Public Survey of Experts: Regulated Wholesale Prices in the Telecommunications Market

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Response to the public survey of experts

Q1. What criteria do you consider to be important for evaluating different price calculation methods? Please prioritise the criteria.

When evaluating different price calculation methods, the criteria to be taken into consideration can be grouped into four categories as defined in the following table. Each category is then discussed in more detail in the following section.

Priority	Issue	Category
1	Competitive pricing offers to end users	End user pricing
2	Enabling a competitive market structure	Market structure
3	Avoiding unnecessary price hikes to end users served by technology platforms that are in decline or obsolescent	End user pricing
4	Facilitating access to services at competitive prices for low income users, and users in high cost (e.g. rural, sparsely populated or mountainous) areas	End user pricing
5	Equivalence of inputs and non-discriminatory practices	Regulation
6	A stable regime in which operators can plan and invest	Regulation
7	The recovery by operators of efficiently incurred costs	Investment
8	The generation of sufficient profits inside the industry to maintain existing technology platforms and invest in new ones	Investment
9	The provision of a wide range of telecommunications products, such as data volumes and throughput rates, and qualities of service	Market structure
10	Preventing wholesale bottlenecks developing which can hinder the development of retail markets	Market structure
11	Avoid interference with national policy goals such as households connected to high speed broadband, or access to new economy services such as e-government, and e-health	Regulation
12	Facilitating geographically averaged prices	End user pricing
13	Preventing unnecessarily complex and confusing tariff structures for end users	End user pricing

Investment

One of the key decisions to be made when evaluating different price calculation methods is the likely impact on investment into the market. Wholesale prices should allow operators to recover efficiently incurred costs of both the maintenance of existing networks, as well as the roll-out of those based on next generation access (NGA).

NGA roll-out across Europe is highly dependent on the ability of the existing operator to invest in technology that allows for the development of the market as a whole while maintaining its investment in legacy networks. Rollout out also depends on incentivising other market players to either invest in the roll-out of their own NGA, or buy access from another provider.

In the responses to the recent European Commission consultation regarding costing methodologies[1], respondents generally argued that regulators should avoid methodologies causing the cost of copper to arbitrarily reduce; its cost should be maintained on parity with its replacement costs, allowing for operators to recover their investments.

Regulation

One of the key elements for a successful market is the stability of the regulatory regime. Investors and operators do not like it when regulators alternate methods of wholesale price regulation. A stable regime promotes a market in which operators can confidently plan and invest in legacy and next generation networks.

After calculating a wholesale price, a key next step is to put it into effect in a way that prevents discriminatory practices between operators. Operators who access the network of a market-dominant provider should be subject to non-discriminatory charges. For example wholesale charges for operators such as Orange or Sunrise should be subject to the same price points as Swisscom's retail arm. This issue has also recently been consulted on at a European level[2], with multiple respondents agreeing that protection against discriminatory pricing will enable market development and the provision of competitive services.

Wholesale prices can play a role in the achievement of national policy goals such as household connectivity to high speed broadband, or indeed access to new economy services such as e-government, and e-health.

Market structure

Wholesale prices can influence the extent to which structure competitive structure is maintained within the market. Even though OFCOM's Questionnaire is primarily focused on fixed networks and FULL, we will provide here an example from the mobile world. A recent econometric study[3] of 20 countries over 10 years found a correlation between the wholesale price for mobile call termination and the degree of competition in the market. It looked at the impact of MTR asymmetry on market concentration.

- MTR asymmetry arises when an operator with higher costs charges a higher MTR than its lower cost competitor. Its higher costs usually arise out of factors such as higher frequency spectrum allocations and later licensing of entry to the market. (It's worth noting in passing that an asymmetric MTR is not discriminatory: all operators in the market pay the higher-cost operator the same price to send voice minutes to its network).
- In the study, market concentration was measured by the commonly employed Herfindahl-Hirschman Index (HHI),[4] an index which ranges up to 10,000 for a fully concentrated market of one player with 100% share. To put the index into context, in the Merger Guidelines, the USA Department of Justice and the Federal Commerce Commission consider that an increase in the HHI of 100 is generally problematic.
- The study looked at the impact of a 25% degree of asymmetry (that is, when the higher cost operator charged 25% more per minute than the lower cost operator for voice minutes sent to its network). A 25% asymmetry was correlated with a reduction in the HHI of 280 points, with a time lag of approximately one year.

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1 European Commission, 'For the public consultation on costing methodologies for key wholesale access prices in electronic communications', October 2011

2 European Commission, 'For the public consultation on the application of a non-discrimination obligation under article 10 of the access directive (including functional separation under article 13A)', October 2011

3 Graham Johnson and Jeffrey Rohlfs (2011), "Competitividad en el sector móvil colombiano", available at http://www.crcom.gov.co/?idcategoria=53479&pag=2 under "Presentations" and "Tigo#2".

4 The sum of the squares of the market shares of market competitors.

The study found a correlation between asymmetric MTRs and the evolution of market shares towards more competitive market structures. It highlights the need to be conscious of the impact on market structure of changes to wholesale prices, in general.

Pricing for end users

Wholesale prices should not hinder the rollout and provision of service to economically inefficient areas of its country, such as those in rural areas. A measure must be put in place to create a geographically averaged price as this would ensure the continued investment into rural areas.

The pricing method that is to be implemented should prevent unnecessary price hikes to end users served by technology platforms that are in decline or obsolescent by effectively applying a pricing method that prevents such an increase. A number of other methods are discussed further in this document.

Q2. How do you rate an adaptation of the price regulation method which is based solely on FULL? Alternatively, what criteria would you apply for a generally formulated, product-neutral adaptation of the method of price calculation?
Q3. Art. 54 TSO could be amended to the effect that the requirement is removed only for FULL, to use the MEA approach. How would you assess this type of revision? In this case, in the cost modelling, should overall demand consisting of fibre and copper connections be applied to design the copper access network?

It would not be ideal to calculate FULL prices using a different methodology to that employed for other wholesale prices, as it could lead to inconsistencies along the (hypothetical) chain of wholesale supply from the "duct owner" to the "cable owner" to the "cable renter" to the various "bitstream purchasers".

The problem here is not the "MEA[5] approach" as a concept, but instead how to model the efficient replacement costs of a copper local loop, or sub-loop. With vectoring, some sub-loops may one day operate at speeds around 100Mbit/s. Implemented as fibre, all of those sub-loops (not just some of them) will all be able to support, at a similar future time, significantly higher data transfer rates than 100Mbit/s. A fibre local loop (or sub-loop) is therefore a significantly superior asset, so is not "equivalent" to a copper local loop (or sub-loop).

Furthermore, it is not yet proven that FTTH[6] is the MEA for a fixed broadband access network. In 2008 over half of new build homes in UK were supplied by copper rather than fibre.[7] Under the heading "copper or fibre" BT's guide for new housing developers explains, that "From 2011, we may ask certain new site developers, depending on their location, to install tubing to their site and ensure they're ready for fibre" (emphasis added).[8] The words "may" and "ready" imply that the installation of fibre is not yet the default option for new housing developments. The associated BT manual aimed at new building developers offers them a range of copper items, such as drums of copper cables.[9] It is possible that copper remains a lower cost option than fibre for builders in many circumstances. The UK's

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5 Modern Equivalent Asset. In revaluing an asset which cannot be purchased new any more (e.g. a PDH radio link), the MEA approach looks for the closest modern equivalent (e.g. an SDH or ethernet radio link) which could replace it.

6 FTTH (Fibre to the Home) means an arrangement whereby Swisscom's traditional all-copper local loop is replaced by a local loop, making use of fibre-optic technology in all parts of the connection.

7 Ofcom (2008) "Next Generation New Build: Delivering super-fast broadband in new build housing developments", page 8. The authors do not explain precisely what the mean by "fibre" in this context; it is likely that they include FTTC in the definition. The implication is that the majority of newly built homes were supplied then (and probably still are now) using copper at some point in the infrastructure

8 "Service Options", http://www.openreach-communications.co.uk/our-network/service-options/how-do-I-know-what-products-are-right.aspx

9 Openreach (2012) "Communications infrastructure: guide for developers, Issue 5.1", page 30.

principal cable operator, Virgin Media (which employs an HFC[10] network partly based on copper) is also installing its infrastructure in new housing builds.

In some countries of the world, fixed broadband access networks using HFC are being procured and rolled out in 2012 because they are quicker and cheaper to roll out than FTTH networks in some circumstances. This is happening in Latin America (e.g. Paraguay) and in other emerging markets, providing a further argument against considering FTTH to be the MEA for a local access network such as that of Swisscom.

We would suggest that the MEA approach be considered of one of a number of ways of modelling *efficient replacement costs*, but not the main one. This would entail modifying Art.54 TSO accordingly for all services not just FULL, to allow alternative methods of modelling efficient replacement costs as part of the cost calculation.

It is worth putting the MEA method in the context of other typical replacement cost methodologies which have been employed in the regulatory costing models of telecommunications operators in Western European countries. The commonly employed methodologies are:[11]

- Historic cost accounting (HCA)[12]
- indexation
- absolute valuation
- MEA.

The appropriate method to use depends on the asset in question. In the UK, for example, the replacement cost of BT's local access network is modelled using a combination of two methods (not MEA):

- assets installed prior to 1997: HCA (with fully depreciated assets excluded)
- assets installed since 1997: absolute valuation.

The cost calculation for Swisscom's access network should model an efficient transition between technologies, recognising that for many years to come Swisscom will operate, in parallel:

- Full-length copper local loops: from customer to legacy exchange
- Copper local sub-loops: from customer to VDSL (later, vectoring) node
- FTTH local loops: from customer to FTTH cross connection point (GPON or Ethernet switch, or else a physical patch panel in the case of a point-to-point structure).

It is worth noting that the annualised cost of the copper sub loops is likely to represent a very significant portion of the annualised cost of the full-length loops. So even if the MEA is FTTC,[13] a major part of the cost of the MEA would be the copper sub-loops, which should

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[10] Hybrid Fibre-Coax technology (similar to that employed by Cablecom) which uses copper sub-loops

[11] See, for example, Independent Regulators Group (IRG) (2006) "Principles of Implementation and Best Practice regarding the use of current cost accounting methodologies as applied to electronic communication activities", page 21.

[12] HCA methods take into account the original cost of acquiring or building the asset using actual historical financial information held by operators. This is then depreciated over the lifetime of the asset and added to the cost of capital in order to come up with an appropriate costing.

[13] FTTC (Fibre to the Cabinet) means an arrangement whereby Swisscom's traditional all-copper local loop is replaced by a local loop making use of fibre-optic technology to the cabinet, and traditional copper cables from the cabinet to the customers' premises.

be modelled (as in the UK) using HCA, or absolute valuation, depending on their age. And in both cases, the costing should use the unit costs most representative of an efficient operator.

In any case, the MEA method should be thought of as a means to an end, not an end in itself, to be used when the other methods are impossible. Such impossibility would arise attempting to value an asset which is no longer widely available to be purchased new, such as a PSTN[14] line card or a PDH[15] radio link. However new copper-based access network components are available to be purchased now, and indeed are still purchased.

*Q4. At present, replacements costs are used as the **cost basis** for price calculation, with the exception of the rebilling for fixed network local loops. Among others, the contestable markets model constitutes the theoretical background, i.e. incentives are applied for duplication of the infrastructure concerned.*
Q4a. Would you set a different cost basis for specific cost blocks within individual access products? Would you set a different cost basis for access products or for activities in the value chain?
Q4b. what would be possible criteria to determine duplicability?
Q4c. Do you see a justification for applying historic costs in the case of cable ducts? What would the consequences be?
Q4d. Apart from FULL, cable ducts can also be used for more modern transmission media such as fibre. If historic costs are applied in the case of cable ducts, would a problem or distortion of price signals result from this?

It is sometimes argued that the costs of obsolescent assets such as copper local loops should not be modelled using replacement costs, because they will not now be replaced. Instead, it is argued, their costs should be modelled using HCA.[16] There are a number of problems that can arise from this use of HCA, such as those highlighted by Analysys Mason in a recent report regarding the valuation of BT's duct access in the UK:

> *Use of historic costs would give greater advantages to operators who have not built network in the past, and devalue the assets of those who have built in parallel with [the market-dominant provider] in the past, though often at a later date, e.g., [cable operators] in major cities, etc.* [17]

These issues highlight why HCA is not widely used in cost calculations for wholesale services.

Replacement cost methodologies (used in CCA and LRIC) value assets based on the current value of what they would cost to replace. This is the most popular approach used by regulators, and is currently the method most widely used in the regulation of wholesale access prices. Analysys Mason concluded:

> *Replacement cost methodologies (either using absolute valuation or by indexing a previous valuation) have specific strengths: they provide efficient market entry signals, do not disincentivise efficient investment by [the market-dominant provider], are relatively practical and robust, and can be sufficiently transparent and stable. They are also consistent with past regulatory decisions. Replacement cost methodologies are therefore preferred.*[18]

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[14] Public Switched telephone Network.

[15] Plesiochronous Digital Hierarchy, a set of transmission standards which was supplanted first by Synchronous Digital Hierarchy and then Ethernet.

[16] See, for example, ECTA (2011) response to the EC's October 2011 questionnaire. Page 3. They do not argue for a shift to HCA for ducts and other civil work infrastructures: only for copper.

[17] Analysys Mason, 'Alternative methodologies for the valuation of BT's duct access – Public version', March 2010

[18] Op. cit.

Another practical disadvantage of HCA arises out of the process of switching from replacement costs to HCA. When the switch takes place, the cost accounts of the modelled entity will show a holding loss due to its reduced asset value. This holding loss (a kind of depreciation charge) will cause an upward spike in total costs and unit costs. This spike could, in principle, be avoided by retrospectively applying the change in valuation method to previous years. However, the spike could equally well be avoided by implementing a smoother transition, by introducing efficiency adjustments to an existing model.

It is not true to say that the copper local loop will not be replaced. Many of the sub-loop cables from the cabinet (or equivalent) to the customer will be copper for many years to come. These sub-loops may account for as around 80% of the total value of the copper in the access network. They will need to be maintained and replaced until replaced by FTTH. It is not guaranteed that a total transition to FTTH will happen any time soon. So a replacement cost methodology for copper will permit the market-dominant operator to generate sufficient costs to maintain and upgrade it sub-loop cables as necessary.

Replacement costs, however, needs to be implemented carefully in order for them to reflect the costs of an efficient operator. Below are two such examples that outline issues that may be missed if such care is not taken.

The broken duct scenario

In the scenario where a duct collapses, or has damage to it, it is the decision of the owner to either repair the duct, or to build a new one at the other side of the road. In the scenario where a new duct is built at the opposite side of the road, the existing duct may still remain on the register. If only one cable is active within that existing duct, it will still form part of the valuation. Replacement cost methods do not account for this situation very capably should ensure that such duplicate ducts are not included in an absolute valuation.

Construction costs

Valuing a network roll-out cost can be a challenge. With replacement cost methods, recent maintenance or building projects will be taken as a benchmark on which to base the current cost of deploying a new network. If, for example, one kilometre of new network is deployed, this will then be multiplied against the entire network to get the current costing. This can lead to inaccuracy as a one kilometre incremental roll-out is not a good proxy for an entire network roll-out cost.

In order to avoid issues such as those outlined above, a cost calculation can be based on the market-dominant providers's capex budgets going forward, applying an efficiency gain to model future costs. For market-dominant players who have emerged from the public sector, an efficiency adjustment is especially important so as to incentive the operator to streamline its operations, as well as to reflect the variations in efficiency between a public-turned-private operator over an originally private operator.

Q 5. In detail, ComCom sets cost-accounting replacement costs and calculates the annual capital costs using the so-called tilted annuity formula.
Q5a. Would you apply a different capital cost calculation method for specific cost blocks within individual access products? Would you apply a different capital cost calculation method for access products or for activities in the value chain?
Q5b. Do you see a need to change the capital cost calculation method? How would you change the method?

The wholesale prices of FULL and of wholesale access to NGA should be set to allow recovery of efficiently incurred costs. The tilted annuity formula is one of a number of annualisation methods suitable for achieving this, as we will described more fully in the answer to Q11 (below).

*Q6. (Relative) **prices** are an important factor for investment incentives and competition effects.*
Q6a. What effect does the difference between the (copper) FULL price and NGA access prices (for FTTx, DOCSIS 3.0, LTE and the like) have in relation to investment incentives?

This is a controversial subject which has been widely debated, most recently in the responses to the European Commission's questionnaire on the subject, issued in October 2011.[19]

There is insufficient empirical evidence upon which to base an answer, because there is very little historical data in any country on the difference between FULL (copper) and NGA access prices. This, in turn, is because there is very little data in the public domain on NGA access prices. NGA access pricing (that is, offering wholesale NGA access to alternative ISPs who previously used FULL or BBCS[20]) is a rather recent phenomenon. NGA access prices are lightly regulated in some countries (as in the UK) or else the take-up by alternative ISPs is at a very early stage (as in Spain), or both.

This absence of empirical evidence caused some of the key responses to the EC's October 2011 Questionnaire (those of ECTA and ETNO, for example)[21] to be based on theoretical models. While these models covered many interesting and important issues, they did not arrive at a conclusive answer to the question posed.

In the absence of an answer to the question posed, the approach advocated by BEREC is appropriate:

> *The question to be answered is not whether "the price is too low or too high?", but "does the regulated price send the right economic signal, i.e. is the price competitively (and technologically) neutral?" If the answer is yes, it will steer the market towards an efficient outcome (in terms of competition, investment and ensuring consumers are safeguarded as the industry moves to NGA infrastructure). In BEREC's view this will best be achieved with cost-oriented access prices seeking to mimic the outcome of a competitive market where the equilibrium price reflects the cost of efficient service provision.*[22]

Later in our response we will offer some suggestions on how to arrive at cost-oriented access prices that reflect the cost of efficient service provision.

Q6b. In this context, please explain the role of end customers' willingness to pay for products which compared to products via FULL enable a distinctly higher data transmission speed and a wider variety of services.

End customers' willingness to pay impacts on the average revenue per user (ARPU) that Swisscom and alternative ISPs can expect to achieve for their bundles of voice, broadband and TV. This expected ARPU is, in turn, a key input to any margin squeeze calculation that may be required to determine whether or not Swisscom's wholesale prices permit an alternative ISP to make a reasonable margin. So the main role, in this context, of end customers' willingness to pay is an input to such a margin squeeze calculation.

A typical regulatory remedy to the finding of market dominance in the market for wholesale broadband access would be to mandate wholesale access to the corresponding network. For example, in the UK BT is required to offer unbundled access to its NGA network (a

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[19] The consultation document and responses could be found, at the time of writing, at: http://ec.europa.eu/information_society/policy/ecomm/library/public_consult/cost_accounting/index_en.htm, under the heading "Commission launches public consultation on costing methodologies for key wholesale access prices in electronic communications".

[20] Broadband Connectivity Service. Described at: http://www.swisscom.com/en/wholesale/products/broadband-connectivity-servicebbcs/isp-offer.html

[21] Linked from the EC's consultation web page cited above. ECTA is the European Competitive Telecommunications Association. ETNO is the European Telecommunications Network Operators' association.

[22] BEREC (2011) "BEREC's answer to the Commission's questionnaire on Costing methodologies for key wholesale access prices in electronic communications", linked from the EC's consultation web page cited above. Page 6.

mixture of VDSL and FTTH) by means of a bit-stream offer known as VULA (Virtual Unbundled Local Access).[23] However the price for VULA has not been set using a regulatory cost model, even though the FULL price was set using such a model. The UK regulator Ofcom decided that imposing cost-based access prices on a network that was still in the early stages of construction would be unnecessarily stringent. Downward pressure on the VULA price will come instead from the need for BT to maintain a margin between its wholesale prices and its retail ARPU, to avoid squeezing its competitors' margins.

It follows that, if end users of bundles based on NGA do not generate ARPUs significantly higher than similar bundles based on FULL, then the price of wholesale access to the NGA should be rather close to that of FULL. If, on the other hand, the market-dominant provider provides evidence that there is an ARPU differential then a differential between the wholesale prices for NGA and FULL could also be justified. It would also be necessary to demonstrate that wholesale NGA prices allowed alternative ISPs to earn a margin on replicating the bundles offered by the retail arm of the market-dominant provider.

Q6c. How would an upward price trend for FULL affect the investment incentives of a market-dominant provider on the one hand and other market participants on the other? What effects on consumers can be expected (end user prices, quality of services, etc.)?
Q6d. How would a downward price trend for FULL affect the investment incentives of a market-dominant provider on the one hand and other market participants on the other? What effects on consumers can be expected (end user prices, quality of services, etc.)?

Q6c and Q6d have been discussed at length in responses to the EC's October 2011 Questionnaire. In general, there is agreement that a downward trend in the wholesale price would reduce retail ARPUs for both current- and next-generation access providers. This in turn would tend to reduce the attractiveness of access network investments for all types of operators.

However, if the trend in the FULL prices is moderate (such as the recently announced downward trend in the UK of approximately 2% to 4% per year in nominal terms) then the direction of the trend itself is less important than operators' confidence that the trend has been arrived at by objective and unbiased methods. Investment will be incentivised if they are confident in the method and (equally important) confident that the method is unlikely to be significantly changed during the time that they plan to recover their investments.

Q6e. Should FULL prices be differentiated regionally? Please give reasons.

It depends if there is a policy goal to offer geographically averaged retail prices for broadband access and related bundles of fixed line services, and if there is a separate ownership structure that requires implicit cross subsidies to be made explicit. Imagine that Swisscom were to be (hypothetically) broken up into (a) a national retailer of broadband access and related bundles and (b) separately owned and operated regional operators providing FULL to the national retailer. In that situation each regional operator should be able to price so as to recover its own costs. If those costs were different, then the wholesale price of the FULL service would, in effect, be differentiated regionally. However, the policy goal of geographically uniform retail prices would require the retailer to offer the same retail price in each region. This would mean that the retailer would subsidise high cost regions with profits from lower cost regions. This cross subsidy is, implicitly, what the (not-broken-up) integrated Swisscom does now, by offering the same FULL price everywhere. So while there is a single national market-dominant provider of FULL, and while there is a goal of national averaged retail prices, there is no reason for FULL prices to be differentiated regionally.

Q7. The question is also posed regarding the costs of parallel operation of copper and fibre access networks.
Q7a. What additional costs are incurred for parallel operation of copper and fibre access networks? What sort of effects does this have on the efficiency of the market participants?
Q7b. Does parallel operation of copper and fibre access networks weaken investment incentives?

[23] VULA is described and diagrammatically depicted at Figure 1 (Page 6) of BT (2011) "Sub-Loop Unbundling (SLU) Openreach Internal Reference Offer, 6th April 2011 - Issue 1", downloaded March 2012 from: http://www.openreach.co.uk/orpg/home/products/llu/subloopunbundling/subloopunbundling/downloads/slu_iro_v1b.pdf

Q7c. Accordingly, should the market-dominant provider be allowed to switch off its copper access network? When? What would be the shutdown criteria? How should any dismantling of exchanges take place?

Alternative ISPs who rely on FULL should be given sufficient notice of the switch-off of an MDF or cable bundle, so that they can plan their transition to wholesale NGA access over the networks that make the FULL lines redundant. Some of these alternative ISPs will have made significant investments in assets with long lifetimes (such as fibre connections into the MDF sites of the market-dominant provider), so the notice periods should be long, recognising the alternative ISPs' reasonable expectation of the economic payback period of those investments, at the time they were made. Investments in local access businesses are characterised by high up-front costs and long pay-back periods; a minimum of 8 years would therefore seem to be appropriate for this notice period. Furthermore, there does not seem to be any compelling reason not to allow the alternative ISPs a veto over whether the copper can be switched off in a particular area, until they are able to access all potential customer premises in that area via a choice of wholesale FTTC and FTTH, both at reasonable profit margins. Finally the competence to regulate fibre access networks based on an access request should be given to ComCom, prior to switching off the copper access network. This means existing copper regulation would need to be extended to cover fibre.

Q7d. Would end user prices for services with the same performance, as with those via FULL, increase after switch-off of the copper access network in the absence of access regulation for fibre access networks?

Cable TV networks and wireless broadband will act to moderate those end user prices to a certain extent. However cable is not available to all potential customer premises. Wireless broadband is not a close substitute; it does not offer a comparable data throughput to NGA when many users are connected. Unless wholesale access is mandated as a successor to FULL, the number of competitors passing a significant proportion of potential customer premises can be expected to reduce, and prices could therefore rise. For this reason a range of wholesale NGA including in particular BBCS and fibre access network (FTTC and FTTH) products should be regulated. Furthermore, the existing bit stream access regulation should be extended beyond 2013 and the conditions should be reviewed in order to allow interconnection at the backbone level instead at local exchanges only.

Q8. The minimisation of market distortions generally plays an important part in terms of efficient investment.
Q8a. Within the context of the FULL price calculation method, how can it also be guaranteed that the least possible distortion of ***intra****-modal competition occurs?*
Q8b. Within the context of the FULL price calculation method, how can it also be guaranteed that the least possible distortion of ***inter****-modal competition occurs?*

The least distortion will be caused by cost-oriented access prices that reflect the cost of efficient service provision. In our answer to Q11 we will offer some suggestions on how to arrive at such prices.

Q9. The predictability or rather the stable evolution of prices is also a factor in relation to investment incentives. The fixation of prices or the use of other remedies in advance provides predictability but may favour errors in regulation. What is your position on this?

Before changing the calculation methodology for a wholesale price (for example, from CCA to HCA) it is best to have exhausted all the opportunities for improving and fine tuning the detailed implementation of the existing methodology. Detailed implementations of costing methodologies are often not made public. This can be because the underlying data is confidential (for example, contacts between the market-dominant provider and its suppliers), or because the published explanations contain only a summary for reasons of space. We do not know what detailed implementations currently characterise the FULL and duct access prices. Notwithstanding, here are some examples of the sorts of areas where calculation of the replacement costing of an access network can sometimes be improved:

- Replacement cost calculations often estimate the replacement cost of an incumbent's underground plant using km of trench from an inventory of the existing local access network. It should be checked that only the kms required by an efficient

operator are taken into account in the calculation, by excluding disused, empty and low-occupancy ducts. (Low occupancy might be the result of legacy network evolution, and would not be present in a newly built network).

- Replacement cost calculations should avoid working out the cost of a network significantly superior in technical terms to the real one. Modern price lists for access network components (such as access chambers, poles, ducts and cabinets) can sometimes exclude some lower cost or differently dimensioned elements which are actually more representative of the real network. The market-dominant provider should be prevented from introducing upwards bias into replacement cost calculation by means of selective interpretation of its own suppliers' price lists.
- Replacement cost calculations in forward looking models should make use of the market-dominant provider's actual cost drivers in its real capex budget. Such capex budgets typically make use of real historical data for (for example) person hours of digging, installing, covering-over and suchlike. Such calculations can forecast costs using recent trends in key performance indicators such as hours per metre, hours per manhole, cost per hour (and suchlike), and project them into the future based on a reasonable estimate of productivity and efficiency gains. Ideally the budget would forecast three- to five years into the future.

By progressively improving the accuracy of the replacement cost calculation each time the cost calculation is done, a gradual progression can be achieved towards an efficient cost. These sorts of gradual step-wise improvements (within the proven and widely accepted paradigm of cost-oriented access prices that reflect the cost of efficient service provision) are preferable to abrupt methodological changes, or the employment of cost concepts such as "SRIC" or "pure LRIC" and other such innovations whose practical effect is often merely to bias costs downwards.

Q10. What additional factors concerning investment incentives and competition effects should be taken into account with regard to achieving the objectives of the TCA aim?

An important type of wholesale access service which is sometimes overlooked in this kind of discussion is mobile backhaul, high speed links connecting 3G and LTE base stations to the core networks of mobile broadband operators. Furthermore, it is sometimes overlooked that radio spectrum is not the only constraint to the development of a mass market in high-speed high-throughput mobile data. Another key constraint is the availability of competitively priced mobile backhaul. We have mentioned a number of times the need to take efficiency adjustments into account when calculating the forward-looking costs of wholesale services. This remark applies equally to wholesale leased lines for backhaul, as it does to FULL and the other services covered by this questionnaire. Furthermore, wholesale leased lines for backhaul are also an important building block for competing fixed, as well as mobile, broadband networks.

Q11. At present, in your opinion, what would be the optimal method of price calculation for FULL? Please describe the method in sufficient detail, e.g. with reference to the cost basis to be applied or any problems with application, and give reasons for your choice.

As we have mentioned before, we would favour stability in the cost calculation method, so that the Alternative ISPs who purchase FULL from Swisscom are not subjected to unpredictable regulation. However if continuation of the current method leads to counter-intuitive results (such as a rising unit cost for FULL) then the assumptions in the model should be reviewed.

The first stage of the review would be to critically appraise predictions of future efficiency gains. If there is a rising trend in the unit cost of FULL due to falling volumes, then the model should be checked for its forecasts of the efficiency gains required during such a "winding down" phase of an obsolescent product, or during the contraction phase of the whole fixed line market. The model should also be checked to ensure that new local access lines (FTTC or FTTH) which substitute the FULL lines or PSTN/ISDN lines (as they decline) pick up the corresponding share of the duct cost which was picked up previously by the FULL/PSTN/ISDN lines.

It would also be helpful to have the model project the unit cost of wholesale services several years into the future. In this way, a target could be set for the FULL price in (say) five years' time which would also help to provide the alternative ISPs and their competitors with some additional predictability.

We have not mentioned in this reply any change to the cost annualisation formula. Continuing with an existing formula which allows the recovery of efficiently incurred costs (as the tilted annuity formula does) would be preferable to a change to a more theoretically ideal formula (such as economic depreciation, or a model based on DCF). The reasons are as before: favouring stability in regulation. There is at least as much additional accuracy to be gained from fine tuning and continually improving the model's inputs (especially regarding revaluation, efficiency and allocation) as there is from implementing changes to the annualisation formula.

Q12. In the case of anchor pricing, a specific price level, e.g. for FULL, would be frozen. Such possible anchor points would be an average of the price over the last few years or the last regulated price in the case of the entry into force of a revised ordinance. How do you rate the anchor pricing method? What would be its effects?
Q13. What problems might arise with the application of anchor pricing? How could these problems be tackled?

As described here, this method has the advantage of simplicity. It also protects the end users of services based on FULL from price rises, if the situation arose in which it proved impossible to prevent the cost model from outputting a rising FULL price even after the model review described above under our answer to Q11. However, it would be preferable to solve the problem of rising FULL prices via adjustments to the model, in case it turned out that the rising price was due to a modelling error such as modelling insufficient efficiency gains, or over allocation of duct costs to FULL during the transition to NGA.

Q14. In the case of the discounted cash flow (DCF) method, a business scenario for copper access networks would be constructed, e.g. for the FULL price in which the necessary investment would be compared with the envisaged returns. This essentially enables demand effects to be taken into account. How do you rate this method? What would be its effects?
Q15. What problems might arise with the application of DCF? How could these problems be tackled?

The DCF method is good because it is a multi-year method, and requires a volume forecast, which in turn favours an industry discussion about the rate of migration from FULL to NGA, and about the likely total number of fixed lines in the country over the modelling period (five years, say). The benefit of forecasting is that it allows the model to project the unit cost of wholesale services several years into the future, as already mentioned in the answer to Q11 above.

Q16. A glide path, e.g. for the FULL price, would mean that starting out from a specific level, the price would fall over a prescribed duration to a prescribed level. One possible justification would be customers' relative willingness, increasing over time, to pay for services with substantially higher bandwidth. The copper access network would lose value relative to the fibre access network thereby justifying a falling price trend for FULL. How do you rate this method? What would be its effects?

A glide path would add to predictability, and allow modelling resource to be incurred once every three- to five years, rather than every year.

Q17. If a glide path were to be applied, how should this be configured, in your view? Please give your reasons and express a start and target value, as well as the duration of the glide path and any intermediate stages.

The glide path could be configured using the annual forecasts produced by a multi-year cost model, of the type described in the answer to Q11, above. The target value would be the unit cost output by the model in its final year (Year 5, say).

Q18. One possible starting value for a glide path would be a price based on the current provisions in the ordinance. Operational costs (SRIC) could serve as a target value for FULL.
Q18a. How do you rate such a starting value? Would you agree with the argument that at the present time sudden price shifts for FULL must be avoided, with regard in particular to investment security?
18b. How do you rate the proposed target value? What would be conceivable alternatives?
18c. How long should the glide path be? Or rather, what criteria should be used as a basis for the glide path?

18d. Should the glide path be linear or non-linear? Please give your reasons.
18e. Does a non-linear glide path in which the changes become greater over time appear beneficial? Can the rate of technological adaptation be influenced in this way?

In the event that the intermediate values in Years 2-4 did not follow smooth trend, the glide path could be smoothed. A non-linear (geometric) trend would be most natural, representing a constant percentage decline each year.

Q19. What problems might arise with the application of a glide path? How could these problems be tackled?

The main problems with the glide path are:

- it might allow over recovery of costs
- it could be disrupted by inflation.

The second can be dealt with by expressing the annual change relative to a price index such as RPI. The first problem is unavoidable, because the cost over-recovery might be due to the regulated company's diligence in achieving efficiency gains.

Q20. In the case of retail-minus, the costs which are incurred for efficient sales/marketing of a product are deducted from the end-user price. The goal of this method is in particular to prevent margin squeeze. How do you rate this method? What would be its effects? What would have to be taken into special consideration for FULL?

A margin squeeze test is a complementary exercise to the cost modelling, not a substitute.

A margin squeeze test is not a simple exercise to carry out. It requires the identification of Swisscom's "retailing costs" which include not only its sales and marketing costs but also the costs of those parts of its network and operations outside the scope of what is provided by FULL. It then requires a DCF model to help answer the question: if Swisscom had to provide broadband services by purchasing FULL at the same price it charges to its competitors, and then add on to that its "retailing costs" (as defined above), would it still make a reasonable return on capital? This is one way of arriving at a FULL price, but it isn't significantly less costly in terms of data gathering and modelling than doing the cost modelling described in our answer to Q11 above.

Q21. In Switzerland, for the end-user price, the price ceiling for a subscriber line of CHF 23.45 excl. VAT (Art. 22 TSO) is sometimes key. Do you see any problems resulting from this price ceiling in relation to the application of retail-minus? Would the FULL price be substantially distorted? How could any problems be tackled?

The price given here is for a plain fixed voice line, without calls and without broadband. If an alternative ISP tried to compete with this Swisscom product using FULL as its main wholesale input, a margin squeeze test might be triggered, even if the FULL price was cost based. However, we do not think it is an urgent regulatory priority to ensure this kind of voice-only competition is viable, unless there is a clearly expressed desire by alternative operators to pursue the corresponding business model. It is more likely that alternative operators will want to offer voice as part of a bundle. For this reason a margin squeeze test on the whole bundle is more important. The priority objectives should be for alternative operators to be able to use FULL (and other wholesale access products) to make a reasonable margin on the typical bundles of voice and broadband (including revenues from usage charges such as calls).

Q 22. There is increasing demand for bundled products in which television services, mobile telephony services, internet access and fixed-network telephony are combined. Do you see any problems resulting from bundled products in relation to the application of retail-minus? How could any problems with bundled products be tackled?

The same principle applies as we referred to in our answer to Q20 above. A margin squeeze model on a bundle would help answer the question: if Swisscom had to provide this bundle by purchasing FULL at the same price it charges to its competitors, and then add on

to that its “retailing costs” (as defined in our answer to Q20), would it still make a reasonable return on capital? Once again, it’s a complex model, made more complex by the need to include TV and telephony costs in the modelled “retailing costs”.

It is worth noting here that wholesale prices are not the only obstacles to competition in bundled services. Wholesale access products must offer a full range of interfaces into the market-dominant provider’s networks and systems to allow challengers a chance to replicate bundles. Such interfaces must allow enablers of service differentiation such as voice over broadband, unicast class of services, and multicast. Swisscom is massively deploying VDSL in street cabinets. It is not economically viable for alternative ISPs to keep using FULL in the presence of this VDSL, as it would require deploying DSLAMs at Street Cabinets level (there are maybe as many as 5000). The fixed market is increasingly driven by bundles of voice, broadband and TV. The technological requirements for such bundles make it necessary for alternative ISPs to use one single network, Swisscom’s VDSL network, in order to match Swisscom’s economies of scale. Otherwise, fixed costs for TV multicasting are replicated: once on VDSL, and another time on a platform running over FULL.

For this reason a range of wholesale NGA including in particular BBCS and fibre access network (FTTC and FTTH) products should be regulated. Further the existing bit stream access regulation should be extended beyond 2013 and the conditions should be reviewed in order to allow interconnection at backbone level instead at local exchanges only. This would allow alternative Internet Service Providers to leverage on their backhaul infrastructure.

Q23. There is the possibility of combining retail-minus and LRIC according to the following price rule: min [LRIC, retail-minus], i.e. the method which produces the lower price is applied. In some cases, this approach would make it possible to prevent both margin squeeze with retail-minus as well as excessive price setting with LRIC. Would such an approach be preferable to retail-minus on its own? Please give your reasons.
Q24. What other problems might arise if retail-minus or a combination of retail-minus and LRIC are applied? How could these problems be tackled?
Q25. The SRIC method explained in connection with the glide path (section 5.3.3) could also be applied in combination with LRIC. In the latter variant, depending on the replicability of an installation for different cost elements, different cost scales (SRIC or LRIC) could be used. How do you rate this method, particularly also with regard to the FULL? What would be its effects?
Q26. What criteria should be applied to determine replicability? Would there be alternative criteria other than replicability for the choice of the cost scale?
Q27. What problems might arise with the application of an SRIC-LRIC mix? How could these problems be tackled?
Q28. Do you see any other commendable methods which can be implemented? Please describe the methods in sufficient detail, e.g. with reference to the cost basis to be applied or any problems with application, and give reasons for your choice.

Regarding Q23-Q27, we would like to reiterate that there is probably more to be gained by working on the inputs to the model, than by changes to the costing standard.

Q 29. As mentioned above, from 2013 onwards ComCom will consider IP-based interconnection as the MEA in relation to PSTN. Do you consider that this adequately reflects the evolution of the market?

The networks will evolve towards next generation networks. However, the date of 2013 is too early as the interconnections are still mainly done based on circuit switching technology. We thus recommend to postpone the introduction of such an IP reference model to 2015.

Q 30. In the interconnection sector, as a result of the switch to IP-based interconnection, there is a possibility of replacing charging for interconnection services on a per-minute basis with capacity-based charges (CBC). How do you rate this method? What would be its effects?
Q 31. Do you have any other comments on price regulation relating to interconnection?

The tariff model should be adapted only by the GSM-A and should concern all interconnection (national and international). A model which is based on the capacity for the national interconnections and on minutes for the international traffic is of very limited usage as national traffic can be routed using international connections. The following effects will occur as a result of the introduction of the capacity based charges model:

- The use of this model will lead on smaller interconnection pipes between operators to minimize costs;
- The minimal dimensioning of pipes will cause congestion problems during busy hours and significant issues in case of outage on one link (extra capacity not provisioned on other links to avoid the costs);
- The use of two models for national and international traffic will result on international tromboning during the busy hours or to congestion;
- The customer experience will be degraded compare to the current situation on busy hours and in case of any outage on one particular link; and
- If the traffic between two operators is not balanced, there will be an issue to dimension the pipe according to the need of the net sender operator.

Q 32. To what extent are you in agreement with the structure and requirements in the above representation? Please explain any deviant ideas you may have.

The vision of Ofcom on Next Generation Network, as set out in the pre-amble to this question, is correct. It corresponds to what operators (such as ourselves) are currently deploying for new network rollouts. However it is important to note that:

- Migration of existing infrastructure to such target network structures takes several years during which time parallel systems have to co-exist
- Migration towards target network structures can sometimes be put on hold (whether due to changes in the general economic climate, or changes in the cost-benefit equation that originally justified the corresponding investments), in which case the above-mentioned co-existence can be prolonged indefinitely.

Q 33. Please place your answer to question 32 within the context of cost modelling.

Cost modeling should take into consideration that previous-generation technologies (such as TDM[24] circuits) will co-exist with next generation (such as Ethernet circuits) for several years. Wholesale pricing should allow the operator of the two networks to recover the efficiently incurred costs of running the two generations as co-existing platforms during the transition. As we have mentioned before, effort should be devoted to:

- Implementing efficiency adjustments in cost models used for this purpose. For example, consider a Layer 2 composed of some Ethernet and some TDM. If the cost per unit of output (per Mbyte) appears higher for the TDM than for the Ethernet, then this suggests a modeling problem that needs to be addressed, or else an inefficient operation
- Ensuring correct cost allocations for the previous-generation technology. Continuing with the example, the reason the TDM technology is kept in service (and not already replaced by Ethernet) may be to do with the needs of certain types of customers or services. In that case, its cost should be allocated to those specific customers or services.

There are often legitimate reasons to keep successive generations of technology running in parallel for significant periods. This happens with mobile networks, due to the proliferation of handsets in the market. It might be argued that Release 99 (R99) of 3G is an old technology, which has been superseded by HSPA. However, it would be a mistake to model only the costs of an “HSPA only” network, because such a network would not serve the many millions of R99 handsets in the market. Similar arguments apply to GSM.

[24] Time Division Multiplexing. TDM technology is the previous-generation technology corresponding to Ethernet in Ofcom’s Figure 1.

Finally, case should be taken not to penalise operators who own previous-generation technology which is not yet fully depreciated. A 2G+3G mobile operator rolling its network out today would use integrated 2G+3G base stations, rather than separate base stations for each of 2G and 3G. However, an operator running separate networks of 2G and 3G base stations today is not necessarily inefficient. If the 2G base stations were acquired prior to 2006, implementing them as separate base stations was probably the efficient choice, at the time. So forcing a cost recovery based on a hypothetical "modern equivalent network" of integrated base stations would be wrong, as it might preventing the operator from recovering its efficiently incurred costs.

Q 34. In its decision of 7 December 2011 Com Com stated that it will only be possible to meet the statutory requirements in the future by the use of NGN and NGA.
Q34a. What effects does this announcement have on the offering of interconnection interfaces?
Q34b. What further effects might this announcement have on the participants in the market?

We have already, earlier in this response, expressed our disagreement with the idea of modeling all replacement costs systematically as hypothetical "modern equivalent asset" (MEA). On occasions MEA might be the right choice, but not always.

Regarding interconnection interfaces, we have already given some comments on this in our answers to Q29-31 above. Swisscom should propose regulated Ethernet connections in addition to (not instead of) the current TDM interfaces. That will help other operators (such as ourselves) as we also migrate towards IP-based interconnection. Premature withdrawal by Swisscom of the TDM interfaces would cause other operators to incur in unforeseen costs, and would not be efficient overall.

Marcel Huber / March 20, 2012