

Fibre access, duct and legacy copper – costs and pricing

A short examination of the EC Questionnaire and related papers

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Table of contents

Summary	1
The pricing of access fibre (NGA) is related to legacy copper	2
The EC NGA Questionnaire defines some of the current problems ...	3
Calculating the LRIC cost of legacy and fibre	6
Confusions in the Questionnaire	8
Replies to the Questionnaire.....	9
What costing method to use?	10
Conclusions and actions.....	13

Important note

This paper is a discussion document only. Any ideas expressed need not represent views of Telzed Limited or any clients.

The purpose of this paper is to highlight some issues and dangers raised by recent work on the regulation Next Generation Access (fibre technology), with the intention of provoking further discussions and actions. The paper does *not* attempt to fully analyse all the issues, alternatives and best solutions – that would take a very extensive piece of work. The paper simply points out some of the problems, dangers and conflicts.

Summary

There are many issues raised by the need to set prices for legacy copper access networks and new fibre access networks. Regulators have to ensure fair prices are available to help the consumers and competitors but must also include the interests of the investing telcos. With huge investments at stake, the risks are high but benefits from more/faster broadband are also clear. With varying approaches and outcomes in Europe, a Questionnaire has been issued by the Commission as a stage towards setting out a standard approach to costing and pricing of both legacy copper and new fibre access services.

This Telzed paper reviews some recent papers and identifies key issues and some possible approaches for moving forward. The paper notes the need for: economically valid approaches; separating aims and politics from economics; understanding that cost calculations are not the same as setting prices and incentivising investments; the Digital Agenda aims do not alter the need for correct costing work; fibre costs are a function of both legacy *and* fibre demand and this demand analysis still requires further work.

Urgent action is required to clarify the situation to reduce regulatory uncertainty that may be holding back investments – uncertainty that has been *increased* by the Questionnaire.

A thorough review of the fundamental aims, the possible approaches and of the Questionnaire's responses is required before a draft recommendation on costing and pricing is issued. The need is urgent but the implications are profound – the investment is large and risks are high. Getting the approach wrong could result in major financial problems for some telcos or discourage the desired investment.

This short paper does not try to cover the issues and solutions in detail. It identifies some key issues and areas that require additional studies. Further work is required.

The pricing of access fibre (NGA) is related to legacy copper

Telcos across the world are deploying fibre in the loop¹ – also termed Next Generation Access (NGA). The fibres link to the customer premises or else the fibre may terminate nearby in the street (fibre to the cabinet – FTTC in contrast to FTTH [home]). FTTC uses copper for the last drop link to the premises – which is relatively expensive to do per household, despite the short length. The technology is now mature and delivers much faster access speeds than possible over all-copper access. The legacy copper access network cannot deliver 100Mbit/s or more – as is possible over FTTH or the 20-30Mbit/s possible over FTTC. New copper technology such as vectoring however will increase the speeds, and this is relevant as it can increase the useful life of copper only or copper-fibre networks,

In principle the decision to invest in fibre is a standard business plan evaluation of the alternative legacy and NGA costs plus evaluations of the likely revenues of each as seen over a transition phase. The issues are complicated by the demand for fibre depending on the prices for legacy copper service – if priced low, then customers might prefer copper to faster but more expensive fibre. The investment decision is clearer in new “greenfield” sites as a new-build of fibre is not much more than copper, and so new locations are likely to be all fibre.

The commercial telco fibre investment decision is relatively easy where costs are low and demand (and revenues) are high – denser urban areas. FTTH and FTTC are being deployed but costs and business risks rise in less dense areas and for remote customers.

The fibre business case is further complicated by a number of other factors:

- It is rarely economic to have competing fibre or copper cables in the same street – this means there is effective market dominance by the main provider. Without competitive forces, consumers might not get the best deal. This means that National Regulatory Authorities (NRAs) may have to intervene to give competitive service supply. This is often achieved by giving wholesale access to the fibres or signals over the fibres. This enables service competition, in the same way seen today in many countries over copper wires – wholesale DSL and local loop unbundling services are available for the competing service providers
- The wholesale fibre access pricing impacts the business case, as it affects the market retail price and investment returns
- Retail prices and demand for fibre-based services are also affected by alternative networks – cable TV, mobile/wireless/LTE, and the lower performance copper-based services.

This means that NGA investment is strongly influenced by the NRAs decisions on wholesale NGA pricing. It is also related to the legacy copper pricing (a fact that might not initially appear so obvious).

Wholesale pricing solutions generally consider what is the efficient cost (including a return on investment) as the basis, since this reflects the theoretical price that should occur if access

¹ “Local loop” is the access network from the telcos central exchange site to the premises

services were in a competitive market. As we discuss later, the costs are a function of uncertain demand (and other parameters), and we note that wholesale prices may also be set in other ways than on cost.

This wholesale issue has been recognised by the telco regulatory community for many years and a number of papers have been issued on the subject. Some NRAs have made decisions and implemented solutions. The European Commission (EC) has also identified this as a major issue and has issued a number of papers on the matter: NGA discussion papers; and a Questionnaire issued in late 2011². This resulted in a number of replies, some of which are discussed in this paper.

A further factor in the evaluations of “correct” wholesale prices is the Digital Agenda. This defines an EU wide aim to meet targets for information technology and telecoms services. This included, for 2020:

- 50% of customers to have >100Mbit/s access
- 100% of customers to have >30Mbit/s access.

This can only be achieved by NGA – possibly with some areas addressed by wireless (LTE) or cable TV technologies. This means the fibre investment (and wholesale pricing) are linked to these targets. In other non EU countries, other political targets may exist.

These targets are laudable, but they are political targets. Telcos must make commercial decisions – based on making returns. NRAs are *mostly meant* to be politically independent and address competition and market economics related problems. The decision process may be influenced by some external aims – which set the overall policy and approach of the NRA, however combining politics, regulatory economics and business investment thinking can (as we show in this paper) open up real dangers.

The EC NGA Questionnaire defines some of the current problems

The need for a regulatory solution to the pricing of wholesale fibre access has existed for many years. Some working solutions have been implemented to suit the national requirements. Examples include: a retail-minus approach seen in Austria and the provision of some price freedom to the access provider – as seen in the UK. In the UK, BT Openreach is allowed by Ofcom to set the prices, but it has the restrictions of having to provide equivalent services (and prices) both to other service providers and to its own down stream business.

If the economic issues are similar then logically a common solution (or set of solutions) should be available. The EC has therefore discussed NGA costing and pricing with a view to giving a common approach that NRAs may follow. The Questionnaire is a recent stage in this process. The process has not been finalised and so many countries have had to implement their own solution, but while the EC has yet to give its Recommendation, all solutions are therefore subject to uncertainty. Uncertainty increases risks and risks are a barrier to

² http://ec.europa.eu/information_society/policy/ecomms/library/public_consult/cost_accounting/index_en.htm

investment. Fibre deployment is therefore probably being held back. The EC Questionnaire is therefore a central factor in the telco industry's plans.

The Questionnaire starts by identifying the key issues. These include:

- Different approaches to cost calculations are used in different countries and even the same method may give different outcomes
- Copper legacy pricing affects NGA take up
- Alternative technologies - cable and wireless have an impact
- The Digital Agenda.

This is the lead-in to the rest of the discussions and questions. Some problems are inherent with this start point:

- The discourse on costing methods generally has not properly discussed the fundamental purpose of cost calculations to set prices, or where other pricing methods may be used. Too much focus is on the formulae and mechanics of the method
- The Digital Agenda is a political aim. An NRA's primary focus is on solving regulatory competition issues. Funding of NGA investment (if alternative sources of funding are required) is not within most NRA's roles. If tax or other funding incentives are given then this may alter a NRA's approach, but a NRA's role is economic, not political. Any financial assistance to fibre investment is a national decision so this would lead to different national pricing approaches
- A start assumption is that the Agenda is a correct aim and regulation must be biased to help this outcome. This is a central issue. The Agenda may be a desirable outcome³: but whether should this be forced, by an NRA, is another separate issue
- The fact that countries have different outcomes for costing of copper should be examined on its own. Costs will vary significantly (copper length, population density, digging costs) so there is no need for the same outcome. If cost calculations are incorrect, then that can be corrected⁴ - a new method might not be required
- Costing methods are seen as a way to help achieve a desired political outcome. This is a change in the use of cost calculations and how an NRA normally acts.

It is sensible to go back to the basics of regulation and the role of cost based calculations that have been used in the past: the use of cost calculations to set prices is done where there is a need for cost based pricing. A central role of regulators is to define the telecoms markets and

³ Equally 1Gbit/s per house is desirable – technically this is not unrealistic. A technically visionary agenda should go beyond what is easily possible. After all, most desks in offices have up to 100Mbit/s to the desk – so why set an agenda to deliver what is already commonplace? Why should all locations get the same performance? It is also more relevant to consider the percentage of houses that are to get >30Mbits – should it be as much as 100%?

⁴ A parallel is seen with mobile termination rate cost calculation. The rates were meant to be all cost based (LRIC) some two years ago, but the differences were surely far more than underlying national cost differences. This was used by some as an argument for changing to pure LRIC. This is not a very sound logic for the change. Correcting the errors is the obvious solution. There are other reasons for the change to pure LRIC but poor cost modelling in some countries is not a good reason

to identify if there are competition problems, if there is a lack of competition then some remedies may be applied. This could be simply non-discrimination or publishing of tariffs. In some cases the prices are set by the NRA. Usually only wholesale prices are set by NRAs (at least in Europe) as retail market competition should optimise the consumer prices, but there have been plenty of retail price controls in the past.

Where there is a need for cost oriented prices due to market dominance, NRAs need to make some calculations. The Ofcom approach is: “the dominant provider should provide access based on a forward looking long run incremental cost [LRIC] approach allowing for an appropriate mark up for common costs and appropriate return on capital employed⁵.” This has been in place since around Y2000. It does not specify a costing calculation method. There is no reason for competition economics to change. Just because there a new technology, the basics do not change.

At this point we should note the recent change to pure LRIC⁶ and pressures towards bill and keep for mobile call termination, as this diverges from the usual remedy of cost oriented prices. Call termination is a different situation to an alternative provider having access to network components or infrastructure (such as NGA). Call termination is a service that is mostly provided *bi-laterally*. If set at LRIC plus a mark-up, there is little risk of economic or competition harm to any party, but there are arguments for potentially even better consumer outcomes with even lower rates. This is of course disputed by some operators. We note that where access is asymmetrical, such as with carrier pre-selection, (or if infrastructure or transmission is obtained only from the dominant carrier), then the pure LRIC approach has to be modified or is invalid. There is little suggestion that wholesale access to infrastructure and NGA should be at marginal cost (i.e. pure LRIC) even if this may be reasonable for call termination. So pure LRIC should not be taken as a precedent for future access network costing, but it does set a precedent for later major changes in regulatory price control policy. This is something that investors should be aware of: NRAs can change the rules.

A LRIC costing approach has a range of costs – not one value. The lower bound is the directly incremental cost and the upper bound is the stand alone cost (SAC) that includes all joint costs that are shared by other services and the common costs of running the business. This follows as, if service were in a competitive market, prices beyond these limits ought not to be possible (monopolistic over-high charges are implied if above SAC or predatory prices are implied if below incremental costs). NRA-set prices try to simulate competitive market outcomes.

This is well understood and NRAs have used various methods to define the approach and have also used various cost calculation methods. The principles should still stand. It is reasonable to believe that nothing has changed that impacts the fundamental regulatory requirements that NRAs should fulfil. Economics has not changed, even if technology has.

The question that then follows is: how do we correctly calculate the LRIC costs? This is at variance from the some of the Questionnaire discussions which seem to be related to: what gives a desired outcome, what gives high or low costs or which one encourages fibre

⁵ Ref:see for example recent Competition case on partial private circuits

www.catribunal.org.uk/files/1146_BT_Judgment_CAT5_220311.pdf or http://www.ofcom.org.uk/static/archive/oftel/publications/ind_guidelines/pcr1201.htm

⁶ Pure LRIC is a calculation of marginal cost that results in a low mobile (or fixed call) termination wholesale price

investment? This is a basic problem of the Questionnaire – the wrong questions and wrong basics seem to be behind the paper⁷. It is also a serious problem at this stage in the regulatory developments, as a Questionnaire that seems to be so far from ready to moving to a sound Recommendation is adding uncertainty and risk for investors.

Calculating the LRIC cost of legacy and fibre

The start point is the requirement to calculate the forward looking incremental cost and consider appropriate mark ups for common costs. It is not: which method gives highest, lowest of best outcomes for business X? The method chosen depends on the data available, degree of accuracy needed, and the types of assets and services. Clearly a new service, yet to be launched has no costs, and so accounts from last year cannot be used. For a business that has been in competition for many years in a steady market, then the account-costs may well reflect the average incremental cost of the service (after appropriate calculations).

The aims of LRIC calculations are to find the forward looking costs of providing the service. In commercial businesses, the Discount Cash Flow (DCF) method is almost universal. This method remains robust⁸ and clearly this is the approach to use for recent services or those still to be launched. Other methods may be simpler to use and may give a result that is adequately accurate (net result is economically similar to DCF). DCF can give a LRIC compliant result (arguably, LRIC methods simply aim to give the same as DCF).

A few aspects must be considered when we consider the analysis:

- Long Run. Some assets are long lived. Unless a NRA wishes to bias costs, a neutral approach considers costs are all recovered in the long run – assets will need to be replaced
- Shared (common) costs. This is highly relevant to telecoms as many systems are shared. The cost of duct and digging are high but the cost can be shared by many cables and services. This is where mark-up issues become important. This follows as it is not viable for have *all* services at their directly incremental cost (the overall business would fail). NRAs should not regulate such an outcome – hence the need for *appropriate* mark-ups
- Past investments. A DCF business plan is forward looking and past investments do not impact forward investment decisions (it cannot be unspent!). This does not mean that NRAs (or business managers) write this off and assume there is no cost – there *is* capital invested⁹ and the investment was assumed to be recovered over time. Past investment costs *are* reflected in accounts and are valid in many business decisions¹⁰, though some adjustments may be required to make them economically valid for forward looking cost-based pricing.

⁷ See also comments in BEREC response for example

⁸ See Brealey and Myers: Principles of Corporate Finance

⁹ Invested capital has a *cost of capital* – that must be recovered at a rate that reflects the business risk – to give a fair profit

¹⁰ There *are* situations when a past investment is not considered. But if 1€ billion of assets were bought last year and were expected to be recovered over 10 years, it is a dangerous situation for *all* services' prices to now ignore this. Who bears the loss?

These requirements are basic and so long as the method(s) appropriately take them into account, any method can be used to get the LRIC. If the economic outcome is similar, then the calculation-formula-method used, does not matter.

We next consider the main methods used in regulatory cost models. All are valid. In some situations some are simpler or give a more robust method to define the same LRIC outcome:

- The DCF. This is ideal for new services and also where the directly incremental cost is required. The Net Present Value (NPV) gives the economically valid result needed. New fibre build is logically modelled this way. A few issues need to be considered in its application to telecoms:
 - There are common costs that still need to be recovered – these can be added in, assuming an appropriate contribution of these is reasonable¹¹
 - The new service may use existing assets that may either have costs that are not all recovered or else in the long run they will need replaced.
- Bottom up LRIC. This is a model of the business that defines demand and equipment volumes and then defines the costs. The result should be economically similar to a DCF. Within this category of models there are some variations:
 - Some use annuity type functions to annualise asset investment costs
 - Some use NPV or economic depreciation type calculations
 - Some use the data for one year¹², others use costs and volumes over many years and average them¹³

These are computation methods to the same end - defining the forward looking LRIC using “bottom up methods”. All computations can be valid depending on how they are used.

Accounting methods are also used – these are termed top down as they allocate accounts data down to products. The main methods within this category are

- HCA FAC. Historic cost accounts fully allocated costing. Everything is allocated and “last years” costs are used (based on what is used for annual reports). Depreciation, operation costs and cost of capital are considered. This can be valid – especially if the future volumes are not likely to vary significantly and assets do not alter in value significantly over time
- CCA¹⁴ FAC. This re-values assets as if bought today. This makes the asset values more representative and resulting costs are closer to DCF

¹¹ It should not need to be pointed out that using only marginal costs for one service gives a greater cost burden for another. This bias is a critically sensitive issue if the common cost is a large (which can be the case in telco access). All services cannot be at marginal (incremental) cost

¹² E.g. PTS Sweden fixed network model. This also uses an annuity type formula

¹³ E.g. Swedish mobile model, this also used a NPV type method

¹⁴ We assume only Financial Capital Maintenance Current Cost Accounting is used. This means that if assets reduce in value then there is a loss of value that (of course) must be recovered and thereafter the depreciation and value is less. The investment value is recovered exactly over the lifetime – there is no over recovery

- CCA or HCA LRIC. This top down allocation method includes functions that alter costs with volumes – and so common and joint costs can be determined with greater accuracy, fixed and variable costs are analysed in greater depth.

All methods can give valid results. The choice depends on the service and the problems that need to be solved. A key note should be added: re-valuing assets using CCA does not create over or under-recovery. If the asset (copper cables) is fully depreciated then the re-valued value is still zero, even if copper prices rise ten-fold.

We later return to the most appropriate method.

Confusions in the Questionnaire

The Questionnaire used some terminology that did not help and as a result some respondents gave replies that took different meanings. A key point is *replicable assets*. It would have been far better if the discussions defined:

- Replace-able assets. This is an asset that will be replaced once it is at the end of its working life with something similar. Voice switches will be replaced by new ones, even if they use IP technology
- Replicate-able. This is an asset or service that can be replicated (in the sense of being duplicated) by something else. Very high speed wireless services can replicate DSL copper services or slower speed fibre access. Copper cables are replicate-able if it is economically feasible for another operator to build copper in the same street. If cable TV networks are in the same street then they may replicate broadband services. If services are replicate-able then it implies there is at least some competition¹⁵
- Modern Equivalent Asset (MEA) replacement. As LRIC should be forward looking, then the replacement costs should be considered – this is what CCA re-valuation does. If the asset technology changes over time then this new technology should be considered – this is routinely done in many bottom up and top down models
- CCA BU LRIC. This Questionnaire term combines an accounting term with bottom up methods. Almost all bottom-up models use current and future asset costs (for today's and next years' assets). Addition of "CCA" did not help with clarity. BU models are not normally accounting models.

Some responses identify long term or "enduring" assets. Ducts may have a long lifetime and so replacement is far in the future. This does not mean the assets will not be replaced – in the long run they must be. However the replacement may be many years away – those costs are still valid (however they will be low as is obvious from a DCF NPV type of thinking). There

¹⁵ Competition implies less regulatory controls. If the asset is potentially replicate-able then this is also relevant as the threat of competition alters the situation of pure market dominance. If duct space is available at low cost, then an access copper or fibre cable *can* be replicated by an alternative provider. Whether this is economically feasible is another question. Even the threat of a second cable in a street being installed gives a degree of competition – that will help to control prices

is no “new economics” that should ignore the existing or future costs since, as noted before, the economic principles of LRIC remain.

Replies to the Questionnaire

We cannot cover all of the comments and the various proposals. We note here some general points:

- Some replies were confused over the term “replicable”
- Some replies might have been biased by the potential to give high or low cost-based prices – and may have been influenced by whichever is in the sponsor’s best commercial interests. In a slightly similar way the basis of the Questionnaire may have been influenced by the desire to support the Digital Agenda. The basic economic thinking to define costs, should not alter
- Some replies contradict others – they cannot all be correct
- A major schism exists. Those who believe copper legacy:
 - if priced high, then that will encourage fibre
 - if priced low then that better encourages fibre¹⁶
- There is more concern over copper and duct legacy cost calculations than over fibre
- Fibre can be calculated by DCF or BU LRIC – there is no major issue with either as both should give similar results. Accounting methods are generally agreed to be not valid (lack of accounting history). We note that early deployment cost data should be in a business’s General Ledger, and this *can* be extrapolated and analysed to give a *source* for other cost calculation, but this is not the normal Top Down accounting approach, as is commonly used for current copper local loop costing
- There is some concern over the political implications of including the Digital Agenda and political desires moved the debate beyond normal regulatory economic discussions¹⁷. This is a profound criticism
- The Questionnaire does not seem to properly consider fibre-copper combinations. These are widely deployed, leaving the full fibre to the home decision to later. In this case the copper is part of the NGA costing – not an alternative. It also means the copper link to premises may well be a replace-able asset¹⁸
- The Questionnaire does not fully consider replicate-able assets. What should be done if NGA assets or services can be replicated? Cable TV or LTE wireless give

¹⁶ See Plum and ECTA papers for example

¹⁷ E.g.: “Virgin Media has significant reservations with the options being considered by the Commission and the approach that it has taken to the matter. In particular we are of the view that it has failed to consider the wider implications of those options, diverged from the principle of technology neutrality and is seemingly minded to disregard regulatory best practice in favour of achieving political aims”

¹⁸ It could be replaced at the end of its working life – with new copper

some replication of broadband – and cable can be the main provider in some regions. There may be partial competition of supply

- The replies from Austria noted the approach used there, is based on retail minus¹⁹. This is worth further study. This is not directly a cost based price method (but can give a proxy to costs and can give the right economic signals for competition). This work noted that this could create a price squeeze - the calculated costs of copper-based services are more than the retail minus level. This means either the calculations are wrong or else the retail prices do not recover the incumbent's costs. The retail prices are set competitively – in part driven by alternative access providers and mobile methods. This means that access services are being replicated. This situation is worth further study as it has implications for other countries. Should regulation change if the services or access infrastructure is replicate-able and therefore has some competition? Could an incumbent be forced by regulation (and/or retail competition) to deliver wholesale or retail services that do not recover the costs? If retail costs are set too low (below cost²⁰), should wholesale costs also be low?

The replies need to be examined in great detail. A general deduction from the replies (and from a read of the Questionnaire) is that the premises behind the Questionnaire should be re-examined. Extensive work is required before a sound Recommendation can follow that is based on technically neutral thinking and which separates political aims and related incentives.

The above discourse does not attempt to summarise the many varied replies and options being proposed. We do note that replies were frequently critical: going beyond simply giving replies. The fundamental start point (Digital Agenda must be achieved); purpose - to give the Agenda outcomes; mixing of costing analysis with aims; confusion of terms; lack of inclusion of other services; non- inclusion of external investment incentives etc., all are sources for critical responses.

What costing method to use?

The question should not be “BU or CCA” but which calculation gives the correct forward looking LRIC costs? This can be done for copper legacy and for fibre. This should be done irrespective of the Digital Agenda.

Tilting the results to a political aim would have to consider not only the aims but also tax or other investment incentives. The correct economic LRIC cost of the asset or service does not alter. Adding the incentives, is a separate task this may alter the pricing and it may alter the treatment of common costs or cost of capital values (risks).

¹⁹ See also market situation of last digital agenda market report http://ec.europa.eu/information_society/digital-agenda/scoreboard/docs/regulatory/at_reg_dev_2011.pdf

²⁰ There is parallel in Access Deficit – PSTN lines were often sold below cost as a result of historical pricing. The wholesale prices could then be above retail prices. The same can occur due to retail price competition. A “nightmare scenario” follows if retail business are in a price war and/or some players do not realise they are below real cost. Major financial problems can result

The following is a *straw man* for an economically sound approach – set up for further discussion. We note that the exact calculation formulae does not fundamentally matter – the real requirement is to get the forward looking LRIC. Other approaches *could* give the same outcome, depending on how implemented.

- New fibre investments should be at DCF or BU LRIC (essentially the same)
- Where efficient copper investments have been made, then CCA FAC remains valid. This cost falls to the short run incremental cost (operational only) as the asset is fully depreciated. It is not reasonable for an NRA to decide that a 20-year life asset, when only 15 years old was not recovered and so the net value and CCA depreciation were valid - but then, at year 16, to now assume it was all fully recovered²¹ and so claim the net value and depreciation is now zero. If CCA FAC was a valid proxy to LRIC, then it is still valid.

We note that: if the incumbent removes copper then the asset cost disappears. If fully depreciated, the costs revert to only the operational costs

- Ducts costs could use CCA FAC – similar to copper. This should give a result close to the LRIC cost. When fully depreciated and replacements are far in the future there is no need to include the replacements as the discounted effect of them is small. Replacement is far into the future and when replacements are incurred, they re-enter the asset base. This is an important point as some views taken of a business are distorted by considering the cost calculations of one asset using CCA – real business are not based on one duct or copper cable that lasts 40 or 20 years. Mixed vintages exist and new ones are installed and if efficiently incurred then the average effect is LRIC-like when using CCA
- Some common business costs are valid to each of fibre, copper and duct. Duct is common to fibre and copper. *How much* to include is still to be decided – this *can* be influenced by the outcomes desired.

Once we have the LRIC of the services, then the cost of copper, fibre and duct then need to be combined to reflect the migration. This gives the transition cost of each service (legacy and NGN).

This approach is technically neutral – it does not matter if it is copper, duct or fibre or radio. The aim is always the same: to define the forward looking LRIC costs. Once these are defined, there is no over recovery or super profits. Nor is there economic harm to the service provider – it recovers the fair costs and makes a return on capital. LRIC for costs (and pricing) in itself does not tilt the decisions to one service or one technology over another. The supplier's preference for fibre or legacy is based on the technical factors and the long run potential to make monies and deliver wholesale services to its own retail business that can be sold and make a profit. I.e. the decision is market led (at least to a degree) even if there is market dominance in the wholesale local loop market.

²¹ Of course the copper and duct was *paid for* when it was installed. A forward looking DCF approach could ignore this cost (past investments do not impact forward looking decisions). But, such major assets were assumed to be recovered *over time* and a return on the investment should give a return on capital employed. It would be questionable for a NRA to decide that the investor should take a loss and write off the investment – with the implication that the accounts and past regulatory logic are now invalid

A concern is whether: could this approach lead to a lack of investment in fibre and a “luddite mentality” that would prefer to continue to use, replace and sell copper services rather than migrate to fibre. This needs further study, but the onus should be on proving that fair LRIC costing of all services will be a clear dis-incentive to building fibre. Can this be proved? Telcos such as BT *are* deploying fibre – at least in the more clearly viable areas and so the current wholesale regime is certainly not a complete barrier.

All telcos are moving to fibre (at varying speed and depending on location) so they are not totally holding back. Perhaps the onus should now be on proving that adding any tilt away from “neutral costing” will *not* increase risks and therefore harm investment.

The straw man above does not consider BU LRIC for copper or duct (in line with many respondents). This *can* certainly give the LRIC values and has been widely used. If based on annuity methods it can give generally similar values to CCA FAC, but some respondents did not like the higher costs produced by the BU LRIC. Arguably the annuity approach may no longer be valid if most of the assets are fully depreciated or close to the end of life and will, in say 5 years, be replaced by something else. Annuity calculations produce the average cost to recover each year and are reasonable for modelling a long run average business costs which replaces the assets and has multi-vintage assets. The errors become clear if we have all assets still in place but fully depreciated and they will not be replaced for 5 years (the business is “soaking the assets”). Annuity costing gives a high cost but CCA FAC gives very low costs. This is not because annuity is an invalid method, but it simply needs altered to cope with the business situation which is not “normal.” LRIC remains the correct result – but annuities might not be the best method to get LRIC, with assets that are mostly fully depreciated. Annuity methods could be adjusted.

The straw man does not consider short run incremental costs (basically just copper or duct operational costs). This has been suggested as a cost floor²². This is probably below real LRIC and the ignoring of assets values is essentially a *bias method*²³ that moves away from fair cost determination. An argument could be based on the assumption that: the asset is paid for and/or the duct asset has a very long life and so will not be replaced for many years. A counter example to this logic is land. Land has no depreciation (it never wears out!) so it is an *in extremis* illustration. If it is “paid for,” then only some low maintenance costs are required. This logic would imply that all farmers who rent land should not pay for land rental – “the land was paid for by our forefathers.” This is unlikely to be acceptable. There is capital value in land or in duct investments and a return on this surely remains valid.

A key issue raised by respondents, is the fundamental basis of CCA FAC. If the business has fully recovered the investment, then continuing to pay for the asset’s residual accounting capital cost and depreciation, for the remaining few years, means over-recovery. The logic is: accounts do not reflect the real economics and a business should have paid off the investment many years ago. Some suggest that the asset must have been recovered by now,

²² An alternative cost floor definition is the NPV of forward looking revenues and costs as this is the market value of copper. If customers will pay 3€ per month for slow copper based DSL then even if the copper is paid for and is fully depreciated, this indicates the cost floor. Setting a floor at the short run incremental opex would effectively outlaw a legitimate local loop business sale. The lesson is – there can still be a value in a depreciated asset

²³ This is therefore a pricing issue. This is part of the tilting approach that might be applied to encourage an outcome. It may be valid – there *are* good reasons to bias prices. However this is separate issue to evaluating the LRIC level in the first place

others suggest that HCA FAC gives the closest to correct costs to recover. We note that CCA is normally considered better than HCA, from an economic view and is widely used in regulatory accounts and charge controls. There is no sound logic for breaking this rule, just because HCA gives a lower value for access assets. If copper had devalued recently (then $CCA < HCA$ cost), would the same parties still argue for HCA? The key point is: *has the legacy asset cost been recovered?* This is not straight forward. We also note access deficits often existed in early years (which implies under-recovery during that period). Another complicating factor are assets purchased in pre-privatisation eras – are the current shareholders and debt holders expecting a return on an asset that is “free” and previously paid for. The resolution of this is not totally clear. If the asset has been paid for (no need to make any more return), then this does imply the regulatory accounts and annual reports give a false business view and economically the telcos now make huge returns. This might be reflected in very high share values as this should have been seen by the investor community. Alternatively the over-recovery is a short term benefit as in a few years new assets must be built and so the prices (and company valuations) are fair – the revenues are needed for long run costs, and it would be dangerous to reduce prices to short run LRIC (opex only), as it would be hard to increase them again later. More critical examination is required of the accounting and economic cost claims.

Conclusions and actions

This paper has examined some of the issues and approaches to cost determinations for pricing of legacy and new NGA fibre services. The EC Questionnaire and its responses have been examined in brief. The main conclusions are:

- Costing analysis should aim to define the fair LRIC of the legacy and fibre services
- This costing should be separated from the issue of political aims and biases to encourage a certain outcome. Biasing for political aims is valid but must be considered a separate issue to defining LRIC. The costing and final pricing are of course linked
- The Digital Agenda or other aims aim should be separated from costing – it might be included in pricing or investment incentives
- The targets of the Agenda are questionable in the first place. For example: many customers may prefer basic services (at lower prices). Trying to achieve the aim could increase costs for those who do take the services. The service take up rate may be low – making very high costs per customer which might well be unrecoverable
- The demand side impacts legacy and NGA volumes and so affects resulting costs. This requires far more study, as trying to achieve the target could possibly result in a telco financial calamity
- Legacy costs, and related prices impact demand and so impacts NGA demand and so the net NGA unit cost. The complexity of this interaction is a central business analysis and regulatory analysis problem
- There is a strong need for regulatory clarity and direction. With the Questionnaire lagging behind the reality of telcos building fibre and NRAs already forming solutions in many countries, a final Recommendation is now overdue. The current uncertainty adds risks and therefore slows fibre investment

- The Questionnaire has a mix of economics, accounting and politics. This sends a signal that a future Recommendation could have some bizarre outcomes. This adds uncertainty and risk
- The replies sometimes have diverse proposals – they cannot all be correct
- A fair LRIC calculation can be made for each asset and service type. Some *appropriate* inclusion of common costs should be considered in line with past calculations
- The fact that some calculations used may be wrong or give different results in different countries is not a reason to change to give a lower or higher value. Altered calculations should be done to give more robust LRIC values.

This discussion shows that many actions are required. Not the least among them is a very thorough review of the fundamental aims and questions that are being asked. Extensive appraisals of the relevant literature and of responses are needed.

Separation is needed of: the issues; encouragement of fibre investment; costing; and pricing. Once clarified then incentives, costing and pricing can then be inter-connected when prices are set (incentives do not alter the costs of a fibre cable).

A rapid update is required as the mixed messages from the Questionnaire have added uncertainty and this is surely damaging investor confidence.

Please contact Telzed for further advice and help.