

5.64 For example, if the risk associated with the advent of NGA is perceived by equity investors to change the risk profile of the company as a whole in a manner that is non-diversifiable, it could be the case that the appropriate way to treat any differential risk profile arising from NGA is simply to revisit the estimation of the Beta in Eircom's cost of equity calculation. A difficulty with this approach could be its effect on legacy copper network wholesale prices.

5.65 An alternative approach is also possible, in that one may treat any additional and quantifiable risks associated with NGA investment as separable and apply an uplift to any WACC applicable to NGA investment only. This approach appears to be more consistent with the Recommendation. This could possibly imply

- an NGA specific WACC with its own equity Beta estimation, its own debt equity split, and so forth; or
- some risk premium entirely different to that envisaged by the CAPM/WACC approach.

5.66 With regard to any revised WACC for NGA specific investment, it is likely that the computational challenges would be formidable since there have been very few NGA roll out programmes with any track record to date from which to draw any conclusions. Nor is it clear what assumptions with regard to the proportion of debt or equity or the cost of debt could be derived.

5.67 On a more fundamental level, it is not clear that the CAPM/WACC approach is designed to capture the nature of any risk involved. CAPM makes certain assumptions about the valuation of an investment which may not apply in this context. For example, it assumes that the risk of an investment can be measured in a statistically meaningful manner based on historic data and that on that basis, a rational investor will only be rewarded for risk that cannot be eliminated using a portfolio investment approach. However, in this case (i.e. NGA) there is little or no historical data. It is not clear if the risk of NGA investment can be diversified away. The investment is large; once off and lumpy. Players do not know what consumer demand will be, what the impact on revenue streams will be and what applications may emerge over time to drive take up.

5.68 These considerations raise the question of whether it is possible to measure any risk-premium in practice.

5.69 One possible means for an investor in NGA to resolve the uncertainty is to wait and see how things develop in other countries. In other words there may be a monetary

value associated with delay and taking a "wait and see" approach. Against this must be set the risk of deterioration in its market position because of the advent of other platforms and technologies. This approach might apply an uplift based not on a CAPM approach but on trying to measure the financial value of the option to "wait and see" as compared to investing immediately. In economic literature this is referred to as a "real option" and tools do exist to measure such values. (For example tradable financial options are usually valued using a statistical model known as the Black Scholes Model). However, the computational challenges of this approach would also be formidable.

5.70 ComReg intends to factor the responses received in relation to the discussion above as part of a broader work stream later this year which will review an appropriate WACC for regulated wholesale products.

Q. 51. Do you agree with the application of a risk premium as envisaged in the NGA Recommendation? As part of your response please address, insofar as possible, your views on the nature of any such premium, whether and how it could be measured and what its relationship to Eircom's existing (or a potential split) WACC should be.

Q. 52. Do you agree with the NGA Recommendation that any risk premium should only be applied to NGA/fibre specific assets and not to legacy copper based assets (for example, FTTH versus FTTN)?

Q. 53. Do you believe that the WACC ComReg Decision from 2008 remains appropriate and applicable for NGA investment and allows for sufficient return on investments made and to be made in the future? Please provide reasons for your response.

Q. 54. Do you have any other observations or proposals in relation to NGA investment risk and whether there are mechanisms other that the WACC to account for risk in NGA wholesale pricing?

Accounting for other factors that affect risk

5.71 There are various ways in which the incumbent, or indeed other operators, could mitigate the risks associated with investment in NGA. ComReg is mindful to avoid over-recovery by operators of the 'rewards' attached to NGA investment in the form of the risk-premium. It is therefore import to consider how commercial arrangements between operators might impact on the 'cost of capital' associated with NGA investment.

5.72 At the same time, this document covers multiple forms of access ranging from civil engineering to virtual bitstream, which may entail varied degrees of risk. Other factors that impact the risk faced by an operator when investing in NGA include the timing of investment, the network architecture, and the geography (proxy for population density).

5.73 ComReg, therefore, believes that consideration should be given to these factors when determining any risk-premium that could apply in specific circumstances. Whether they impact on risks, how we measure it, and how it affects pricing. As such, these factors are discussed in more detail below and are also related to Annex 1 of the NGA Recommendation dealing with pricing principles and risk.

Long-term up-front supply contracts and volume discounts

5.74 The SMP operator could enter into an arrangement with another operator in attempt to share the investment risk. For example, where an operator commits to purchasing a fixed future volume of access at an agreed price, and is required to pay (contribute) the pre-determined contracted price irrespective of the actual volume used. Thereby taking on some of the risk associated with the underlying investment. As a result, the investment-risk is shared between the investing SMP party and the wholesale access seeker, though the overall risk remains the same.

5.75 Risk sharing through the establishment of long-term supply contracts is one way in which the SMP operator (or any investing party) could seek to reduce its exposure to demand-side risk. If the SMP operator investing in an NGA network is able to reduce the demand-side investment-risk exposure by contracting it out to a third party, then the risk-premium factored into the access price by the regulator for NGA access might be reduced accordingly. A reduced risk-premium allowance would be consistent with the European Commission's NGA Recommendation which notes that

> *"NRAs need to ensure that access prices reflect the cost effectively borne by the SMP operator, including due consideration of the level of investment risk"*[70]

5.76 On that basis, ComReg anticipates that a discounted access price could apply in cases where access seekers were to agree to up-front volume-based contractual commitments. This risk-mitigation could be reflected in a reduction in the price of NGA access provided under such contractual arrangements, compared with the pay-as-you-go access price or 'spot-price'.

5.77 The duration and number of wholesale lines covered by the contract impact the degree to which investment-risks faced by the incumbent are mitigated. Therefore, these factors would determine the extent of any reduction in the risk-premium (and hence the price of access). The question then arises as to whether a lower (non-discriminatory) access price is justifiable under such circumstances (particularly having regard to the impact on risk), and what would be the competitive impact of any discounts offered on this basis.

5.78 While the European Commission recognises the possibility of such commercial contracts, their agreement in part would be subject to ComReg's approval to ensure *inter alia*, that the prices set

- are not exclusive and do not limit access by other operators to the relevant wholesale product,
- do not create the potential for margin squeeze;
- only reflect the reduction of risk for the investor (i.e. the discount should not exceed the risk-reduction)
- do not preclude the operator from engaging in secondary trading.

5.79 The NGA Recommendation also notes the danger of foreclosure of smaller competing operators if volume discounts were made available (particularly to the incumbent's retail arm). In this regard, the NGA Recommendation notes that a

[70] Recital 18 of the NGA Recommendation.

network operator with SMP in the relevant market should not be allowed to award its own retail arm lower access prices on the basis of an alleged volume commitment or risk transfer. This is because, in the European Commission's view, such an arrangement would not reflect a real risk-reduction, since the overall level of risk that rests on the entity is the same.[71]

> *"Long-term access pricing may however be abused by the SMP operator over time to sell its retail services at prices lower than those for its regulated wholesale services (since it would charge its own downstream retail arm low long-term commitment prices), thereby in effect foreclosing the market. Furthermore, alternative providers with smaller customer bases and unclear business perspectives face higher levels of risk. They might be unable to commit to purchasing over a long period. They might thus have to stagger their investment and purchase regulated access at a later stage."*

5.80 The European Commission therefore recommends that such pricing should be available only to the extent it reduces risk to the (incumbent) investor, and should be limited by appropriate margin squeeze tests.

5.81 However, the question also arises whether an SMP operator should be permitted to avail of volume discount schemes in particular circumstances, such as, for example, where its retail arm is structurally separated from its wholesale/networks arm and is providing non-discriminatory and fully equivalent access to third party access seekers.

5.82 The NGA Recommendation states that long-term access contracts might afford the access seeker greater control of NGA infrastructure and as a result more flexibility than what might be available with shorter term contracts. In particular, the NGA Recommendation notes that:

> *"…entrants would acquire full control of physical assets, also offering them the possibility to engage in secondary trading. Short-term contracts would be available without long commitments and thus normally be priced higher per access line, with access prices reflecting the potential value attaching to the flexibility of such form of access which benefits the access seeker."*

5.83 Once again, ComReg is mindful of the criteria set out in the NGA Recommendation (paraphrased above), and needs to consider the impact of variations in contractual terms on competition in the relevant markets.

The level of access

5.84 The NGA Recommendation suggests that NRAs should ensure the availability of various forms and levels of access, ranging from indirect access products such as bitstream to unbundled access. The latter requires more infrastructure investment by the entrant.

5.85 Along with other NRAs, ComReg has attempted to calibrate the relative pricing of physical (LLU) and virtual (bitstream) wholesale access in a way that encourages efficient investment in infrastructure by competing operators and the SMP operator. This lead to some OAOs investing in core network infrastructure, and

[71] Annex 1 to the NGA Recommendation.

hence reducing their reliance on the incumbent's network. However, there remains a significant reliance on the access network.

5.86 The situation is somewhat more complex in the case of access to NGA, since NGA networks involve the deployment of new infrastructure for the purpose of providing new and improved service. As noted in section 2 of this paper, the expected return on investment for NGA infrastructure is subject to a higher degree of uncertainty, particularly compared to that associated with legacy copper networks. The incumbent therefore faces considerably higher risk for NGA investments than it does for the legacy network. Consequently, another dimension to access pricing must be considered: namely to what extent access pricing reflects the extra investment risk inherent in these new investments.

5.87 The question arises therefore as to the differential between the various modes of access (bitstream type services, unbundled access, duct access etc) as well as the absolute level of prices and what effect this might have on competition as well as investment.

Co-investment

5.88 The NGA Recommendation defines[72] co-investment in a FTTH scenario as follows:

> *"….an arrangement between independent providers of electronic communications services with a view to deploying FTTH networks in a joint manner, in particular in less densely populated areas. Co-investment covers different legal arrangements, but typically co-investors will build network infrastructure and share physical access to that infrastructure."*

5.89 Where the SMP operator co-invests in NGA infrastructure, the assets concerned would, save in certain circumstances, be subject to the regulatory requirements established under the relevant SMP designations. Therefore, regulated access to such infrastructure would still be required.

5.90 However, the NGA Recommendation also notes that

> *…"Co-investment into NGA networks can reduce both the costs and the risk incurred by an investing undertaking, and can thus lead to more extensive deployment of FTTH.*
>
> *Arrangements for co-investment in FTTH based on multiple fibre lines may in certain conditions lead to a situation of effective competition in the geographic areas covered by the co-investment. These conditions relate in particular to the number of operators involved, the structure of the jointly controlled network and other arrangements between the co-investors which aim at ensuring effective competition on the downstream market. In such a situation, if competitive conditions in the areas concerned are substantially and objectively different from those prevailing elsewhere, this could justify the definition of a separate*

[72] Paragraph 11 of the NGA Recommendation.

> *market where, after the market analysis according to Article 16 of Directive 2002/21/EC, no SMP is found."*[73]

5.91 The NGA Recommendation suggests that co-investment in a network might (subject to some other conditions) reduce both the costs and risks incurred. However, the European Commission considers that co-investment does not change the characteristics of network costs or the investment risks. The European Commission's view is that while co-investment does share the risk and cost faced by each respective parties in the co-investment arrangement, the overall risk and overall cost remains the same.

Geographic coverage

5.92 Because of factors surrounding economies of scale/density and demand-uncertainty for NGA retail services, it is likely that an operator's initial NGA network deployments and product launches would be targeted at more densely populated urban areas. The success or otherwise of NGA roll-out in urban areas may influence the timing or the degree to which rural areas are served by NGA.

5.93 By initially rolling out NGA services in urban areas, operators are more likely to achieve economies of scale. NGA investors may face less exposure to risk in densely populated areas, because the cost of network deployment 'per potential customer' is lower.

5.94 The business case associated with NGA deployment in rural areas is likely to be more difficult than that associated with urban areas, in that, the cost per subscriber is likely to be higher by virtue of the absence of economies of density. The European Commission's NGA Recommendation accounts for such circumstances by recognising the potential for NRAs to either define sub-national geographic markets or to apply geographically differentiated remedies when conducting market analyses. Such an approach could allow for wholesale access pricing to be varied on a geographic sub-national level to take account of the different levels of cost associated with each area.

Dynamic nature of risk

5.95 The risk associated with NGA infrastructure will differ from that associated with already built copper networks and associated infrastructure. Such risks are largely accounted for by demand, technology and other uncertainties.

5.96 The European Commission considers that the risk profile faced by investors may change over time and therefore the risk premium may need to be adjusted in order to reflect any potential changes. For example, once the initial NGA infrastructure has been deployed the uncertainty regarding cost of deployment diminishes. Similarly, the uncertainty of demand will decrease over-time and, therefore, in order to ensure the same level of return of investment, a lower blended access price may be appropriate. The NGA Recommendation notes that

> *"NRAs should clarify to the greatest extent possible how foreseeable changes in market circumstances might affect remedies".*

[73] Recital 28 of the NAG Recommendation.

Network architecture

5.97 The risk premium will also differ according to which types of infrastructure, services, and network architectures underpin different access products and could, therefore, result in different underlying levels of investment-risk being associated with different network elements.

5.98 For example, prices for access to existing civil engineering structures such as ducts should not, according to the EU Commission, allow for the recovery of a risk premium because such infrastructure exists and already has the same risk profile as that associated with existing copper infrastructure. Likewise, access pricing for existing copper sub-loops (as will be utilised in a FTTC network) should, according to the NGA Recommendation, not allow the recovery of a risk premium since there is no additional risk associated with this legacy infrastructure.

5.99 The NGA Recommendation states that unbundled access to fibre loops and sub-loops (in the case of FTTH) is to be cost orientated but access prices may allow for a 'risk premium'.

5.100 Therefore, the application of any risk premia will need to be considered on a network element basis in order to ensure that the individual wholesale access product price accounts for the specific risk-profiles attached to each component that makes up a given remedy/product. For example, a duct access WPNIA product may have a different risk premium than an unbundled fibre access product.

5.101 This same principle applies to the pricing of WBA. For example, the price of WBA access should only incorporate a risk premium to the extent that the underlying infrastructure and technology is subject to higher commercial uncertainty and hence risk. For example, the risk premium associated with WBA over a FTTH network could exceed that allowed for WBA provided via a FTTC network (because FTTC contains a copper sub-loop, which, arguably, is a historic asset carrying less risk than fibre networks).

Q. 55. Do you agree that the factors above identified are the most relevant mitigators of risk? Should such factors be taken into account when determining wholesale pricing arrangements and, if so how? Are any safeguards necessary?

Q. 56. In the context of upfront purchase commitments and volume discounts, are any safeguards necessary to ensure efficient investment and the development of effective competition? Please explain your reasoning.

Addressing Margin (Price) Squeeze Issues

5.102 ComReg is conscious of the risk that margin squeeze may occur as a result of NGA retail and wholesale products being made available by Eircom. It is important to consider whether the potential exists for margin squeeze to occur (between various products and in multiple forms), and whether it is appropriate to address any margin squeeze issues directly through the price control mechanism.

5.103 One way of addressing concerns about the potential for Eircom to impose a margin squeeze is by establishing a test, under the price control remedies. The test could be established to determine whether Eircom's downstream operations could trade profitably on the basis of the wholesale price charged to third parties for the

relevant input (NGA access). At a higher level, the test might aim to ensure the promotion of efficient infrastructure investment and encourages investment which should in turn facilitate effective and sustainable competition.

5.104 In this regard the NGA Recommendation states[74]:

> *"NRAs should ensure that a sufficient margin remains between wholesale and retail prices to allow for market entry by an efficient competitor. NRAs should thus verify the SMP operator's pricing behaviour by applying a properly specified margin-squeeze test over an appropriate timeframe. NRAs should specify in advance the methodology they will follow for identifying the imputation test, the parameters for the margin-squeeze test and the remedial mechanisms in case of established margin-squeeze."*

5.105 The Commission recently commented on BNetzA's analysis of the WPNIA market, in particular with respect to its reliance upon a margin squeeze test to regulate the price of FTTH access.

5.106 The Commission noted that relying solely on a margin squeeze obligation was insufficient as *"…there might be a significant discrepancy between a cost oriented price and price which can be considered as abusive*.[75] It also noted that the proposed [margin squeeze] price controls are usually not an appropriate means of preventing the competition problems identified in relevant wholesale market and that *"….the proposed price control does not provide the necessary legal and regulatory certainty"*. The European Commission noted that:[76]

> *"In order to ensure regulatory certainty for access seekers and, thus, promote efficient investment by all operators access prices need to be cost-oriented, transparent and set with sufficient notice in advance."*

5.107 One of the solutions to margin squeeze issues is the ability of operators to either invest up front in the NGA programme through a long term commitment to purchase services or to sign up to a volume commitment where the NGA is built. Discounts could then be applied to the wholesale access prices for those operators who have taken some of the risk of the likely demand. This could mitigate a margin squeeze being imposed on such operators. However, operators who chose not to or cannot give such commitments but who still wish to compete in the retail market using the mandated wholesale access products, be it market 4 or 5, might well require assurance on the margin squeeze test that will be applied to retail offerings before they make the decision to buy. Operators would then be equipped with the knowledge on whether to invest up front or whether to take the low risk option of buying later once the market has been tested.

5.108 There are a number of key features in the design of a margin squeeze test that could influence the resulting price control.

- the operator cost base.

[74] Paragraph 26 of the NGA Recommendation

[75] European Commission letter concerning case DE/2011/1177, SG-Greffe (2011) D/2850, letter to BNetzA, Germany, 24 February 2011. See part III.

[76] Ibid.

- the operator volume base (adjusting for economies of scale factors).
- the cost standard to be applied.
- discounts (based on volume commitments or investment)
- scope of the margin squeeze test.

5.109 These are discussed further below, in relation to the specific features of a margin squeeze test for the WPNIA and WBA markets.

Choosing an appropriate operator cost base:

5.110 The key inputs to such a test will be the wholesale access price for NGA as well as the costs that an operator might incur in order to replicate the retail offers of the incumbent/other platform providers.

5.111 There are two margin squeeze tests which are traditionally used in European case law and by the Commission in its guidance note. These are:

- Equally Efficient Operator test ("EEO") (Incumbent's costs)
- Reasonably efficient operator test ("REO") (An entrant's costs)

5.112 Additionally ComReg has to date used a cost standard called the similarly efficient operator ('SEO') (Incumbent's costs adjusted for scale).

5.113 The EEO test is applied on the basis that if the downstream arm of the vertically integrated company is able to make a profit based on the price charged to downstream competitors, this would suggest that there is no margin squeeze as an equally efficient operator to the vertically integrated company should also be able to make a profit. The EEO test therefore assumes the efficient costs based on the volumes of the incumbent, is more often associated with ex-poste competition case law. The EEO approach recognises that in a competitive situation, an effective alternative operator will be able to compete only if it is as efficient as the SMP operator in the market.

5.114 The REO test on the other hand assesses whether a 'reasonably' efficient service provider can obtain a normal profit based on the prices charged to downstream competitors. The REO test assumes the efficient costs for an operator that has the volumes of an 'alternative operative with a reasonable market share'. The European Commission has a preference for a REO test. However, in Ireland no alternative operator has achieved the scale of direct access experienced in other EU states such as France and Germany. Generally, REO data is not appropriate given the general issue regarding the robustness of OAOs data and in some cases it is not appropriate to the test being set in the medium term where those operators are in start up mode.

5.115 A SEO cost base takes the costs of Eircom as a starting point and adjustments are made to these costs for economies of scale and scope differences. Where possible, these costs are also compared with the costing information from OAOs, where it is available. Since 2006 ComReg has used the SEO test to regulate wholesale bitstream access and more recently, ComReg has proposed the SEO test in consultations regarding the price control obligations for bitstream and leased lines. ComReg believes that this approach should provide the appropriate "build/buy" signal to new entrants.

Choosing an appropriate operator volume base:

5.116 Another element of the test that requires consideration is the appropriate adjustment for economies of scale.

5.117 ComReg is of the view that it can be difficult to assess whether a new entrant should be more (or less) efficient than Eircom in its operation within the market under review.

5.118 Using Eircom's volumes to determine the minimum margin between wholesale and retail prices might allow for the exact recovery of Eircom's own costs, but it could also jeopardise and dis-incentivise alternative operators from entering the relevant downstream markets. This is because the alternative operator may not have sufficient volumes or customer-numbers over which to spread the fixed element of their costs building the relevant infrastructure. As a consequence the margin between wholesale and retail prices calculated based on Eircom's volumes may not be sufficient to make a normal profit.

5.119 It is therefore appropriate to adjust the test to account for differences in economies of scale between Eircom and the access seekers. For example, the minimum margin could be based on the cost base of an operator with:

- 10% market share;
- 15% market share; or
- 25% market share.

Choosing the appropriate cost standard:

5.120 Calculating the minimum allowable margin requires the NRA to determine additional costs associated with converting wholesale access into the downstream product (e.g. retail broadband). This involves choosing between a range of cost standards that each allocate costs in a different way. The options include:

(a) Average Variable Cost ("AVC");

(b) Average Avoidable Cost ("AAC");

(c) LRAIC,

(d) 'LRAIC plus'; or

(e) Average Total Cost ("ATC").

5.121 The AVC standard approximates to the variable cost of producing an additional unit of output. AVC does not include an allocation of fixed costs, which are the major cost component faced by telecom operators.

5.122 AAC represent the short-run avoidable variable and incremental fixed costs of the additional sales of the product in question. This standard is distinct from AVC insofar as it includes fixed costs which would otherwise be avoided if the incremental output were no longer produced.

5.123 The remaining three options presented above (c, d, e) all include a fixed cost allocation, and can be described as follows:

- LRAIC is the average efficiently incurred variable and fixed costs that are directly attributable to the activity concerned over the long-run. This approach does not include an apportionment for common costs.

- 'LRAIC plus' is the average efficiently incurred variable and fixed costs that are directly attributable to the activity concerned over the long-run, plus a mark-up for joint and common costs.

- ATC is the average total cost and includes variable, fixed, joint and common costs based on historical cost data but with no adjustments for efficiencies.

5.124 These cost standards would appear to be more appropriate given the significance of fixed costs as against variable costs in the provision of telecommunications services. Failure to include a fixed cost allocation under such circumstances may result in operators failing to recover a normal return on investment. Given that one of the regulatory objectives is to promote infrastructure competition, the three most relevant options that are consistent with that objective are LRAIC, 'LRAIC plus' and ATC. The differences between LRAIC, 'LRAIC plus' and ATC are as follows:

Discounts

5.125 A margin squeeze test should also consider the treatment of commercial contract discounts available to access seekers in the provision of wholesale NGA services. ComReg therefore should consider how the margin squeeze test should be applied to long-term and short-term contract prices.

5.126 The Commission's NGA recommendation allows for operators to charge lower prices for long term commitment and for volume discounts for pricing of fibre loops. However, it does so on the basis that there still exists sufficient margin between wholesale and retail prices to allow for market entry by an efficient competitor in the downstream market.

5.127 The option (between long-term and short-term) may depend on the extent of competition from the availability of long term contract prices.

Scope of the margin squeeze test

5.128 An assessment of a margin squeeze test can be conducted either on the single product or on a range of products i.e. a portfolio of products.

5.129 There is one main advantage of assessing a margin squeeze on every single product: the "replicability" principle is satisfied at the most disaggregated level, giving an alternative operator the freedom not to reproduce the portfolio of the SMP operator in order to compete.

5.130 On the other hand, if the margin squeeze focuses on a product range or portfolio rather than a single product, this can avoid the difficulties with determining incremental costs for individual products. This may be particularly relevant in the context of NGA where operators are providing services n competition with other platforms and given the uncertainty of demand.

Application of the margin squeeze test

5.131 As well as the possibility of applying a margin test between retail and wholesale services ComReg also has the option of specifying *minimum* prices for certain wholesale products such as bitstream. This might be done if it were felt to be necessary to ensure that entrants faced the correct incentives as to whether to use indirect access services as compared to unbundled or passive access services.

Q. 57. **Do you believe that all the relevant and appropriate options were considered above regarding the main principles for a margin squeeze test? Please provide reasons for your response.**

Q. 58. **Are ex-ante price controls or measures required in order to prevent margin squeeze? If so, what is the appropriate methodology to address margin squeeze and what factors should be considered by ComReg when specifying an imputation test (if this approach is deemed to be necessary)? Please explain your reasoning.**

6 Migration from Current Generation Copper Products to NGA Products

6.1 ComReg has already established migration remedies in the WPNIA market with respect to current generation access and has in its preliminary views on its WBA market analysis has proposed a similar approach. Generally, migrations refer to the ability of an operator purchasing wholesale access to move between different wholesale products which can fall within or across several regulated markets. The migration can occur within the same operator or across different operators. For example an operator providing a retail service using WBA wholesale inputs may, at the wholesale level, wish to migrate to a WPNIA based input while continuing to provide the retail service to the same customer. Migration measures are important, not only because they facilitate retail customer switching in an efficient manner, but because they also encouraging operators to climb the ladder of investment by moving from active to passive base wholesale products.

6.2 The shift to NGA brings with it new migration challenges, namely the migration of WPNIA or WBA access seekers from current generation products to NGA. In this regard, the NGA Recommendation states that:

> *"Operators currently enjoying access have a legitimate interest to have an appropriate time to prepare for the changes that substantially affect their investments and their business case. In the absence of a commercial agreement NRAs should ensure that there is an appropriate migration path put in place. Such migration path should be transparent and developed at the necessary level of detail so that operators currently enjoying access can prepare for the changes, including rules for any necessary joint work by access seekers and the SMP operator as well as for the precise modalities of de- commissioning points of interconnection. Existing SMP obligations should be maintained for an appropriate transitional period. This transitional period should be aligned with the standard investment period for the unbundling of a local loop or local sub-loop which is in general 5 years. In case the SMP operator provides equivalent access at the MDF, the NRA may decide to set a shorter period."*[77]

6.3 The NGA Recommendation further states that

> *"Existing SMP obligations in relation to Markets 4* [WPNIA] *and 5* [WBA] *should continue and should not be undone by changes to the existing network architecture and technology, unless agreement is reached on an appropriate migration path between the SMP operator and operators currently enjoying access to the SMP operator's network. In the absence of such agreement, NRAs should ensure that alternative operators are informed no less than 5 years, where appropriate taking into account national circumstances, before any de-commissioning of points of interconnection such as the local loop exchange. This period may be less than 5 years if fully equivalent access is provided at the point of interconnection."* [78]

[77] Recital 40 of the NGA Recommendation.

[78] Paragraph 39 of the NGA Recommendation

6.4 ComReg has already considered this issue in detail as part of its completed review of the WPNIA market and determined that a 5 year advance notice period for the closure of an existing WPNIA facility is required, unless otherwise agreed by ComReg. A similar approach has been proposed in its preliminary views on the WBA market. ComReg's current position on this matter is, therefore, consistent with the European Commission's NGA Recommendation. However, ComReg accepts that shorter notification periods may be appropriate to minimise overall cost, and this need not necessarily threaten the interest of alternative operators and their associated consumers.

6.5 The NGA Recommendation goes on to specify[79] that:

> *"NRAs should put in place a transparent framework for the migration from copper to fibre-based networks. NRAs should ensure that the systems and procedures put in place by the SMP operator, including operating support systems, are designed so as to facilitate the switching of alternative providers to NGA-based access products."*

6.6 The NGA Recommendation therefore suggests that ComReg establish a transparent framework for migration from current to next generation wholesale inputs and that systems and procedures adopted by Eircom are designed to facilitate operator switching to NG WPNIA and NG WBA products.

6.7 The NGA Recommendation also states in paragraph 41 that:

> *"……Where the SMP operator envisages to replace part of its existing copper access network with fibre and plans to de-commission currently used points of interconnection, NRAs should under Article 9(1) of Directive 2002/19/EC ensure that undertakings enjoying access to the SMP operator's network receive all necessary information in timely fashion to adjust their own networks and network extension plans accordingly. NRAs should define the format and level of detail of such information, and ensure that strict confidentiality of the information disclosed is respected."*

6.8 As noted above, ComReg has already consulted on and made a determination with respect to the five-year notification period. In relation to the transparency of information surrounding network upgrades, some information on Eircom's network developments is made available through industry fora which address specific wholesale products in specific regulated markets.

6.9 ComReg is open to considering and implementing a more formalised, coordinated and efficient approach by which transparency of such information could be ensured.

6.10 Considerations as to the inefficiencies of maintaining two parallel networks in the same geographic location may also be relevant, including any potential impacts on wholesale pricing. Issues such as the availability of effective and efficient NGA based wholesale products that are appropriately priced may also influence outcomes in this regard, affecting as they might the incentives of other operators.

[79] Paragraph 40 of the NGA Recommendation.

Q. 59. **Should Eircom be required to maintain existing copper network infrastructure in parallel with NGA network upgrades? If so, then for what period of time? Under what circumstances could a shorter period of parallel operation be appropriate?**

Q. 60. **What forms of fully equivalent access at the points of interconnection (such as exchanges), might justify an advance notice period for decommissioning of less than 5 years? Please explain your reasoning.**

Q. 61. **In an NGA setting, what are the most appropriate migration paths that need to be put in place and what are the main technical, operational or commercial issues that would need to be addressed? Please explain your reasoning.**

Q. 62. **Are commercial arrangements likely to lead to the most effective outcome in ensuring that an efficient and transparent migration process takes place? Please explain your reasoning.**

Q. 63. **How should ComReg ensure that the systems and procedures put in place by Eircom, including operating support systems, are designed so as to facilitate the switching of alternative providers to NGA-based access products? Please explain your reasoning.**

Q. 64. **What would be an appropriate and proportionate regulatory approach for ensuring that information around Eircom's network and its extension plans are made available to WPNIA and WBA access seekers? Please consider issues regarding commercial sensitivity and network integrity when explaining your reasoning.**

Q. 65. **What should be the format and level of detail to be contained in the network information above and how can the strict confidentiality of such information be maintained? Please explain your reasoning.**

7 Submitting Comments and Next Steps

Submitting Comments

7.1 All input and comments are welcome; however, it would make the task of analysing responses easier if comments were referenced to the relevant sections and questions within this document.

7.2 Please also set out your reasoning and all supporting information for any views expressed.

7.3 The preliminary consultation period will run until 17.00hrs on 11 July 2011, during which time ComReg welcomes written comments on any of the issues raised in this paper.

7.4 In order to promote further openness and transparency ComReg will publish all respondents' submissions to this preliminary consultation, subject to the provisions of ComReg's guidelines[80] on the treatment of confidential information.

7.5 We would request that electronic submissions be submitted in an unprotected format so that they can be appended into the ComReg submissions document for publishing electronically.

7.6 ComReg appreciates that many of the issues raised in this paper may require respondents to provide confidential information if their comments are to be meaningful. As it is ComReg's policy to make all responses available on its website and for inspection generally, respondents to this preliminary consultation are again requested clearly to identify confidential material, and to place confidential material in a separate annex to their response, also providing supporting reasoning as to why such material is confidential in this annex.

7.7 Furthermore, respondents are requested to clearly identify to which specific questions each element of their response relates.

Next Steps

7.8 Interested parties have six weeks from the date of publication of this preliminary consultation paper to submit their observations.

7.9 All submissions which are received will be published (redacted as necessary in order to take account of any confidential or commercially sensitive information).

7.10 When it has concluded its review of all of the submissions received, and other relevant material ComReg will take them into account in the development of detailed proposals specifying remedies which will be published later this year.

7.11 Such proposals will likely take the form of a public consultation and draft decision instrument setting out ComReg's preliminary views on specific NGA remedies in the WBA and WPNIA markets. On foot of this consultation and in light of the consideration of further responses received, ComReg would expect to publish its final decision on remedies in Q1 2012.

[80] ComReg Document 05/24, Response to Consultation - Guidelines on the treatment of confidential information - March 2005.

Appendix A – Preliminary Consultation Questions