Pricing Principles for the Unconditioned Local Loop Service (ULLS) in Australia

The Conceptual Framework

Final Report for OPTUS

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1 INTRODUCTION

Terms of reference and Europe Economics' experience

1.1 This report considers what methods should be used to determine the prices to be charged by Telstra for use of its local loop, in particular for the Unconditioned Local Loop Service (ULLS).[1] It concentrates on the conceptual issues involved, leaving implementation issues and estimation of appropriate cost levels for subsequent work.

1.2 In setting limits to Telstra's charges the ACCC has followed the principles that charges should be cost-based and non-discriminatory. Hitherto, estimates have been made using the methodology referred to as "Total Service Long Run Incremental Cost plus share of common costs" (TSLRIC+). The LRIC approach, of which this is an example, has also been widely used in other regulatory contexts. However, the ACCC's most recent draft decision with regard to the charges for local loop services noted that in some circumstances there are other options that might better serve the long-term interests of end users (LTIE).

1.3 The report was commissioned by Optus from Europe Economics. Europe Economics is an independent economics consultancy, providing analysis and advice relating to economic regulation of telecommunications and other sectors; competition policy; and other public and business policy issues.[2] We have no conflict of interest with regard to this report.

1.4 Europe Economics' experience includes preparing for the European Commission (EC) a model design to estimate the charges that should be made for interconnection with the core networks of incumbent telecommunications companies in the European Union (EU). This project was completed in 1999; we subsequently helped to apply models based on this design on behalf of regulators or regulated companies in the UK (for leased lines), Ireland, Italy, Denmark, and Spain. This has increased our familiarity with the conceptual issues involved and our experience in dealing with practical estimation problems.

1.5 We reviewed the application of alternative costing models in a further report for the European Commission, in 2004, and concluded that there were some weaknesses in LRIC methodologies in application to the local loop.[3]

1.6 We have applied similar concepts to regulatory issues in other sectors, including energy, airports and water.

1.7 The team involved in preparing this report were:

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1 The engagement letter with full terms of reference is in Appendix 1.
2 Further information about Europe Economics is on our website, www.europe-economics.com
3 Europe Economics' report for the European Commission (DG Competition) Pricing Methodologies for Unbundled Access to the Local Loop, 2004

(a) Dermot Glynn, Project Director, Chairman of Europe Economics, who is one of the UK's most experienced consultants in regulatory economics;

(b) Dr Matteo Aquilina, Project Manager, who is a senior consultant with Europe Economics and has experience in regulatory accounting and telecommunication; and

(c) Stefano D'Ambrosio, who has been a member of Europe Economics' teams in work in telecommunication cost modelling for a number of years.

1.8 Professor Tommaso Valletti was academic advisor. [4]

1.9 This present report has been prepared following the Federal Court Guidelines for expert witnesses. It seeks to be clear about the factual premises on which the opinions expressed are based, and about the reasoning leading from these premises to the conclusions.

1.10 Previous studies of the economic and policy implications of the long run incremental cost methodology and the principles of regulatory price setting discussed in this report have included:

- T.J. Brennan and J. Boyd, Stranded costs, takings, and the law and economics of implicit contracts. Journal of Regulatory Economics 11 (1997), pp. 41–54 (discusses electricity)
- Cave, M., From cost plus determinations to a network price cap, Information Economics and Policy, Volume 9, Issue 2, June 1997, Pages 151-160
- Martin Cave, Ingo Vogelsang, How access pricing and entry interact, Telecommunications Policy, Volume 27, Issues 10-11, November-December 2003, Pages 717-727
- J.J. Laffont and J. Tirole, Competition in telecommunications, MIT Press, Cambridge, MA (2000). (classic book)
- Littlechild , S., 2003, "Price controls on mobile termination charges", The Vodafone Policy Paper Series. (discusses regulation of mobile termination rates, but has also relevant discussion on why price caps used in general, and based on costs of an efficient operator and not actual costs)
- Tardiff, T., Pricing unbundled network elements and the FCC's TELRIC rule: economic and modeling issues, Network Economics 1 (2002) (2), pp. 132–146.

[4] Fuller details of the project team are in Appendix 2.

- Valletti, T., The practice of access pricing: telecommunications in the United Kingdom, Utilities Policy, Volume 8, Issue 2, June 1999, Pages 83-98

- S.S. Wildman, Interconnection pricing, stranded costs, and the optimal regulatory contract. Industrial and Corporate Change 6 (1997), pp. 741–755.

1.11 In reaching our conclusions, we made the inquiries that we believe are desirable and appropriate. No matters of significance that we regard as relevant have, to our knowledge, been withheld.

Structure of the argument

1.12 We support the pricing principles set out by the ACCC. Among these principles, the most fundamental is that access prices should be cost-based, since this implies that they should also conform to the principles of being non-discriminatory,[5] non-predatory,[6] and avoid distorting competition in related markets.[7] Cost-based pricing is a predictable feature of competitive markets.

1.13 Cost–based prices appropriately defined and measured would therefore be in the best interests of consumers of telecommunications services as economists would generally understand the concept. Moreover, we understand that the ACCC regards cost-based prices as consistent with the "LTIE" concept as defined in Australian law.[8]

1.14 In considering how to interpret and apply these pricing principles the essential questions are:

(a) to define the relevant concept of cost, and

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[5] Kahn, Alfred E. Economics of regulation principles and institutions. Cambridge, Mass: MIT P, 1988. " Discrimination- that is, charging different purchasers prices that differ by varying proportions from the respective marginal costs of serving them." P.123
Kahn, Alfred E. Economics of regulation principles and institutions. Cambridge, Mass: MIT P, 1988. "One of the virtues of pure competition is that it eliminates the possibility of price discrimination. The more necessitous buyer does not have to pay more than the less, the rich more or less than the poor; no one, however inelastic demand, can be exploited by sellers with monopoly power—which is, precisely, the power to hold price above marginal cost. And in long-run equilibrium, the seller can have no need to discriminate in price, although he would find it profitable to do so if he could: capacity is properly adjusted to the level of demand, the price to all buyers can be at SRMC and at the same time cover ATC." P. 123

[6] Thomas J. Di Lorenzo- "The Myth of Predatory Pricing" viewed from: http://www.cato.org/pubs/pas/pa-169.html
"The predatory firm first lowers its price until it is below the average cost of its competitors. The competitors must then lower their prices below average cost, thereby losing money on each unit sold. If they fail to cut their prices, they will lose virtually all of their market share; if they do cut their prices, they will eventually go bankrupt. After the competition has been forced out of the market, the predatory firm raises its price, compensating itself for the money it lost while it was engaged in predatory pricing, and earns monopoly profits forever after." ACCC website- http://www.accc.gov.au/content/index.phtml/itemId/816375 – "Predatory pricing occurs when a company sets its prices at a sufficiently low level with the purpose of damaging or forcing a competitor to withdraw from the market."

[7] This is a matter of definition; discriminatory prices are prices that do not bear a reasonable relationship to costs of supply; predatory prices are prices below the costs of supply; and distortions in a related market are defined as effects on competition that do not reflect underlying costs.

[8] Disclaimer: our expertise is in economics not Australian law and we have not reviewed the case law on this matter.

(b) to specify how this concept of cost should be measured.

1.15 This report will argue as follows:

(a) Proposition 1 is that in setting a limit to the charges that may be made for a monopoly service such as that provided by Telstra's local loop, the economic regulator should try to limit charges *to the competitive level* on a realistic set of assumptions about the level of demand and about the legal and policy framework within which supply would take place. The evidence for this proposition is:

- from economic theory, that competitive markets generally operate in the best interests of consumers;
- from consistency with Australian law, in which the objectives of regulation are to advance the best long-term interest of end users (LTIE).

(b) Proposition 2 is that the competitive level of charges would tend to equal the costs of supply for an *efficient supplier*. The evidence for this is:

- from economic theory;
- supporting context is provided by the reference in the ACCC statements of pricing principles to prices reflecting cost.

1.16 **Interim Conclusion 1** is that the ACCC should set Telstra's price limits for the ULLS at levels that equal the likely costs of supply that would be incurred by an efficient operator. This follows from Propositions 1 and 2.

(a) Proposition 3 is that in estimating the costs of an efficient supplier, the relevant costs are forward–looking estimates of avoidable costs that would be incurred in meeting predicted demand, and (or including) a reasonable return on investment.[9] The evidence for this is:

- from economic theory, since this is the basis on which decisions are made in competitive markets;
- contextual support is given by ACCC policy statements and regulatory practice following some other privatisations of monopoly services.

(b) Proposition 4 is that *demand for the services of Telstra's ULLS will be significantly affected by the introduction of the NBN*. This means that some of Telstra's local loop assets will no longer be used (being made technically obsolete by the NBN), others of

[9] Avoidable costs are also referred to as the costs caused by the supply, or the opportunity costs of the resources used in supply.

the Telstra assets will be used in different ways, and a third category will continue in pretty much their present uses. The evidence for this is:

- from the Government's specification for the NBN;
- from our interpretation of the approach to rolling out the NBN that is likely to be taken by the successful bidder.

(c) Proposition 5 is that the relevant costs for Telstra's ULLS are to be estimated on the assumption that an efficient new entrant would be *able to use Telstra's trenches and ducts*, paying an appropriate price for their use, rather than having to re-build or replace them. The evidence for this is:

- the assumption that this would cost a lot less than re-building the trenches and ducts;
- economic reasoning based on that assumption showing that, in order for investment to be efficient, potential investors should be comparing the costs and benefits of alternatives with the costs and benefits of using the existing ducts and trenches in return for payment for use of the assets, not with the higher alternative costs of replacing them.

1.17 **Interim Conclusion 2** is that the relevant costs for the estimation of the charges for the ULLS are those of an efficient operator of the existing Telstra local loop assets, for the time and in the ways in which these assets will be in use, and (or including) a reasonable return on investment. This follows from Interim Conclusion 1 and Propositions 3 – 5.

(a) Proposition 6 is that the TSLRIC+ methodology if applied in a way that did not take these factors into account would not provide estimates of the relevant costs. This is because it would:

- assume a long-term time horizon, which is not appropriate for assets likely to be made redundant by the NBN (i.e., it does not take into account changes in demand for services);
- assume that an efficient new entrant would rebuild ducts and trenches, which would not be an efficient form of competition.

(b) Evidence for these characteristics of TSLRIC+ includes:

- documentation from the ACCC explaining the TSLRIC+ methodology;
- Optus's confirmation that these are features of the Telstra Efficient Access (TEA) model used by Telstra in its proposed ULLS charges.

1.18 **The Conclusion** is that the appropriate methodology for estimating the costs to which Telstra's ULLS charge should be limited must be based on realistic assumptions about

the future demand for Telstra assets, and on assumptions that an efficient level of costs would include the use of some of those assets in return for an appropriate fee to Telstra. This reflects the same economic principles as underpin LRIC+ in other contexts, but taking into account the circumstances that are relevant here; it follows on from Interim Conclusion 2 and Proposition 6.

1.19 In elaboration of the Conclusion, the recommended methodology would resemble in some respects the system of renewals accounting that was developed and applied in the regulation of the water industry in England and Wales, and it would in any case be practical to implement. The supporting argument for this comprises:

(a) an explanation of the principles of renewals accounting;.

(b) an account of how a similar approach has been taken in the water industry in England and Wales;

(c) an outline of how the proposed methodology would be applied to estimate charges for the ULLS.

Layout of the report

1.20 Section 2 below describes the main features of the context that are relevant to these propositions and conclusions. Section 3 provides the main analysis, and Section 4 describes the adaptations to the TSLRIC+ conceptual framework that are recommended for the more accurate measurement of the efficient costs of supply of Telstra's local loop services.

1.21 Section 5 reviews how the proposed methodology would meet the regulatory requirements; and Section 6 notes some precedents from other contexts in which a renewals accounting methodology has been adopted. Supporting material is supplied in Appendices.

2 CONTEXT

The Trade Practices Act 1974

2.1 The Australian Trade Practices Act 1974 (TPA) as amended stipulates that the objective of the telecommunications access regime is to promote the long-term interests of end users (LTIE).[10]

2.2 The Unconditioned Local Loop Service (ULLS) was first "declared" by the ACCC under Part XIC of the TPA in August 1999, and was re-declared in July 2006 for a further three years. As a result, the price and other principal characteristics of the ULLS are subject to regulation.

2.3 The current ULLS declaration describes the service as involving the use of unconditioned cable, primarily copper pairs, between a customer's premises and a point located at or associated with a customer access module (CAM).

ACCC pricing principles

2.4 The ACCC believes that the LTIE will be promoted by sustainable lower prices, higher quality of service and greater choice of products, and sees these objectives as being promoted by:[11]

(a) competition in markets for telecommunications services;

(b) achieving any-to-any connectivity in relation to carriage services that involves communication between end-users;

(c) encouraging the economically efficient use of, and the economically efficient investment in, the infrastructure by which telecommunications services are supplied.

2.5 The ACCC has drawn up four broad pricing principles to achieve these objectives. Access prices should:[12]

(a) be cost based;

(b) not discriminate in a way which reduces efficient competition;

(c) not be inflated to reduce competition in dependent markets;

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[10] In particular, Subsection 152AB (1); Part XIC; Part XIC telecommunications access regime; and subsection 152AH (1) of the TPA. Other matters may also be taken into consideration.

[11] ACCC, Access Pricing Principles - Telecommunications, a guide, 1997

[12] ACCC, Access Pricing Principles - Telecommunications, a guide, 1997

(d) not be predatory.

2.6 Europe Economics agrees with and supports these principles, which correspond with our own approach to these matters.

Previous use of TSLRIC+ methodology

2.7 In order to translate these pricing principles into ULLS price limits the ACCC and the Australian Competition Tribunal (ACT) have hitherto concluded that prices should be equal to total service long run incremental cost (TSLRIC) plus an appropriate share of costs common to services other than those in the defined increment, hence the "+".

2.8 This has been explained by the ACT as follows:

> "In our view, there are some basic pricing principles that should be observed in applying the LTIE test. In considering these principles, we are in general agreement with the approach established by the Commission in its guide to Access Pricing Principles – Telecommunications (as published in July 1997).
>
> "This version of cost-based pricing is known as 'total service long run incremental cost' ('TSLRIC'). It includes operating and maintenance costs, a normal commercial return (moderated by the risk involved) and a contribution to common costs. In our view, in the general case where access prices need to be regulated, unless pricing is on a TSLRIC basis, efficient investment is unlikely to be encouraged. This, in turn, would fail to promote competition in the long-term, as end-users would not be able to benefit from new investment (thereby also missing out on more efficient and diverse product offerings)." [13]

The ACCC's willingness to consider alternative methodologies

2.9 In March 2008, Telstra withdrew the Undertaking that it had lodged with the ACCC in the previous December and in its place lodged the 2008 Undertaking, supported by its Telstra Efficient Access Model (TEA Model). We are advised by Optus that the TEA model purports to be an application of the TSLRIC+ methodology.

2.10 The 2008 Undertaking proposes a monthly charge of $A30 payable by access seekers for the ULLS in Band 2. Telstra also submitted that the Proposed Monthly Charge of $A30 be limited to the term of the 2008 Undertaking and that ULLS prices can subsequently be increased to $A47.86 (estimated as TSLRIC+ by the TEA Model) either through commercial negotiation, arbitration or Telstra lodging another Undertaking.

2.11 The ACCC's draft decision rejects the 2008 Undertaking. The ACCC considers that a monthly charge of $A47.86 is higher than should be required by an efficient operator to recover the costs of providing the ULLS in Australia. The ACCC also has significant

[13] Australian Competition Tribunal, *Seven Network Limited (No 4)* [2004] ACompT 11 at [135] to [136]

doubts as to whether the proposed monthly charge of $A30 is justified, noting that when the TEA Model is run on assumptions or estimates other than those proposed by Telstra the resulting charge estimates are significantly less than $A30.

2.12 The ACCC also found significant discrepancy between Telstra's proposed monthly charge and international benchmarks of the charges required in other countries to recover costs of supplying an ULLS.

2.13 In rejecting Telstra's undertaking the ACCC made the following statement (we have added emphasis to some of the points):[14]

> (a) **If the rolling out of fibre closer to the customer makes the prospects of efficient duplication more remote, then some of the key rationales for a TSLRIC+ approach to pricing will be less relevant.**
>
> (b) The ACCC has **always been open to considering other approaches of pricing regulated services.** Whilst the concept of TSLRIC+ can be consistent with the legislative criteria the ACCC must consider, there are other pricing approaches which are also likely to be consistent with the criteria.
>
> (c) The ACCC is also **aware of the limitations in the application of TSLRIC+ outside its original focus for public switched telephone network (PSTN) assets**, in that the TSLRIC+ concept revalues the network assets in each regulatory period such that it does not take account of depreciation in the value of the assets. **This limitation is particularly apparent in the case of enduring assets such as trenches which are likely to be less susceptible to bypass.** The ACCC also notes that under Part XIC it is open to parties to put forward their preferred pricing approaches, and Telstra has consistently proposed TSLRIC principles. However, it is also open to parties to adopt new and/or different applications of these principles in different regulatory matters, including by revaluing assets. This can create considerable uncertainty for access seekers.

2.14 The ACCC recognises both the possibility of improving on the TSLRIC+ methodology and the desirability of regulatory consistency.

The proposed National Broadband Network

2.15 The Government has pledged the provision of funding up to $A4.7 billion as a contribution to the cost of a Fibre to the Node (FTTN) National Broadband Network (NBN), which would be a new, open access, high-speed, fibre-based broadband network. The

[14] Assessment of Telstra's Unconditioned Local Loop Service Band 2 monthly charge undertaking, Draft Decision, Public Version, November 2008

Government also committed itself to consider regulatory changes necessary to facilitate the deployment.[15]

2.16 A Request for Proposals (RfP) to roll out and operate the NBN was published in April 2008. This included the objective that the NBN be:

> rolled out and made operational progressively over five years from the date of execution of a contract between the Commonwealth and successful Proponent.[16]

2.17 Proposals were invited by 26 November 2008.[17] The stated offer period was 12 months after the Closing Time so that the NBN should be complete by the end of 2014. We assume that the network will be operational in many areas well before then.

2.18 The main objectives for the NBN are that it:

(a) covers 98 per cent of Australian homes and businesses;

(b) is able to offer broadband services with a minimum 12 Mbps dedicated downlink transmission speed over each connection provided to a premises;

(c) uses fibre-to-the-node or fibre-to-the-premises network architecture;

(d) enables uniform retail prices on a national basis;

(e) is rolled out and made operational progressively over five years from the date of execution of a contract between the Commonwealth and the successful Proponent;

(f) has sufficient capacity to meet current and foreseeable demand and has a specified upgrade path within clear timeframes, consistent with international trends;

(g) facilitates competition through open access arrangements that ensure equivalence of price and non-price terms and conditions, and provides scope for access seekers to differentiate their product offerings;

(h) enables low access prices that reflect underlying costs while allowing Proponents to earn a rate of return on their investment commensurate with the risk of the project; and

(i) provides the Commonwealth with a return on its investment of up to $4.7 billion.

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[15] Australian Labor Party, ALP Broadband Statement "New Directions for Communications. A Broadband Future for Australia – Building a National Broadband Network " – March 2007 http://www.iia.net.au/files/ALP_Broadband_Statement.pdf

[16] Request for Proposals to roll-out and operate a National Broadband Network for Australia, Request for Proposals Number: DCON/08/18 - Department of Broadband, Communications and the Digital Economy, 11 April 2008

[17] http://www.dbcde.gov.au/communications_for_business/funding_programs__and__support/national_broadband_network

2.19 Tenders were submitted by Telstra, Acacia, Axia, Optus, TransACT and the Tasmanian Government (the last two of which were for regional coverage only) but Telstra has since been excluded from the process.[18]

2.20 The population in Australia is concentrated in some densely populated regions but there is also a large dispersed rural population.[19] At least one NBN bidder advocates the use of wireless technology as an alternative to cable to service some of the population.[20]

Implications for use of Telstra's assets

2.21 As the NBN comes into use this will affect the use made of Telstra's assets in different ways. We distinguish two categories:

(a) assets that will become technologically obsolete, and that will no longer be used;[21]

(b) assets still required in essentially their present use (there are some assets whose use will be affected in some way, either contractually, e.g., by being leased to the NBN operator, or by more or less intensive use consequential on the increased capacity offered by the NBN).[22]

2.22 We assume from the information about the proposals which is summarised in Appendix 3 that when decisions have been made about the physical configuration of the NBN and about its regulatory framework, it will be possible to identify how Telstra's assets will fall into these categories. Appendix 3 also provides a stylised map of the network, as it is at present and how it might be after the installation of the NBN.

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[18] Minister media release "Telstra proposal excluded from further consideration under Government's NBN process, http://www.minister.dbcde.gov.au/media/media_releases/2008/097?SQ_DESIGN_NAME=print_page

[19] In 2004 Australia had the largest share of national population in the 10 per cent of regions with the largest population out of all the OECD countries (a measure of population density) at 64 per cent, yet a rural population of 23 per cent, the OECD average. See http://stats.oecd.org/WBOS/Index.aspx?DatasetCode=CSP2008

[20] Australian IT, Acacia confirms national NBN bid, http://www.australianit.news.com.au/story/0,25197,24710253-15306,00.html

[21] If a FTTN architecture is adopted for the NBN, the existing copper cabling linking pillars to exchanges may become obsolete.

[22] Assets continuing in use may include:
-The existing copper cabling linking end user customers and pillars, and the pillars themselves, which we understand are likely to be incorporated into the NBN.
-Local Access Points might also be located within existing Telstra Exchanges.
-If the existing copper cabling linking pillars to local access points was left in place, in some cases it might be efficient to continue using this infrastructure to provide services to consumers who demand only low access speeds.

3 ANALYSIS

Proposition 1

3.1 Proposition 1 is that in setting a limit to the charges that may be made for a monopoly service such as that provided by Telstra's local loop, the economic regulator should try to limit charges *to the competitive level on a realistic set of assumptions about the level of costs that would be incurred by a competitive supplier, about the levels of demand and about the legal and policy framework within which supply would take place.*[23]

3.2 The reasons why competition tends to produce the most efficient outcome for consumers need not be rehearsed in detail here. In essence, consumers who are able to choose between alternative competing suppliers will pay the best prices for the goods and services that meet their needs most satisfactorily; and suppliers' incentives to make profit lead them to seek out the most efficient techniques of production.

3.3 This is why the view is widely held that competitive markets are generally more efficient in providing goods and services than an alternative such as state planning. We find it natural that competition law in Australia should be designed to ensure effective competition, and why economic regulation in sectors characterised by natural monopoly generally seeks to mimic as far as possible the outcomes that would be expected under competition.[24]

3.4 It follows that the concept of cost to which access prices should correspond is that concept of cost to which prices would tend in a competitive sector, on a realistic set of assumptions about the level of demand and about the legal and policy framework.

3.5 This establishes one essential point: the cost concept must be a **forward–looking measure of the costs caused by supply**. A number of other terms are sometimes used to express this idea: **opportunity costs** (since they are the costs of the opportunities forgone by using the same resources in their best alternative use), **avoidable costs** (since they are the costs that would be avoided by not supplying the services in question)

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[23] The fact that the local loop provider almost certainly has monopoly position means that a bottom up estimation is needed of the competitive / efficient level of its input costs.

[24] Sayer, Stephen. Regulating Utilities A Time for Change? (Readings). New York: Coronet Books, 1996. Ch.4 *Competition and Regulation: The UK experience*, John Vickers p.91-105 "Competition is rivalry between two or more parties for something that cannot be obtained by all. To be 'effective', the rivalry must be real—not token or sham or one-sided. It must exert a strong influence upon the behaviour of all firms. The rivalry must also tend to promote economic efficiency—which it does by aligning prices with costs, by increasing pressures for cost reduction, by selecting more efficient firms from less efficient firms, by promoting innovation, and by diminishing the inevitable imperfections of regulation."

" In much of the economy, effective competition is naturally self-sustaining. The history and technology of the utilities, however, make effective competition difficult, and sometimes impossible, to achieve. Effective competition is a logical impossibility in severe natural monopoly conditions (though there is sometimes the possibility of competition for the market). Where competition would promote efficiency, it might be thwarted by barriers to entry or anti-competitive behaviour by the dominant incumbent."p.96]

[24] John Kay and John Vickers. Regulatory Reform in Britain. "Market power is detrimental to economic efficiency in several ways. Allocative efficiency is undermined by the incentive for dominant firms to charge prices significantly in excess of marginal costs of supply; and the lack of competitive stimulus further blunts incentives for dynamic and productive efficiency." P. 304

and **marginal** or **incremental costs** (since they are the amounts by which total costs are increased as a result of an increase in supply).[25] Whichever term is used, the relevant costs of supply in a competitive market are the costs that could be avoided by ceasing to supply; measured by the value of forgone opportunities of using the resources in their next best use. A normal return on investment is part of the costs of supply in a competitive market.[26]

3.6 In a competitive market prices will reflect the avoidable costs of supply for the following reason: a supplier which set its prices according to past cost levels rather than on estimates of future avoidable costs might either be unable to stay in business (if the costs of the inputs needed to produce new supplies were increasing) or be competed out of the market (if input prices were falling, so that competitors were able to charge less and still be profitable).

3.7 The principle that the relevant measures of cost are avoidable opportunity costs is widely recognised in regulatory economics and is applied by regulators. It implies that some investments may turn out to be worth less than they cost, and that in contrast others may have an economic value that exceeds their historic cost.

3.8 It is equally important to use realistic assumptions about the regulatory and legal framework within which competition is assumed to take place. It may seem that this could be taken for granted, as being the normal general framework of competition and law. However, there are important circumstances in which more specific assumptions will be needed.

3.9 For example, if the assets in use are such that it would be inefficient or impossible to duplicate them then it may be necessary to assume that an efficient entrant would be able to use these assets, in return for an appropriate payment to the owner. To illustrate the point with examples outside the telecommunications sector, in the water industry - because of the lie of the land - reservoirs and aquifers used to provide raw water may have no significant alternatives so that it would be fanciful and useless to estimate what such alternatives might cost. Or, to give another example, there may be no realistic possibility of planning permission being given for (say) a second gas pipeline. In cases of this kind, the existing facilities are best regarded as an essential facility that needs to be available to alternative suppliers if a competitive outcome is to be achieved.

3.10 In such cases, the calculation of the cost of a theoretical alternative to the existing assets would not yield any useful information and it would be more appropriate to assume that an efficient entrant would have use of those assets, in return for an appropriate payment

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[25] The term marginal cost would not be used here in the sense of the cost associated with supplying one additional (infinitesimal) unit of output.

[26] In some contexts the return on investment would be a sunk cost, not an avoidable cost of future supply.

to the owner as a return on the investment they represent.[27] Only on this basis would investment decisions by potential entrants using alternative technologies be efficient.[28]

3.11 As a regulatory precedent, Ofcom, having established that BT would have over-recovered the costs of its copper network, established a regulated asset value on the basis of the HCA valuation to calculate the appropriate costs. [29]

Proposition 2

3.12 Proposition 2 is that the competitive level of charges would tend to equal the costs of supply *for an efficient supplier*.

3.13 This is an implication of using the cost concepts that are relevant in a competitive market. Again, the reasoning is very straightforward: in a market characterised by effective competition the efficient suppliers tend to drive out the inefficient. This means that, without impugning the standards achieved by any particular monopoly supplier such as Telstra, regulators wishing to establish an efficient cost level need to find a basis other than the incumbent's actual costs. The incumbent's actual cost levels may be used as a cross-check, to help ensure that the alternative "bottom up" estimates are not unduly optimistic or unrealistic in some other way, but they should not be used as evidence of efficient cost levels.

3.14 It is therefore established good practice in utility and telecommunications regulation to seek to establish an **efficient level of costs**, rather than the incumbent's actual cost levels. [30]

3.15 Another implication of basing the regulatory concept of cost on that which would be relevant to a competitive market is that the **level of aggregation** of services should be similar to that which would be supplied under competitive conditions. For example, the economies of scope are such that one would not expect a supplier to offer just telephone calls at one time of day; nor to offer telephone calls and not data transmission up to the natural capacity of the means of transmission. However, it is possible to envisage competitors in the access market buying services from a core network operator, and to estimate the costs of supplying the **total bundle** of access charges (the ULLS). This is the type of offering – bundle of products – that one might find in a competitive context.

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27 In the FCC context: "These methods of financing stranded cost recovery are competitively neutral and are vastly preferable to seeking to recover stranded costs by raising the price of UNE's. UNE prices, based on forward looking costs, enable entrants to compete with incumbents on a level playing field. Setting higher UKE prices would create a barrier to entry and discourage local competition." http://www.fcc.gov/Speeches/Hundt/spreh758.html

28 M. E. Beesley and S. C. Littlechild. *The Regulation of Privatized Monopolies in the United Kingdom*

29 Ofcom, Valuing Copper Access, 2005 p.41

30 Alfred Kahn. "If the capacity can be used to provide other services, its use for any particular service does involve an opportunity cost—the value of the other services foregone. Therefore, that cost should be reflected in price. Also, if it has scrap or salvage value, the variable costs of continued operation must include a return above direct costs equivalent to what the owners could earn on their investment if they scrapped the plant and invested the money elsewhere; this is also a marginal opportunity cost of continued production."

This provides the justification for estimating the costs of "total supply" in a TSLRIC+ estimation.

Proposition 3

3.16 **Proposition 3** is that in estimating the costs of an efficient supplier, the relevant costs are forward–looking estimates of avoidable costs assessed on a realistic set of assumptions about the demand for services taking account of the relevant time frame, and (or including) a reasonable return on investment.[31]

3.17 Forward–looking avoidable costs depend crucially on the time frame being used.

3.18 Wherever investment is "lumpy" there are likely to be periods of spare capacity; and it would be efficient in the short term for this to be used even at a low price that covered only short-run marginal costs. However, if prices were maintained at these low levels the investment would not earn an adequate return and the LTIE would not be served.

3.19 The ACCC set out this issue as follows:

> … a central dilemma which must be confronted is that an access price that promotes the economically efficient use of infrastructure in the short term may, in some cases, not encourage efficient investment in infrastructure and may not be consistent with the legitimate business interests of the access provider. In particular an access price based on the direct incremental cost of providing access may not always allow an efficient access provider to recover all its costs over the long term.[32]

3.20 There are circumstances in a competitive market in which efficient prices reflect short-run costs, for example when there is no need to replace an investment. This proposition is intuitively obvious, but of great practical importance. When a service is expected to be required indefinitely, and the assets concerned will be replaced and improved through technical progress, as is generally assumed to be the case for telecommunications network assets, then the LRIC approach is likely to be required. When on the other hand the service is only likely to be needed for a short time, then that is the relevant time period to which a competitive market would respond. A competitive market would not pay for assets that are not likely to be needed and therefore not profitable.

3.21 Competitive markets show combinations of short- and long-term pricing considerations. For example, butchers' shops would not continue in business unless they could on average achieve a sufficient mark-up over costs of stock purchased to cover their fixed costs and make a normal profit; but they may sell turkeys left in stock on Christmas Eve for less than they paid for them. Places on cruise ships or in public conferences or

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[31] As noted, avoidable costs are also sometimes referred to as the costs caused by the supply, or the opportunity costs of the resources used in supply.

[32] ACCC, 1997, Access Pricing Principles – Telecommunications. A guide, p.4

theatres may be sold cheap for early bookings, and then for more, and then again reduced as the departure or performance date approaches and the option of cancellation is no longer relevant for the supplier. More generally, investments that could wait but are made early will require an additional prospective return in order to compensate for the value of options forgone.[33]

3.22 In each case, provided that there is effective competition, prices reflect avoidable costs within the relevant time frame. Where long term investments are required, they will be remunerated in a competitive market; where supply is only likely to find customers for a short period, an efficient supplier would not incur costs that could only be recovered over a longer period. Regulatory practice should be guided by this.[34]

Proposition 4

3.23 Proposition 4 is that *demand for the services of Telstra's ULLS will be significantly affected by the introduction of the NBN*. This means that some of Telstra's local loop assets will no longer be used (being made technically obsolete by the NBN) while others of the Telstra assets will continue to be used in the long term, albeit possibly in different ways.

3.24 The reasons for this have been explained in the previous section, setting out the specifications for the NBN and commenting on some points from published statements by bidders. Some of Telstra's local loop assets will not need to be replaced, making a key point of distinction between the current state of affairs and the usual position for regulated infrastructure. Further detail is in Appendix 3.

Proposition 5

3.25 Proposition 5 is that the relevant costs for Telstra's ULLS are to be estimated on the assumption that an efficient new entrant *would be able to use Telstra's trenches and ducts, paying an appropriate price for their use, rather than having to re-build or replace them.*

3.26 In order for investment to be efficient, potential investors should be comparing the costs and benefits of alternatives with the costs and benefits of using the existing ducts and trenches in return for reasonable payment for use of the assets, not with the higher alternative costs of replacing them. The reasons for believing that it would be less expensive to use existing assets than to re-create their equivalent today include a commonsense view of the different amount of work and costs that would be involved.

3.27 One consideration is that the real costs (meaning costs adjusted for general inflation) of digging trenches and installing ducts may have been lower at the time the CAN network

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[33] Dixit & Pindyck Investment in Uncertainty.

[34] There is no question here of a regulator taking irresponsible opportunistic advantage of an undertaking that had sunk cost for the long term by limiting prices to short run marginal costs.

was installed than they would be today, both because rising real wage costs may have outweighed cost savings through technical progress and because some of the trenches were dug before roads were paved over them. In addition, much of the original cost is likely to have been recovered through depreciation charges. Rebuilding the CAN would not be a practical proposition.

3.28 The evidence for our view that the costs of using the existing assets would be significantly less than replacing them thus includes:

(a) Wages rose at an average rate of 1.63 per cent a year in real terms between 1988 and 2008.[35]

(b) The following extract from the ACCC Discussion Paper on Telstra's Access Undertaking for the ULLS, June 2008, p.30, discussing how much difference it makes when turf is replaced by harder road surfaces. This confirms that using existing trenches and paying an appropriate price for their use would be a good deal less expensive than digging them again today:

> "To examine the effect that the cost and preparation of surface barriers may have on total annual cost, the TEA model was run assuming trenching of turf only. Testing this assumption in no way suggests that this is an appropriate modelling assumption. The results of running the TEA model with this assumption are intended to illustrate the significant effect that the cost of digging different surfaces has on trench costs. The results suggest that the fall in the annual cost to total ducts and pipes, and, in turn, to total annual cost, is highly significant – a fall of almost 24 per cent in the total annual cost. The results also show that the annual cost of for ducts and pipes in the main part of the network fall by 51 per cent, and in the distribution network these fall by about 42 per cent."

(c) It is necessary to take depreciation into account, since otherwise the costs of using capital assets would be incorrectly measured and any charge made for their use would be under or over- stated. With regard to the age of the relevant assets, in 2001 Telstra reported that:

> "…more than 50 per cent of the copper pairs in the Australian CAN are over 20 years old, more than 30 per cent are over 30 years old and nearly 10 per cent predate 1950". [36]

From the 1.2.1 version of the TEA model the following asset lives can be inferred:

- 10 years for 'Main cable';

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[35] Source: Australian Bureau of Statistics, Series 1350.0 Australian Economic Indicators, Mar 2009 – Table 7.6 – Labour Costs, Annual Average.

[36] Telstra, *Productivity Commission's draft report on Telecommunications Competition Regulation – Final Submission*, July 2001, p.21, quoted in Optus' December 2008 submission on the ULLS undertaking. This source also states that: "By 1960 the network owner (at that time the Postmaster General) had provided copper lines to the majority of serviceable addresses. After 1960, growth in the network was mainly for the purpose of servicing new addresses (in response to population growth)."

- 20 years for 'distribution cable';
- 40 years for 'main ducts and pipes'; and
- 30 years for 'distribution ducts and pipes'.

The cost of many of the trenches and ducts must have been recovered through depreciation charges by now.

Building a new network, a feasible alternative?

3.29 The TSLRIC+ approach assumes that a new entrant could, in practice, build an access network if it wished to do so. However, in the Australian context, and given the forthcoming roll-out of the NBN this is unlikely to be feasible.

3.30 Non-low impact installations, which include any in environmentally sensitive areas such as heritage conservation areas, national parks and reserves, require development consent, from the state planning authorities (including local councils), individual landowner's written approval (usually in exchange for a fee). Such procedures are invariably very expensive and time consuming.

3.31 For Low-impact facilities, whilst planning authorities do not have formal jurisdiction, the Telecommunications Act 1997 specifically requires carriers to comply with the Telecommunications Code of Practice 1997 (the Code) and the Code specifically requires that carriers, before installing a Low-impact facility, take reasonable steps to find out if they can use any existing facilities of another carrier or utility. These facilities may include cabling, conduit, easements or other facilities that could be used to co-locate and deliver the service the carrier intends to build.[37]

3.32 A separate obligation under the Telecommunications Act 1997, carriers have to formally notify their intention to undertake new telecommunications infrastructure construction and the prescribed process permits affected parties (the landowners and those that occupy or have any legal interest in land) to formally object. This can potentially create significant delays for any large scale build involving multiple land access (i.e. private landowners public landowners, authorities, utilities, etc.).

3.33 It is therefore clear that building ex-novo a CAN in the time-span implied by the imminent deployment of the NBN would be practically unfeasible in addition to being economically difficult.

[37] Indeed, this reinforces the argument that a new entrant should be granted the use of the existing ducts and trenches when providing the ULLS service in the present context in Australia.

Conclusion on Proposition 5

3.34 From the above reasoning, it follows that if the prices that Telstra is permitted to charge for the use of its ULLS assets, including the trenches and ducts, are set on the basis of what a hypothetical new trench-digging entrant would have to charge, these prices will be significantly higher than those that would be needed to cover the efficient costs of using Telstra's assets including paying a reasonable return to Telstra for its investment in the original trenches etc.

3.35 This in turn has some important implications:

(a) If prices were set at the higher level, they would represent a windfall gain to Telstra compared to a normal return on the assets in question.

(b) Making profits at such prices would not imply a realistic challenge to Telstra management or staff, and thus would not encourage Telstra to improve its operational efficiency.

(c) Investment decisions might be inefficient. For example, an entrant might install wireless technology in order to reduce costs below the levels charged by Telstra for the use of its ULLS, even if the cost of doing so – the avoidable opportunity cost to society – was greater than the actual cost of making efficient use of the existing trenches. By contrast, if the relevant costs for Telstra's ULLS were estimated on the assumption that an efficient new entrant would be able to use Telstra's trenches and ducts, potential investors would have the incentive to make efficient "build or buy" choices – since the ULLS price would reflect the most efficient mode of investment.[38] Or to give another example: if the price to the old network is inflated by the 'wrong' application of TSLRIC, this would slow down the roll out of NBN if done by Telstra itself: the profitability of keeping the old network in place would be increased by the wrong regulatory decision on access prices.[39]

3.36 Similar situations are not new in competition economics and law and can be dated back as far as 1912 when, in the USA the 'essential facility doctrine' was originally developed.[40] According to this doctrine a monopolist can be required to give access to some facilities that it owns when:[41]

(a) the essential facility is controlled by a monopolist;

(b) A competitor is unable, practically or reasonably, to duplicate the essential facility.

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[38] In other contexts, an efficient "build or buy" incentives would involve estimating the cost of a modern equivalent asset designed for the long term, but as explained throughout this report these circumstances do not apply to the ULLS.

[39] This problem might also arise to some extent if the NBN was rolled out by another player (if the incumbent operator has legal and operational tools at its disposal which give it the ability to slow the progress of the deployment).

[40] The doctrine was originally developed in *United States vs Terminal Railroad Ass'n* 224 U.S. 383.

[41] Robert Pitofsky, The Essential Facilities Doctrine under United States antitrust law, mimeo.

3.37 In such instances courts can oblige the monopolist to allow its competitors to use its facility.

3.38 Considerations of this sort were also important in the design of the system regulating the water industry in England and Wales, aspects of which will be discussed more fully below.

Proposition 6

3.39 Proposition 6 is that the *TSLRIC+ methodology as conventionally applied would not provide estimates of the relevant costs*.

3.40 The TSLRIC+ methodology as applied in telecommunications regulation provides a way of measuring costs for the purpose of setting price limits in a regulatory context. In some circumstances it is well designed to measure the costs that would be relevant to prices in a competitive market, but in other circumstances it is not.

3.41 The essential features of the TSLRIC+ methodology as applied to an access network may be summarised as follows:

(a) It measures cost of the total services provided by the access network. These total services are defined as the "increment". (Definition of the correct increment is key to the methodology).

(b) It measures long run costs, including the cost of replacing existing assets with their modern equivalent and a normal rate of return on that investment.

(c) It measures incremental costs, meaning the costs caused by the increment in supply.

(d) It measures an efficient level of costs, since it is based on estimates of what an efficient new entrant using modern technology would need to charge. (Checks are usually made by reference to the incumbent operator's actual cost levels, and to international comparators.)

(e) It assumes that a contribution should be made to the costs that are common between the core and access networks (the "+" factor).

3.42 Although in some contexts the TSLRIC+ methodology is a valid way of estimating the costs that would be relevant pricing in a competitive market, so that it is (for example) widely used in setting access prices to core telecommunications networks, there are two respects in which it would not be a good guide to competitive prices for Telstra's ULLS:

(a) It measures long run costs, including replacement of assets, whereas some of Telstra's local loop assets will not need to be replaced.

(b) It makes no allowance for the inefficiency that would be involved if the trenches and ducts currently in use had to be replaced.

3.43 The proposed adaptations, described in the following section, would address these weaknesses.

3.44 However, given that the TSLRIC+ methodology is currently used in Australia we believe that it is important to highlight some of the shortcomings that are associated which such methodology. We have therefore summarised them in the box below.

Conclusion

3.45 **The Conclusion** is that the appropriate methodology for estimating the costs to which Telstra's ULLS charge should be limited should be based on realistic assumptions about the future demand for Telstra assets, and on assumptions that an efficient level of costs would include the use of some of those assets. This would require adaptation of the conventional TSLRIC+ system used in the past.

Box 1: Shortcomings of the LRIC methodology if applied pedantically to access pricing[42]

1. LRIC models have been developed partly in order to provide an efficient "build/buy signal", i.e., to calculate a level of charges under which a new entrant operator would build its own core network if, and only if, it is more efficient to do so than to pay for the use of the incumbent operator's network.

However, in a situation where it is highly unlikely that an operator would build a new access network the necessity to provide a build/buy signal is not clear, and in these circumstances it would be more appropriate to set the lowest price levels for access that would cover forward – looking costs and provide a reasonable return on existing assets.

2. Traditional copper access networks consist of copper cables (laying underground or hanging on poles) of different sizes connecting the subscribers' concentrator units (where a line card for each customer is located) to the customer's premises. The copper cables start from the concentrator and gradually separate at distribution cabinets, becoming thinner and thinner until they reach the last distribution point where the last drop of cable departs to get to the customer's premises. The cable network usually follows the road grid.

When bottom up models are designed to estimate the forward-looking LRIC of interconnection products, the modelled increment is the whole core network, i.e., the network connecting the concentrator units through 2-3 layers of digital exchanges. This part of the network presents three peculiarities:

(a) The Modern Equivalent Asset is heavily used as a revaluation methodology. In particular, at the beginning of liberalisation SDH transmission technology was the Modern Equivalent of PDH transmission technology; these days IP technologies are completely overhauling not only switching but also transmission technologies.

(b) Asset unit costs were, and still are, showing strong decreasing trends.

(c) The accounting asset lifetimes have proven to be not too dissimilar to the corresponding economic life.

However, these three crucial characteristics do not hold for the copper access networks. This has important implications

[42] These criticisms have been made in other contexts than Australia.

for the applicability of TSLRIC+ in the context of access networks:

(d) The revaluation methodology for the capitalised cost of digging trenches (whose Gross Book Value is likely to be by far the main part of the total GBV of an access network) consists essentially in the current cost of digging trenches. In other words, the forward-looking element of this type of asset does not imply technological developments of any meaningful sort and therefore confirms the inapplicability of a modern equivalent assets (MEA) methodology.

(e) This leads to the second element: the asset unit costs. Again, with labour costs increasing in real terms over time (with insurance costs and social security perhaps playing a major part) the unit cost of installing copper cables these days is unlikely to be lower than it was at the time when the assets were installed.

(One could argue that the network could be designed more efficiently now, with a population settled over the territory, rather than when the network was originally built: the design could be optimised if built from scratch with respect to the current network design, which is the legacy of a gradual development. However, in the light of experience with bottom up models built for access networks under the LRIC standard and reconciliation exercise with corresponding Top-Down models, we doubt if this would lead to significant economies.)

3. Extract from a commentary by the ACCC:

> The ACCC also considers that the inclusion of surface barriers, for example, concrete footpaths and roads, as a component of the asset value for determining network costs would overly compensate Telstra for its investments in facilities used to supply the declared service. In a substantial majority of cases, local copper pairs were installed in turf and only subsequently paved over. Telstra has proposed that forward-looking costs should include the retrenching and re-paving of trenches where local copper pairs were initially laid. The result would be that Telstra would be compensated for costs that it (in most cases) never incurred and is not likely to incur within the economic life of the existing copper pairs.[43]

4. Another feature of access networks in developed countries that hinders the applicability of LRIC is that for these networks, differently from the core networks, accounting asset lifetimes have proven to be quite different from (shorter than) the corresponding economic lives, which have been extended by technological developments. This has led to over-estimation of depreciation costs.

5. Forward-looking TSLRIC+ for the ULLS is estimated on the basis of brand new networks aimed at providing an efficient "build/buy" signal to the industry. Hence, the depreciation and the cost of capital charges are usually calculated as Year 1 charges or, if the model is sufficiently complicated to deal with the issue, as Year 1, Year 2 charges etc. as part of a multi-year schedule.[44] This implies that:

(a) The correct calculation of the capital expenditure (i.e., annual depreciation charge and cost of capital) relies on correctly estimating the life of the assets in question.

(b) Assets that have already been fully depreciated in the operator's account do generate, in TSLRIC models, a depreciation and a cost of capital charge since the network is built under a forward-looking prospective.

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[43] ACCC, 2008, Assessment of Telstra's Unconditioned Local Loop Service Band 2 monthly charge undertaking, Draft Decision, p. 53

[44] This is generally achieved through the use of formulas aimed at mimicking the asset's economic depreciation, i.e. the change in the asset value (calculated at any given point in time as the Net Present Value of the net cash flow generated by the asset) during the year in question.

(c) The cost of capital charge in TSLRIC models depends on the specific annualisation method utilised for the purpose, but it will be consistent with newly deployed assets.

These features of the models through which TSLRIC is usually implemented, coupled with the following observations, will enable incumbent operators to more than recover capital expenditure, if their wholesale prices are based on TSLRIC estimates.

6. Copper networks have been granted a new lease of life with the development of xDSL technologies. The asset lives originally included in the statutory and regulatory accounts did not anticipate this event; as a result, asset lives for this asset category are usually very short compared to the economic life of the asset, with the consequence that most of these assets are now fully depreciated and their net value relatively small compared to their book value.

The bigger the relative amount of fully depreciated assets, the lower the ratio NBV/GBV, and the shorter the asset lives assumed in Telstra's TSLRIC+ model, the more serious the issue of double recovery of costs.

7. If TSLRIC+ is based on the concept of efficiently reproducing a copper-based access network, this would not be the relevant benchmark for the "build or buy" decision. New entrants would not reproduce a copper-based network similar to the one that has already been rolled out by the incumbent. Instead, they will roll out the technology that is most appropriate to the areas they serve (for example additionally using fibre in urban areas and radio in rural areas).

In other words, a TSLRIC+ charge based on the costs of reproducing a copper network is useful only to calculate the costs of a product based on copper and is not necessarily capable of providing useful signals to encourage efficient entry to the access network.

8. The lack of material technical change for many of the assets in the access network will mean that incumbents will rarely make Modern Equivalent Asset adjustments when revaluing assets. Instead, they will simply convert existing assets from historic to current costs. Such an approach, while possibly consistent with a narrow interpretation of current costs, cannot be said to produce an outcome that is consistent with a competitive market. Recognising this, the European Commission has (in our view correctly) defined current costs in a wider sense as the costs of building an efficient modern equivalent infrastructure and providing such a service today.

4 RECOMMENDED METHODOLOGY

Overview

4.1 We propose calculating charges for the ULLS that would reflect the costs that would be reflected in price in a competitive market, taking account of both the NBN and the nature of ULLS assets. This approach is based on the same economic principles as in the past in that it seeks to measure the costs caused to society by the provision of ULLS services, but it embodies two essential adaptations to the TSLRIC+ method of calculation in order that the estimates may give effect to these principles more accurately in present circumstances. These two adaptations are:

(a) The costs of using those of Telstra's assets expected to be made redundant by the NBN, would be estimated as the costs that would be incurred by an efficient operator in maintaining and repairing the existing assets in a serviceable state for the limited time for which they will be in use - including an appropriate rate of return on the investment that had been made but not including the cost of replacing the assets.

(b) The cost of using the remaining assets, i.e., those assets that are likely to be used in the long term, would be estimated as the long-run costs of an efficient new entrant allowed to make use of the existing ducts and trenches in return for an appropriate payment to the owner. This is likely to give a lower cost estimate than calculating the cost of the unrealistic prospect that the ducts and trenches would be replicated with new ducts and trenches, as in traditional TSLRIC+ calculations.

4.2 With these adaptations to the traditional methodology, the ACCC would be able to measure more accurately the opportunity costs to society of the provision of the service.

4.3 The proposed adaptations are now explained in more detail.

Assets expected to become redundant as a result of the NBN

4.4 Those Telstra assets made redundant by the NBN will not be needed in the long term, so it is not realistic or efficient to calculate their prices as if they would.[45] This means that the traditional TSLRIC+ method which involves estimating the cost of replacing existing assets with their modern equivalents should not be applied to these assets. Instead, the cost of using them for their remaining life and of providing a normal return on the investment they represent should be estimated as follows.

[45] This fundamental point is clear from Propositions 1 to 3, and from earlier discussion, e.g. footnote 30. No competitor would survive in a competitive market if its costs included providing services for which there is no demand. Although mistakes can occur, nor would it be good practice in a democracy for public sector investors to provide services not wanted by the people.

Operating and maintenance costs

4.5 The costs of operating, repairing and maintaining the assets in good condition for their expected useful life (which is likely to be between two and five years, depending on NBN roll out) should be estimated with advice from independent telecommunications engineers, cost accountants and economists. These estimates should then be compared with Telstra's actual costs in a recent period, as a plausibility check. Other cross-checks could be made by comparisons with costs incurred by other companies for equivalent work, and any major issues arising then discussed with Telstra.

4.6 In the light of this work, the ACCC would be able to make an informed estimate of the required efficient operating, maintenance and renewals expenditures.

Residual values

4.7 When these assets fall out of use, being replaced by the NBN, they may have a residual value which should be taken into account.

4.8 As far as we know, the Government has not yet made decisions on how the NBN is to be regulated, or on whether Telstra will be allowed to offer alternative services through its lower technology network. It is potentially important to note that the residual value of Telstra's assets will be affected by whether or not it is allowed to compete with the NBN. If Telstra is allowed to compete, the residual values would be higher and the appropriate levels of charge during the period before 2014 would be reduced.

Return on assets

4.9 In calculating the rate of return that should be included, the starting point should be the rate of return allowed to Telstra reflecting its estimated cost of capital. (If there were reasons to think that the systemic risks associated with the ULLS were different from those of Telstra as a whole, there would in theory be a case for adjusting this rate.)

Asset valuation

4.10 This return should be earned on the value of the assets involved, as reflected in company accounts.

4.11 In the present case it would be very difficult to argue that the usual criticism of HCA/RoR methods applies.[46] The major shortcoming associated with such methods is that companies would have no incentive to invest efficiently as they would be remunerated for whatever investment they make. In this case this would not happen, as the asset valuation would be based on the (depreciated) value of the assets that make up the

[46] See Appendix 4.

network upon which the ULLS service is provided at the time when the new approach is implemented.

4.12 This would ensure that a valuation is used which is consistent with the costs incurred; and that no perverse incentive to "gold plate" investment is provided.

Summary

4.13 The charges that should be made for the use of these assets for the period up to about 2014 are the costs of maintaining them in service for the relevant period, plus a normal rate of return on the assets, and minus any residual values at the time the assets are taken out of use. This price would cover necessary repairs and maintenance, and any renewals or capital expenditure that was cost-effective for such a short period.

Assets expected to continue in use

4.14 We understand that Telstra will probably continue to own and operate the last link between the pillar and the end user (e.g., the copper wire to the individual house or office), and that the charge it makes for the use of this asset would have to be regulated as a monopoly. It might also lease some assets to the NBN, and again the regulators might become involved in settling the lease payments.

4.15 We assumed that these assets will continue to be used in the long term, in which case it would clearly be a mistake not to have regard to long run costs. However, the assumptions on which estimates of asset values are made should take account of some special features of the local loop. In particular, the assets providing the ULLS that are expected to remain under the ownership and management of Telstra include ducts and trenches containing the copper wires, as well as poles from which they are strung. We assume that it is unlikely that a new investor would be allowed to dig up roads to install new trenches etc., when existing ducts, trenches and poles could be used.[47] For this reason it would be unrealistic to assess the costs of using these assets by estimating their replacement cost, as in a conventional TSLRIC+ exercise, and the concepts used in renewals accounting become relevant.

4.16 Telstra should receive a reasonable payment for the use of its assets.

4.17 The estimates should be made as follows.

Operating and maintenance costs

4.18 Telstra should be entitled to charge sufficient to cover the costs of operating, maintaining and, when necessary, renewing or replacing the assets. These costs should be estimated by independent engineers, cost accountants and economists, and discussed

[47] See earlier discussion under the heading 'Building a new network, a feasible alternative?' in the section on Proposition 5.

with Telstra so that any major differences between Telstra's actual costs in these areas and the estimated efficient levels can be understood.

Return on assets

4.19 Telstra should continue to be able to charge a price that includes a normal rate of return on the assets, reflecting the cost of capital calculated for Telstra, as discussed above.

Asset valuation

4.20 Under a standard TSLRIC+ approach the costs of replacing the existing ducts and trenches with modern equivalent assets (MEA) would be estimated, and unless an alternative technology such as wireless transmission was more cost-effective the MEA replacement costs would be used to provide the estimated asset values. However, because in the present case there is no realistic possibility of the ducts and trenches being replaced, this would lead to the risk of inefficient investment decisions. For example, suppose that the cost of digging new trenches and providing new ducts was 100, and the price of using wireless was 50, wireless might be put in even if the actual cost of using the existing ducts and trenches (including a reasonable rate of return on the past investment) was 20. Such an investment in wireless would be clearly inefficient. Efficient investment would take place only if the new assets could deliver the service for less than 20.

4.21 For this reason, a standard TSLRIC+ approach would lead to inefficient charging and risk inefficient investment and distortion to competition.

4.22 If, as we propose, the efficient cost of using Telstra's existing assets is estimated, this should include a normal return on their value as expressed in the company accounts.[48]

4.23 This would be a significant amendment to the traditional application of TSLRIC+ principles, but it is required in the particular circumstances of the local loop using existing ducts and trenches if the costs measured are to accurately reflect the costs of supply (as would occur in a competitive sector of the economy).

4.24 In addition to the wires connecting end users to the access network, it is possible to envisage that some telecommunication products that do not require large amounts of bandwidth may well be provided using the current copper network even in the future. These assets might be leased by the NBN from Telstra, or remain under Telstra's ownership and control and be operated to provide a competing service with the NBN.

4.25 If operated as an independent competitor to the NBN the charges for the services provided by these assets would probably not need to be regulated; they would not be able to charge more than they were worth in relation to the NBN.

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[48] Again, it would be very difficult to argue that the usual criticism of HCA/RoR methods apply in this case. See discussion above.

4.26 If, however, the NBN was to lease the assets from Telstra, perhaps in order to integrate better with other NBN services, the question of the appropriate price to be paid for the lease may arise. In this case, the reasonable charge by Telstra would reflect a normal rate of return (as discussed above).

Summary

4.27 The charges that should be made for the use of those of Telstra's assets expected to be in use in the indefinite future, are the long run costs of maintaining them in service if that is more cost effective than replacing them (e.g., digging new trenches and providing new ducts), plus a normal rate of return on the assets as valued in the accounts.

Illustration

4.28 To illustrate the two adaptations we propose to the traditional TSLRIC+ methodology we give the following summary.

Table 4.1: Summary of proposed modifications

	Traditional TSLRIC+	Proposed modified methodology	
		Assets expected to be made redundant	**Assets expected to continue in use indefinitely**
Time frame for projections	Long run	Up to expected date when taken out of use	Long run
Rate of return	Telstra cost of capital as calculated by regulator	Telstra cost of capital as calculated by regulator	
Basis for asset valuation	MEA	Company accounts	
Operating costs, repairs and maintenance	Forward-looking opportunity costs of an efficient operator using modern equivalent assets	Forward-looking opportunity costs of an efficient operator using existing ducts and trenches, and paying Telstra the appropriate rate of return on its assets	

Implementation

4.29 In order to implement the proposed new methodology, the following steps would be required:

(a) to prepare bottom–up estimates of the efficient costs of maintaining in use, for as long as required, those parts of the ULLS network expected to be replaced by the NBN;

(b) to compare these estimates with any evidence put forward by Telstra on this issue; and to reach a judgement on the costs to be allowed;

(c) to prepare bottom–up estimates of the efficient costs of maintaining in use for the long term those parts of the ULLS network that are not expected to be replaced by the NBN - the assumption on which these estimates would be based is that an efficient entrant would have access to the existing ducts and trenches;

(d) to compare these estimates with any evidence on the same assumptions put forward by Telstra, and to make a judgement on the costs to be allowed - an appropriate return would be allowed on depreciated asset values, and on any new investments found to be efficient.

4.30 Issues to be considered further in implementing the recommended approach include:

(a) how to obtain estimates of the dates on which different parts of the present ULLS network would become redundant; and

(b) what assumptions to make about the residual value of Telstra's technically redundant assets, since this would depend on whether they are able to be used in competition with the NBN, and on what terms.

5 HOW THE RECOMMENDED APPROACH TAKES ACCOUNT OF RELEVANT FACTORS

Consistency with legal requirements

5.1 The proposed method of calculation of avoidable future costs would meet the legal requirements of the Trade Practices Act 1974 (TPA) better than a continued application of previous methodology. These requirements are based on deciding whether the terms and conditions promote the long-term interests of end-users (LTIE) which require consideration of:

(a) the objective of promoting competition;

(b) the objective of any-to-any connectivity; and

(c) the objective of encouraging the economically efficient use of, and the economically efficient investment in, infrastructure.

5.2 The TPA also requires consideration of the legitimate business interests of the access provider, and their investment in facilities used to supply the declared service.[49]

5.3 The ACCC has provided principles for prices that would meet the legal requirements of the TPA, including the following:

> **"Access prices should be cost based**
>
> "The price of a service should not exceed the minimum costs an efficient firm will incur in the long run in providing the service. The relevant costs are the economic costs of providing the service. These are the on-going (or forward looking) costs of providing the service, including a normal commercial return on efficient investment." [Access Pricing Principles –Telecommunications a guide, July 1997, p14]

5.4 The ACCC's principles also included:

(a) access prices should not discriminate in a way which reduces efficient competition;

(b) access prices should not be inflated to reduce competition in dependent markets; and

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[49] The Australian Competition Tribunal (ACT) has interpreted these criteria and the economic principles underlying the criteria in recent published decisions, including:
• the Tribunal's 2006 decision on Optus's appeal against the ACCC's rejection of its mobile termination undertaking (http://www.austlii.edu.au/au/cases/cth/ACompT/2006/8.html);
• the Tribunal's 2007 decision on Vodafone's appeal of the ACCC's rejection of its mobile termination undertaking (http://www.austlii.edu.au/au/cases/cth/ACompT/2007/1.html); and
• the Tribunal's 2007 decision on Telstra's appeal of the ACCC's rejection of its ULLS undertaking (http://www.austlii.edu.au/au/cases/cth/ACompT/2007/3.html).

(c) access prices should not be predatory.

5.5 The ACCC went on to explain the relevance of these principles for the LTIE criteria as follows:

> **"Promoting competition in markets for telecommunications services**
>
> "An access price consistent with these principles will promote competition in dependent telecommunications markets. As the price will be based on the cost of providing the service and will not discriminate between access seekers to reduce competition, it will encourage efficient entry and exit in dependent markets. The least-cost access seekers will be viable in the long term in dependent markets allowing greater product differentiation and choice." [Access Pricing Principles –Telecommunications a guide, July 1997, p16-17]
>
> **"Encouraging economically efficient use of, and investment in, telecommunications infrastructure**
>
> "An access price consistent with these principles will also encourage the efficient use of, and investment in, infrastructure." [Access Pricing Principles –Telecommunications a guide, July 1997, p17]
>
> **"Legitimate business interests of the carrier or carriage service providers**
>
> "As an access price consistent with these principles allows efficient access providers to recover their costs of production it will not violate their legitimate business interests." [Access Pricing Principles –Telecommunications a guide, July 1997, p.18]

5.6 All of these statements of principle by the ACCC appear fully consistent with the economic reasoning set out in this report.

5.7 This section therefore reviews and explains the consistency of the recommended approach with the legislative requirements from an economic perspective, i.e., focusing on the underlying principles rather than legal interpretations of statutes or of case law.

5.8 In short, it is our view that the approach recommended in this paper is consistent with the ACCC's four broad pricing principles. That is, it is our view that access prices derived using the recommended approach would:[50]

(a) be cost based, since, for the reasons set out in this report, it would cover the costs of an efficient operator.

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[50] ACCC, Access Pricing Principles - Telecommunications, a guide, 1997

(b) not discriminate in a way which reduces efficient competition, because all those using the ULLS would pay charges calculated on the same basis, and the owner of the assets would receive a reasonable payment for their use.

(c) not be inflated to reduce competition in dependent markets, since charges would be limited to efficient costs correctly calculated; and

(d) not be predatory, as charges would cover costs.

Promotion of competition

5.9 The ACCC has noted that an access price consistent with the principles set out above would promote competition in dependent telecommunications markets. The proposed methodology would promote competition more effectively than TSLRIC+ as previously applied because it would yield cost estimates that more accurately reflect the value of the resources used in providing the service. It would also probably result in lower charges for use of the local loop, which would facilitate competition between service providers.

Any-to-any connectivity

5.10 Any–to–any connectivity is a legal requirement whose achievement would not be affected by the proposed change in pricing methodology.

Efficient use of and efficient investment in infrastructure

5.11 The ACCC has also noted that an access price consistent with the principles it has enunciated would encourage the efficient use of and efficient investment in infrastructure. The proposed methodology implies both that the services provided through the ULLS are more accurately costed, and that the service providers make the relevant comparisons when considering investment in possible alternative techniques. The objectives of encouraging economically efficient use of, and the economically efficient investment in, infrastructure would therefore be achieved.

5.12 The LTIE is best served by efficient use of and investment in the ULLS infrastructure, and by encouraging operational efficiency by the service provider. The more accurate estimation of efficient future costs would provide relevant management targets and should in this way also help to improve efficiency.

The legitimate business interests of the access provider, and their investment in facilities used to supply the declared service

5.13 The ACCC has stated that:

> "As an access price consistent with these principles allows efficient access providers to recover their costs of production it will not violate their legitimate business interests."

5.14 The TPA requires that the legitimate business interests of Telstra are taken into account when determining such prices. This implies that if Telstra is operating efficiently it should

be able to earn an appropriate rate of return on its investments, and that there should be reasonable consistency in the system of regulation.

5.15 The changes proposed here would have due regard to the interests of Telstra, which would be able to recover its costs including the appropriate rate of return provided that it operates efficiently. This is the case as:

(a) the cost of maintaining the network in steady state, i.e., at the current level of functioning (and therefore at the current value) would be covered on the basis of the forward-looking opportunity cost of operating the network;

(b) the appropriate rate of return would be applied exactly on the value of the assets reported in Telstra's accounts - which is what they cost, less depreciation already charged.

5.16 The fact that the changes proposed remain based on the same principles as in the past, with estimation completed differently partly because circumstances have changed and partly in following through ACCC's recognition of a possible flaw in the methodology as previously applied to the local loop, helps to provide reasonable regulatory consistency.

5.17 Thus the legitimate business interests of the service provider are reflected in the ability to recover all future costs efficiently incurred, and to earn the appropriate rate of return on its investments.

5.18 In economic terms, earning an appropriate rate of return on investments has two implications. The first is that the depreciation charge included as a cost of supply should reflect economic depreciation, not exceeding the loss in economic value of the assets during the relevant period. The second implication is that an appropriate rate of return is made on investment, being the market–determined return that investors require for investments with similar risk characteristics.

5.19 In considering the appropriate rate of profit we note that, in rejecting Telstra's 2008 Undertaking, the ACCC stated the proposed point estimate of a post-tax weighted average cost of capital (WACC) of 12.28 per cent (and the implied 16.46 per cent estimate of the pre-tax vanilla WACC) to be excessive, and preferred a figure of 8.58 per cent (which implies a 9.22 per cent pre-tax WACC) when running alternative scenarios of the TEA model.[51]

5.20 Our terms of reference do not require us to comment on the details of the calculations of the WACC. It is, however, important to note the principles on which the WACC has been

[51] In the public reports published by the ACCC on the 2005 undertaking the figures regarding the WACC used previously are omitted for confidentiality reasons.

calculated by Telstra in its submissions. We refer to a report produced by Professor Robert Bowman in supporting Telstra's 2008 ULLS Undertaking.[52]

> It is a fundamental principle of finance and of business that investments are made in projects only if there is an expectation that an appropriate reward will be earned to compensate for any risk that the project entails. The higher the risk, the higher the expected return needs to be to entice investors. The principle that risk will require an appropriate expected return applies to both of the major sources of capital to a business; that is debt and equity. The process of determining the appropriate expected return for a business builds upon the estimates of the appropriate return to each source of capital. Then these costs of capital are weighted by their respective contributions to the total capital. The resulting cost of capital for the business is referred to as the Weighted Average Cost of Capital or WACC. This report sets out an appropriate estimate of the WACC for the assets which comprise the ULLS-Network. [53]

5.21 The cost of capital is estimated in this report through the Capital Asset Pricing Model (CAPM) and this is the method also used by the ACCC.

Implied concepts of risk

5.22 Under the CAPM, risks are divided into two major categories:

(a) systematic risks; and

(b) specific risks.

5.23 The CAPM approach measures a company's exposure to systematic risk. Systematic risk is determined by economy-wide factors and cannot be diversified away by investors. Therefore the company has to compensate its investors for bearing this risk through the cost of capital. Examples of systematic risks include factors related to macroeconomic fluctuations, such as in the rate of growth of GDP, changes in interest rates, and changes in the prices of related factor inputs.

5.24 The specific risks affecting an individual firm are those risks that can be offset by investors diversifying their investments. Under the CAPM it is assumed that investors can protect themselves against specific risks by holding a diversified portfolio — implying that specific risks do not affect the rate of return to investors that the company has to cover through its cost of capital.

5.25 We do not see any additional complication in the calculation of the cost of capital stemming from the proposed new approach to pricing for the ULLS. In theory it is conceivable that it might increase Telstra's exposure to systematic risk, e.g., if the assets

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[52] Robert G. Bowman, Report on the appropriate weighted average cost of capital for the services provided over the CAN, 2007

[53] Prof Bowman also produced a report on the determination of the appropriate cost of capital for non network ULLS assets. The methodology is essentially the same.

made redundant were exposed to systematic risk more or less than the average of Telstra's assets, but it is not obvious that there would be any such effect. We therefore consider that the change would be unlikely to require an increase or reduction in the cost of capital that is allowed, or a change in the methods of estimation.

The asset base

5.26 We noted earlier that the ACCC is "aware of the limitations in the application of TSLRIC+ outside its original focus for PSTN assets, in that the TSLRIC+ concept revalues the network assets in each regulatory period such that it does not take account of depreciation in the value of the assets".

5.27 If our recommended approach is implemented, the value to which the cost of capital would have to be applied would be the depreciated value of the assets making up the network upon which the ULLS service is provided at the time when the new approach is implemented.

Regulatory consistency

5.28 The need to have regard to the legitimate interests of the carriage service provider also implies that pointless regulatory uncertainty should be avoided since this would unnecessarily increase the riskiness of investment, contrary to LTIE. The proposed new approach rests on the same principles as in the past, with methods of calculation adapted to the present circumstances of the ULLS, and so ensures reasonable continuity.

5.29 Moreover, adopting our recommended methodology would not in practice be likely to have any impact on the normal rate of return (as measured by the WACC) to remunerate Telstra's investments. Therefore the methodologies used by the ACCC at present would not need to be modified if our suggested framework is adopted.

Summary

5.30 For the reasons summarised above prices would cover only efficiently incurred costs; and the economies made possible by the NBN would be achieved. Users would be paying only for the efficient costs of supplying the services they require, namely:

(a) Telstra's complete ULLS for the period until it is replaced; and

(b) the part of the ULLS that would be used in the long term, on a long-term basis as at present.

5.31 Competition would be encouraged through the provision of services at an efficient cost, and there would be no threat to the requirement for "any–to–any" connectivity.

5.32 The recommended system would meet the relevant criteria significantly better than the alternatives.

6 RENEWALS ACCOUNTING

Introduction

6.1 We conclude this report with some discussion of other contexts in which similar issues to those arising for the regulation of the ULLS have been addressed. The essential common ground is the economic analysis that has been used in developing the recommendations set out in Section 5 above, that regulatory price limits should reflect the forward-looking avoidable costs of an efficient supplier, including a realistic rate of return on past investments, and taking account of prospective demand, as would be expected in a competitive market.

6.2 In applying these principles, the ULLS has two features in common with the water and sewerage industry (the "water industry"), which in England and Wales has been privatised and subjected to economic regulation as a monopoly supplier. In both cases the regulator has to face particular issues in deciding:

(a) How to value the asset base on which a return should be earned by the incumbent operator, and

(b) How to calculate the correct level of depreciation charges.

6.3 The valuation of assets needs to take into account the fact that although some assets – vehicles, computers etc. – can be treated in the same way as in any other business, the most important assets – the trenches ducts and copper wires in one case, the reservoirs, tunnels, pipes and treatment works in the other – were installed a long time ago, and are most unlikely to be replaced with similar investments. The practical issue for the suppliers is to maintain these old assets in good working order, with of course some extensions or major engineering work from time to time.

6.4 In the case of the water industry, the assets were sold in one major privatisation (with many purchasers of the shares in each of the privatised businesses) at prices that reflected the expected future earnings stream. The expected price limits determined the value of the shares; and were a small fraction of what it would have cost to replace the physical assets owned by the companies concerned. After privatisation, the industry made an attempt to argue that it should be allowed a return on the replacement cost of the assets, but this proposal was quickly dismissed (our impression is that it was hardly taken seriously even at the time); the assets were instead valued for the purpose of the regulatory asset value at the level for which they had been purchased by shareholders on privatisation. Subsequent investment was added to the regulatory asset base at its cost.

6.5 In the case of the ULLS, Telstra's privatisation has been in tranches, and there has not been the same opportunity to observe a clear market value. The values in the accounts are therefore likely to be the best available guide.

6.6 In the case of the ULLS assets in particular, we have explained why it is not relevant to calculate replacement costs, as would be implicit in a pedantic application of TSLRIC+.[54] The historic cost of the assets, less depreciation already charged, is a reasonable basis for calculating the return that Telstra should be able to charge.

6.7 With regard to depreciation, it is clearly impossible to derive a meaningful estimate of forward – looking avoidable costs of using the assets concerned in either the ULLS or the water industry by calculation based on historic cost depreciation conventions. Too much may have changed since the assets were installed. The system of renewals accounting was developed in order to make a correct calculation of the depreciation charge that should be recoverable by water companies through prices.

Overview

6.8 In some regulatory systems depreciation is measured through a system of renewals accounting, rather than through estimates of asset lives. One example is the water industry in England and Wales which provides a precedent for some of the recommendations made in this report. More information is in Appendix 5.

6.9 In this context, it was not appropriate to estimate the costs of replacing, for example, reservoirs and pipes with modern equivalent assets since in practice much of the physical infrastructure would never be replaced. However, realistic estimates were needed of the costs of maintaining the assets in good working order through renewing some parts of the assets and repairing other parts, and the term "renewals accounting" was chosen to describe the system for producing these estimates.

6.10 In most contexts, depreciation is measured by estimating the useful life of an asset; there are then different principles according to which the cost is spread over the useful life. However, where individual asset lives are uncertain a more reliable and accurate measure of the depreciation of a system as a whole may be obtained by estimating the cost of renewals and maintenance expenditure that is likely to be required to maintain the system in a constant condition.

6.11 This system is used for "underground assets" such as pipes and reservoirs, while other assets (such as offices, vehicles, etc.) are depreciated in the usual way.

[54] Telstra's accounts also show estimates of the ULLS assets at replacement cost, calculated by application of price indices.

6.12 The expected cost in renewals and maintenance is expressed as an annual average, referred to as the infrastructure renewals charge (IRC), and actual expenditure of this kind is logged against it.[55]

6.13 The relevance to Telstra's ULLS assets is two-fold. The use of renewals accounting shows:

(a) that depreciation can be accurately measured through estimates of the amounts needed for maintenance and renewals, as is needed for the ULLS assets; and

(b) that this approach may be preferred when the regulatory requirement is to know the efficient costs of maintaining a system, such as a water and sewerage network, or the ULLS.

6.14 An obvious question is whether renewals accounting being designed for the water sector is inappropriate for the telecommunications sector, given the different characteristics of the industry (for example the higher rate of technological change in telecommunications). In our view this argument is not applicable in the circumstances we are investigating, for the following reasons:

(a) Trenches and ducts to enclose copper cable for the ULLS are not more "high – tech" than pipes, reservoirs and other water industry assets. In both cases the assets in questions are long-lived underground assets, constructed through excavation and placement of some form of container in the ground.

(b) The essential feature of both the water industry and the telecommunications local loop is the need to maintain in good working order for as long as needed a system installed often some time ago, with capital expenditure largely limited to renewals when needed and economically justified.

Discussion

6.15 Almost every physical asset has a finite life and thus loses value over time. The measure of the loss in value is depreciation: normally, the life of an asset is forecast and a charge is made in the company accounts against profits for loss in value over this period. However, if the economic life of an asset is particularly long, uncertain or indefinite, the depreciation charge might considerably over- or under-estimate the loss in value experienced by an asset. If the life of the asset turns out to be longer than the one upon which accounting depreciation is based then the loss in value will be artificially accelerated, and *vice versa*.

6.16 Renewals accounting is an attempt to arrive at a measure of depreciation that does not depend on estimating the life of an asset, but rather on the costs that need to be incurred

[55] More information is provided in Appendix 5.

in order to keep the assets in the state at which they were at the beginning of the relevant period. It is intended to estimate the cost of ensuring that the net value of assets (the network in both the water and telecommunications industries) remains constant as they are kept at the same level of functionality over the period.

6.17 In the words of Ofwat, "a system of assets in 'steady state' will suffer depreciation of exactly the same amount as the cost of the new components necessary to replace the loss of effectiveness of the system as a result of the period's usage".[56]

6.18 It is worth quoting more fully from this Ofwat document:

> "How does this apply to the water industry? This is an industry whose underground assets can last so long that even some of those built in the nineteenth century are still in use and there is a shortage of empirical evidence about the length of useful economic lives, especially of underground assets. Some components of the system have moving parts and their rates of wear and tear may be predictable to within normal levels of estimating accuracy, but they only account for a very small proportion of the total value of the system.
>
> Some years ago a new proposal was developed. It was observed that entire systems for each entity continued to operate effectively and achieve the standards required of them, as a result of the expenditure of modest and reasonably predictable amounts for maintenance and renewals each year. This provided prima facie evidence that the systems were in a steady state and therefore renewals accounting could reasonably be adopted -which is what happened.
>
> There were a number of reasons for developing and adopting this proposal but one element in particular seems to have played a part. The process of ascribing lives to infrastructure assets, necessarily delegated to engineers in each entity, had been a source of concern to the industry and seen, by the engineers in particular, as excessively arbitrary. On the other hand, engineers also had the task of assessing the probable course of renewals and repair work, a more tangible and less arbitrary task than assessing lives.
>
> With the development of the regulatory regime and the Asset Management Plan, it was necessary to develop a more far-sighted view of future renewals expenditure anyway. While clearly that process is subject to all the uncertainties of any process of estimation, it is a process that takes full account of current knowledge and experience and one with which engineers are familiar and in which they have some confidence. The attractions of satisfying both reporting requirements and the industry's concerns over estimates with no grounding in real experience proved sufficient reason to encourage the adoption of the alternative of renewals accounting."

[56] OFWAT, 1993 The Long Range Normative Charge for Infrastructure Renewals, RD7/93, p.4.

6.19 Clearly the amount spent will vary substantially among the different assets that compose the system; however, the yearly expenditure to maintain the system as a whole at the same level of functionality should not. Rather than estimating the economic life of all the assets that are part of the network and depreciating them individually, according to this approach one considers an overall charge (against profits) for the annual cost of maintaining the system at its current level of operation.

6.20 The charge calculated using the method of renewals accounting should be constant over time since it represents the annual cost of maintaining the network at the current level of functionality, which corresponds to its "steady state".

6.21 Therefore, an Infrastructure Renewals Charge (IRC) is made to the Profit & Loss account to represent the maintenance of asset value by the business during the year. The IRC should be calculated in a way that reflects an assessment of the company's long-term capital maintenance needs to maintain the serviceability and operating capacity of its infrastructure assets, including any network enhancement. The IRC is taken to the balance sheet as a provision and actual expenditure (IRE) is set off against this provision as it occurs. Any difference (from year to year) between IRC and IRE is accumulated in the balance sheet as either an accrual (IRA) or a pre-payment.

6.22 It may be worth illustrating the concept further with an example that we borrow from Ofwat.[57]

> Imagine a taxi company where the owner runs five identical vehicles, one purchased in each succeeding year, each of which has a useful economic life of five years. Each year, every vehicle would lose a fifth of its value and one vehicle will reach the end of its useful life and be replaced by a new taxi.
>
> For simplicity only we assume that prices are constant. In this case, each vehicle would lose a fifth of its value every year and one vehicle will reach the end of its useful life and be replaced by a new taxi. Therefore, each year the cost of replacing the retired vehicle will be exactly equal to the depreciation charged to the Profit & Loss account (i.e., five vehicles times the depreciation charge of each of them).
>
> The carrying value (or Net Book Value) of the fleet in the Balance Sheet would remain constant since it would be reduced by the total depreciation charge and increased by the cost of the new vehicle, with the cost of the new taxi being equal to the total annual depreciation charge. Constant also remains the size and effectiveness of the fleet with

[57] Ibidem

four vehicles ranging from a brand new one to one that is four years old. The fleet remains in “steady state” in spite of the fact that its components are depreciating.

6.23 This example is illustrated below.

Table 6.1: Renewals accounting, a basic example.

Year of purchase	Cost @ Year 5	Cum Dep @ Year 5	Net value @ Year 5	Annual Dep @ Year 6	Cum Dep @ Year 6	Net @ Year 6
Year 1	100	80	20	20	100	-
Year 2	100	60	40	20	80	20
Year 3	100	40	60	20	60	40
Year 4	100	20	80	20	40	60
Year 5	100	-	100	20	20	80
Total	500	200	300	100	300	200
Year 6	100					100
						300

Source: Ofwat

6.24 In this simplified example, it would not matter whether depreciation was calculated in the conventional way — a fifth of the value of each of the five cars purchased for 100 — or through renewals accounting: the cost of one new car at 100 needed to replace the one that was worn out. Either method accurately calculated the cost of economic depreciation of the ”system”, i.e., the five–car fleet. However, if the individual asset lives were highly uncertain, as in the networks being considered here, then the renewals accounting estimate would give the more accurate picture.

Summary

6.25 The water industry in England and Wales is characterised by a number of underground assets that can last for a considerable period of time; some of the Victorian pipes are only now being replaced across the UK. It is therefore very difficult to estimate the useful economic lives of such assets. Although some components of the water network have parts for which the useful economic life can be estimated quite easily, these account for a small proportion of the overall value of the network.

6.26 It was observed that, by spending a limited amount of resources for maintenance and renewals, the network could be maintained at the same level of functionality and effectiveness. This cost represented the depreciation of the system, and was measured through renewals accounting.

6.27 In our view, it has been a successful part of the system, being conceptually correct and practical in application.

APPENDIX 1: ENGAGEMENT LETTER

23 December 2008

PRIVATE & CONFIDENTIAL
Dr Matteo Aquilina
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Dear Dr Aquilina,

Optus Networks: Pricing Principles for the Unconditioned Local Loop Service

1. Introduction

1.1 Optus Networks Pty Ltd (***Optus***) wishes to retain Europe Economics (***you***) to provide your opinion as an economic expert in the telecommunications industry. The specific questions that we would like you to address are set out in section 4 of this letter.

1.2 Some background information is outlined in section 2 below to assist you to understand the context in which the questions arise and reference is made in section 3 to the Federal Court Guidelines to which you must have regard.

2. Some background

2.1 Part XIC of the Trade Practices Act 1974 (***TPA***) sets out a telecommunications industry-specific access regime.

2.2 There is no general right of access to telecommunications services: the Australian Competition and Consumer Commission (ACCC) must first 'declare' the relevant service (Division 2 of Part XIC of the TPA). Upon declaration, 'standard access obligations' apply (Division 3 Part XIC of the TPA). The access provider is obliged to supply the service to an access seeker upon request. The ACCC has the power to determine pricing principles for the declared service. A dispute about terms and conditions of access can be resolved by binding arbitration by the ACCC. Numerous services have been declared to date. For present purposes it is relevant to note that those declared services include the unbundled local loop service (***ULLS***).

2.3 The Unconditioned Local Loop Service (ULLS) is a service for access to unconditioned cable, usually a cooper wire pair, between an end user and a telephone exchange. The ULLS essentially gives an access seeker the use of the copper pair without any dial tone

or carriage service. This allows the access seeker to use its own equipment in an exchange to provide a range of services, including traditional voice services and high speed internet access, to end-users connected at the exchange.

2.4 The ULLS was first "declared" under Part XIC of the Trade Practices Act 1974 (the Act) in August 1999 and then again in July 2006 for a further three years. As a result of the declaration, the incumbent fixed line operator Telstra is required to supply the ULLS to access seekers including Optus, and the ACCC has the power to determine terms and conditions for access including price in the event of a dispute.

2.5 The Act requires the ACCC, in making a final determination in arbitration of access disputes, to have regard to a number of relevant legislative matters including (amongst other matters):

(i) whether the terms and conditions promote the long-term interests of end-users (LTIE) which requires consideration of:

(I) the objective of promoting competition;

(II) the objective of any-to-any connectivity;

(III) the objective of encouraging the economically efficient use of, and the economically efficient investment in, infrastructure;

(ii) the legitimate business interests of the access provider, and their investment in facilities used to supply the declared service; and

(iii) the pricing principles it has determined for the declared service.

2.6 The ACCC has published pricing principles and indicative prices for the ULLS in 2007 and 2008.

2.7 Telstra lodged an undertaking in March 2008 for the provision of the ULLS in Band 2 Exchange Service Areas (ESAs) applying for the period to 31 December 2010. The undertaking was supported by an estimate of TSLRIC+ which was produced by a new fixed line network cost model, the Telstra Efficient Access (TEA) model. The ACCC has proposed to reject this undertaking.

2.8 A recent development which may be relevant to ULLS pricing is the planned deployment of a new national telecommunications network as part of the Government's National Broadband Network (NBN) project. The new network is likely to be designed predominantly using fibre to the node (FTTN) architecture. The Government plans to select the party to build the National Broadband Network after a competitive assessment process. The Government called for participants to submit bids by 26 November 2008 and received bids from five parties.

2.9 The specific matters in section 4 that we would like you to address in a sworn report are relevant to the pricing principles for the ULLS (which are determined by the ACCC and which are to be taken into account by the ACCC in setting access prices in the course of arbitrating access disputes over the ULLS).

3. **Federal Court of Australia Guidelines**

3.1 It is customary for independent experts providing a report to comply with the Federal Court's Practice Direction: "Guidelines for Expert Witnesses in Proceedings in the Federal Court of Australia". Attached is a copy. You should read these guidelines; it will be necessary for any evidence you give to conform to them.

3.2 In particular, at the end of your report you should declare that "[the expert] has *made all the inquiries that* [the expert] *believes are desirable and appropriate and that no matters of significance that* [the expert] *regards as relevant have, to* [the expert's] *knowledge, been withheld from the Court*."

4. Documents and materials

4.1 Enclosed are various documents and materials which you should consider, as follows:

(a) the ACCC's 1997 guide to access pricing principles in telecommunications;

(b) the ACCC's 2007 ULLS pricing principles determination;

(c) the ACCC's 2008 ULLS pricing principles and indicative prices determination; and

(d) the ACCC's 2008 draft decision on the assessment of Telstra's Unconditioned Local Loop Service Band 2 monthly charge undertaking.

4.2 Any additional materials you rely upon in preparing your report should be referenced in your report.

5. Expert opinion

5.1 We would like you to prepare a report that sets out your opinion on the appropriate pricing principles and pricing methodology for the ULLS, based on your knowledge of and experience in the telecommunications industry. It should address the following specific matters:

(a) comparative evaluation of potential alternative pricing principles;

(b) recommendation of an appropriate pricing methodology;

(c) reasoning as to how the recommended approach takes account of the particular circumstances in the Australian industry;

(d) evaluation of the consistency of the recommended approach with the legislative requirements set out in the Act referred to above; and

(e) high level description of what would be required in order to implement the new approach including, for example, data requirements;

having regard to conditions in Australia and other jurisdictions.

5.2 Please let us know if the matters to be addressed require clarification in any respect or you require any further information.

6. Timetable

6.1 A mutually convenient timetable for this work will shortly be agreed between you and Optus.

7. Fees

7.1 A mutually acceptable fee proposal for this work will shortly be agreed between you and Optus.

Yours faithfully

Tim Sparks
Manager, Economic Regulation

APPENDIX 2: THE PROJECT TEAM

Europe Economics

A2.1 Recent Europe Economics' studies have included the following:

- A study has been completed for the European Commission (DG Competition) of the pricing principles to be adopted for Local Loop Unbundling in order to achieve EU regulatory objectives. This project also involved reviewing reasons for the differences between wholesale charges for Local Loops in different EU Member States. This project was completed in 2004.

- We are currently part of a consortium which is providing Agcom, the Italian telecommunications regulator, with an audit of the regulatory accounts of Telecom Italia for the years 2005, 2006 and 2007 in both historic and current cost versions. The same project was carried out for 2002, 2003 and 2004.

- We have also recently provided technical assistance in another contract with Agcom whose goal is the auditing of the regulatory accounts of TIM and Vodafone for the years 2002, 2003 and 2004 in both historic and current versions.

- In early 2008, we completed a study for the European Commission (DG Infosoc) whose purpose was to determine harmonised rules for defining relevant cost elements for the assessment of fixed and mobile termination rates.

- A study has been carried out for Agcom aimed at calculating the net cost incurred and the indirect benefits accrued to Telecom Italia in providing the Universal Service in Italy for 2002, 2003 and 2004. We have won the bid to conduct the same project for 2005 and 2006.

- In October 2008, we completed an assessment of the value of the digital dividend in the Republic of Ireland. We presented the result of our work at ComReg's Annual Conference in Dublin to an audience that included the European Commissioner for Information Society and Media, Ms Viviane Reding, and the Irish Minister for Communications, Energy and Natural Resources, Mr Eamon Ryan.

- We recently completed a study for the European Parliament on the proposed extensions of the Roaming Regulation in the EU 27. Our report analysed the available policy options, and provided information and advice for the Members of the Parliament. A presentation was made to the relevant Committees of the European Parliament in December 2009, and the full report has been published by the Parliament.

- More information about Europe Economics is on our website, www.europe-economics.com

The project team

A2.2 This report was prepared under the direction of Dermot Glynn, Chairman of Europe Economics. Professor Tommaso Valletti was the academic advisor, and other key members of the team were Dr. Matteo Aquilina, senior consultant at Europe Economics (project manager) and Stefano D'Ambrosio, who has directed or managed many of Europe Economics' modelling and analytical projects in this area.

A2.3 Further detail of the team's relevant experience is summarised below.

Dermot Glynn

A2.4 Dermot Glynn is one of the UK's most experienced consultants in regulatory economics and related fields. Before founding Europe Economics in 1998 he had been the Managing Director of NERA in the UK (and set up its first office in Australia), Chief Economist of KPMG, and Economic Director of the Confederation of British Industry. He studied as an Exhibitioner at Balliol College, Oxford, and was later appointed to the Economics Faculty and Department of Applied Economics at Cambridge University, where he was a contemporary of Alan Fels and an associate author of a study of the effects of the Selective Employment Tax.

A2.5 NERA was the largest US microeconomics consultancy, and under Mr Glynn its UK office quickly became the market leader. A major focus of work for NERA in both the USA and the UK was economic regulation, as the UK developed systems of regulation of privatised utilities and the US addressed the need to reform its traditional rate of return approach. The application of the concept of long run incremental cost was a prominent feature of this work, and Mr Glynn recruited Professor Ralph Turvey of the LSE, who had pioneered academic work on costing and pricing in the electricity industry, as an advisor. He also worked with Professor Alfred Kahn, who was at the time an academic advisor to NERA in the USA, on a number of UK projects in this area.

A2.6 Projects carried out in this period (1985 – 1998) in which Mr Glynn played an important role included:

- Designing the regulatory system for the water and sewerage industry in England and Wales. The client was the industry association, the Water Authorities' Association, and the project continued throughout the period of privatisation and beyond, into the stage in which the regulatory system was first applied. There was no UK or other precedent for privatising this industry, which presented a number of particular challenges including the following:

  a) The companies were sold at prices reflecting prospective income streams that were constrained by political considerations not to increase from levels customary in the public sector, except to the extent necessary to finance future capital expenditure and to meet other future costs. As a result, it was not possible to generate a normal rate of return on the current or replacement costs of the assets. The regulatory asset base, on which a

commercial return was intended, included assets in place at the time of privatisation valued at the prices implicit in the sale price.

b) Many of the assets – the reservoirs and underground water, and the sewerage pipes and pumps – were never likely to become technically redundant. To calculate depreciation by estimating asset lives and allowing a fraction of the purchase cost as amortisation, would not have provided an accurate estimate of the economic cost of capital consumption. The principles of renewals accounting were therefore developed, so that a more accurate estimate of economic depreciation could be made.

- Advising Oftel, the telecommunications regulator, on the economic principles that should determine interconnection charges made by BT to Mercury, which for an initial period of five years was to be the only licenced competitor. Mercury planned a new "figure of eight" core network, and needed to be able to make use of both BT's local loops and core network in order to offer competing services to end users.

- Advising the CEGB (the monopoly electricity generator before privatisation) and National Power (the largest of the successor companies that were privatised) on how their interests in being able to make profitable investments in future generating capacity could be safeguarded in the context of a new system for trading electricity (the "Pool") in which prices were expected to reflect short-term supply costs and demand. The approach developed included providing for peak payments; and for the loss of load probability (LOLP) and value of lost load (VOLL).

A2.7 At Europe Economics, relevant projects in which Mr Glynn has been involved include:

- A contract from the European Commission in 1999 to design the first model for use in the EU with Commission support, for the purpose of calculating the long run incremental cost of access to core telecommunication networks.

- Subsequent assignments to help to develop models on similar principles for regulators or regulated companies in the UK (for leased lines), Ireland, and Denmark.

- For the Irish telecommunications regulator, ComReg, in addition to helping to develop Europe Economics' LRIC model Mr Glynn provided conceptual advice on a) the application of such models to setting a four or five year price limit, and b) in a separate project, the basis for pricing shared leased lines.

- Outside the field of utility regulation, Mr Glynn has advised regulators and companies in the pharmaceutical industry on the principles of Ramsey pricing in relation to patented medicines.

Tommaso Vallettii, academic advisor

A2.8 Tommaso Vallettii is currently a Professor of Economics at Imperial College, London, and the University of Rome, "Tor Vergata".

A2.9 Mr Vallettii studied at the London School of Economics between 1993 and 1998, graduating with a PhD in Economics and an MSc in Economics. Mr Vallettii also studied at Politecnico Di Torino, in Rome where he studied for a *Laurea magna cum laude* in Mechanical Engineering.

A2.10 Mr Vallettii's career has developed from working as a Research Fellow at Brunel University to becoming a Professor of Economics. His career development has been detailed below:

- 2003-2006: Imperial College London, London*:* Reader In Economics
- 2005-2006: University Of Rome, "Tor Vergatta", Rome: Associate Professor in Economics and Management
- 2001-2005: Politecnico Di Torino: Assiociate Professor in Economics and Management
- 2000-2003: Imperial College Management School, London: Governor's Lecturer In Economics
- 1998- 2000: London School Of Economics, London: Lecturer In Economics
- 2002-2005: CONSIP: Board Director
- 1997-1997: The World Bank, Washington: Visiting Fellow
- 1995-2001: Politecnico De Torino: Research Officer
- 1994-1996: Brunel University: Research Fellow

A2.11 Mr Vallettii is also a member and fellow of a number of associations:

- Between 1999 and 2004, Mr Vallettii worked as a Research Associate at the Centre for Economic Policy Research (CEPR) becoming a Research Fellow at the CEPR in 2005. Mr Valletti has also been a member of the Ofcom Spectrum Advisory Board (OSAB) in London since 2007 and a member of the panel of academic advisors for the Competition Commission in London since 2007. Mr Vallettii has also been an Affiliate of the Global Consortium for Telecommunications at the London Business School since 2000 as well as a member of the Executive Committee for the European Association for Research in Industrial organization (EARIE) since 2006.

A2.12 Other experiences include:

- Referee for the following academic journals: American Economic Review, Economic Journal, Economica, European Economic Review, Information Economics & Policy, International Journal of Industrial Organization, Journal of Economics, Journal of Economics & Management Strategy, Journal of the European Economic Association, Journal of Industrial Economics, Journal of Industry Competition and Trade, Journal of Public Economics, Journal of Regulatory Economics, Manchester School, Marketing Science, RAND Journal of Economics, Regional Science and Urban Economics, Review of Economic Studies, Review of Industrial Organization, Scandinavian Journal of Economics, Southern Economic Journal, Telecommunications Policy; British Council Fellowships; ESRC Research Grants and Fellowships Schemes.

- Organiser of the CEPR/ESRC Industrial Organization Workshops, London (2001 and 2002).

- Local organiser of the 10th European Regional Conference of the International Telecommunications Society (ITS), joint with the 26th EARIE Conference, Turin, 2-4 September 1999.

- Member of the Programme Committee of the 1999-2000-2001-2002 ITS European Regional Conferences.

- Guest Editor, “Symposium on Universal Service Obligations”, Information Economics and Policy, vol. 12, n. 3, 2000.

- Guest Editor, “Symposium on competition in Telecommunications”, Information Economics and Policy, vol. 16, n. 3, 2004.

- Co-organiser, Organization & Management Seminar Series, Tanaka Business School, 2005-06.

- Programme Committee (Theoretical and Applied Economics), European Meeting of the Econometric Society (ESEM), Vienna 2006.

- Programme and Scientific Committee, International Public Procurement Conference, Rome 2006.

- Scientific Committee ZEW Workshop on ICT and Firm Strategies, Mannheim 2006.

- Programme Committee (Theoretical and Applied Economics), European Meeting of the Econometric Society (ESEM), Budapest 2007.

A2.13 Listed below are the recent and forthcoming seminar and conference presentations that Mr Valettii has been involved in:

2001:

- University of Cambridge, UK; Ente Einaudi and Bank of Italy, Rome, Italy; Joint Africa Institute (IMF, World Bank, African Development Bank), Abidjan, Cote d'Ivoire; University of Bologna, Italy; ESSET, Gerzensee, Switzerland; EARIE, Dublin, Ireland; ASSET, Crete, Greece; LACEA-World Bank, Montevideo, Uruguay; University of Munich, Germany; University of Padua, Italy; Office of Telecommunications, London, UK.

2002:

- University of Florida, Gainesville, USA; University of Bologna, Italy; Econometric Society, UCLA, USA; Kiel Institute of World Economics, Germany; EARIE Conference, Madrid, Spain; Italian Economic Society, Ferrara, Italy; CEPR Final Workshop on the Evolution of Market Structure in Network Industries, Brussels, Belgium; Warwick Business School, UK; London School of Economics, UK; Office of Fair Trading, London, UK.

2003:

- American Economic Association, Washington, USA; WZB, Berlin, Germany; University of Toulouse, France; London Business School, London, UK; University of Mannheim, Germany; Ecole Politechnique, Paris, France; ZEW Conference, University of Mannheim, Germany; IESE, Barcelona, Spain; European Commission, Brussels, Belgium; CEPR Workshop on Competition Policy in International Markets, University of Toulouse, France; World Bank/EC Seminar on Competition and Regulation in Infrastructure, Cairo, Egypt; WIK, Berlin, Germany; University of Bristol, UK; University of Antwerp, Belgium; ECTA Conference, Brussels, Belgium.

2004:

- University of Lisbon, Portugal; Sabanci University, Istanbul, Turkey; CEPR Conference on Applied IO, Hydra, Greece; Ecole Politechnique, Paris, France; OECD, Paris, France; Centro Einaudi, Turin, Italy; Munich University, Germany; EARIE Conference, Berlin, Germany; IDEI-ZEI Conference on Media, University of Toulouse, France; Keele University, UK; CEPR Conference on Electronic Communication Markets, University of Toulouse, France; Competition Commission, UK; University of Helsinki, Finland; ECTA Conference, Brussels, Belgium.

2005:

- London School of Economics, UK; Tilburg University, The Netherlands; University of Toulouse, France; ECARES, Brussels, Belgium; Royal Economic Society, Nottingham, UK; Sabanci University, Istanbul, Turkey; Ofcom, UK; XI Telecommunications Industry Seminar Madrid, Spain; Universidade Nova de

Lisboa, Portugal; San Diego, US; WIK Conference, Berlin, Germany; Toulouse, France; Munich, Germany; EARIE Conference, Porto, Portugal; Trinity College Dublin, Ireland; London School of Economics, UK; BT/GCLC Conference on media content, London, UK; NIE, Warwick University, UK; CEPR Conference on Competition Policy for International Development, Brussels, Belgium.

2006:

- ASSA Meetings, Boston, US; Ecole des Mines, Paris, France; SOAS, London,UK; WIK, Cologne, Germany; Fundación Del Pino, Madrid, Spain; UCL,London; CEPR Conference on Applied IO, Madeira, Portugal; Accademia dei Lincei, Rome, Italy; ARCEP, Paris, France; ENST, Paris, France; University of Toulouse, France; Turin University, Italy; EARIE Conference, Amsterdam,The Netherlands; IPPC, Rome, Italy; London Business School, UK; Brussels,Belgium; ZEW Mannheim, Germany; Latin-American Conference of Telecoms Regulators, Cartagena, Colombia; Confindustria, Rome, Italy.

2007:

- University of Toulouse, France; Royal Holloway, UK; Office of Fair Trading, London, UK; UPF Barcelona, Spain; Universidae Nova de Lisboa, Portugal; ARCEP, Paris, France; University of Rome, Italy; Oxford University, UK; CEPR Conference on Applied IO, Tarragona, Spain; Competition Commission, London, UK; CRESSE, Corfu, Greece; EARIE Conference, Valencia, Spain.

A2.14 Research interests include:

- Industrial Economics, Regulation and the Economics of Telecommunications

A2.15 External activites include:

- Economic expert adviser on topics such as network interconnection pricing, call termination, procurement auctions, spectrum auctions, spectrum trading. Government agencies include the European Commission (economic expert on remedies in mobile telephony under the new Framework Directive, 2003-04; economic expert on the review of the relevant product markets within the electronic communications sector subject to ex ante regulation, 2005-06), OFTEL/OFCOM (telecommunications regulator in the UK: member of the panel of economic advisors), Office of Fair Trading (UK), AGCOM (communications regulator in Italy), Italian Treasury, OPTA (telecommunications regulator in The Netherlands), the Malaysian Communications Commission, OECD, the African Development Bank and the World Bank.

A2.16 Editorial positions:

- Editor, *Information Economics & Policy* (since 2004; impact factor doubled in 2005).
- Associate Editor, *Journal of Industrial Economics* (since 2004).
- Advisory Board, *Journal of Network Industries* (since 2003).
- Scientific Council, *Communications & Strategies* (since 2005).

A2.17 Mr Vallettii's publications include:

Journal articles

1) "Mixing goods with two-part tariffs", joint with S. Hoernig, *European Economic Review* (forthcoming 2007).
2) "Information creation and competition in telecommunications networks", joint with C. Cambini, *Journal of Industrial Economics* (forthcoming).
3) "Network competition and entry deterrence", joint with J. Calzada, *Economic Journal* (forthcoming).
4) "Content and advertising in the media: pay-tv versus free-to-air", joint with M. Peitz, *International Journal of Industrial Organization* (forthcoming).
5) "Market analysis in the presence of indirect constraints and captive sales", joint with R.Inderst, *Journal of Competition Law & Economics*, vol. 3, n. 2, 203-231, 2007.
6) "A tale of two constraints: assessing market power in wholesale markets", joint with R. Inderst, *European Competition Law Review*, vol. 27, n. 2, 84-91, 2007.
7) "Parallel Trade, International Exhaustion and Intellectual Property Rights: A Welfare Analysis," joint with S. Szymanski, *Journal of Industrial Economics*, vol. 54, n. 4, 499-526 , 2006.
8) "Differential pricing, parallel trade, and incentives to invest", *Journal of International Economics*, vol. 70, n. 1, 314-324, 2006.
9) "Firm size distribution: testing the 'independent submarkets model' in the Italian motor insurance industry," joint with L. Buzzacchi, *International Journal of Industrial Organization*, vol. 24, n. 4, 809-834, 2006.
10) "Mobile call termination: a tale of two-sided markets," *Communications & Strategies*, n.61, 61-77, 2006.

11) "Promotion and relegation in sporting contests," joint with S. Szymanski, *Rivista di Politica Economica* , vol. 95, 3-39, 2005.

12) "Parallel trade, price discrimination, investment and price caps", joint with Stefan Szymanski, *Economic Policy*, vol. 44, 705-749, 2005.

13) "Mobile termination: What is the "right" charge?" joint with G. Houpis, *Journal of Regulatory Economics*, vol. 28, n. 3, 235-258, 2005.

14) "Investments and network competition," joint with C. Cambini, *RAND Journal of Economics*, vol. 36, n. 2, 446-467, 2005.

15) "Strategic price discrimination in compulsory insurance markets," joint with L. Buzzacchi, *Geneva Papers on Risk and Insurance - Theory*, vol. 30, n. 1, 71-97, 2005.

16) "Incentive effects of second prizes," joint with S. Szymanski, *European Journal of Political Economy*, vol. 21, n. 2, 467-481, 2005.

17) "Firm Size Distribution in Small Samples," joint with L. Buzzacchi, *Bulletin of Economic Research*, vol. 56, n. 4, 301-309, 2004.

18) "Access charges and quality choice in competing networks," joint with C. Cambini, *Information Economics & Policy*, vol. 16, n. 3, 391-409, 2004.

19) "Competition in telecommunications: an introduction," joint with M. Peitz and J. Wright, *Information Economics & Policy*, vol. 16, n. 3, 315-321, 2004.

20) "Vertical integration and exclusivity contracts when consumers have switching costs," *Southern Economic Journal*, vol. 71, n. 1, 36-59, 2004.

21) "Market failures and remedies in mobile telephony," *Journal of Network Industries*, vol. 5, n. 1, 51-81, 2004.

22) "Network Competition with Price Discrimination: Bill-and-Keep is not so bad after all", joint with C. Cambini, *Economics Letters*, vol. 81, 59-67, 2003.

23) "The theory of access pricing and its linkage with investment incentives," *Telecommunications Policy*, vol. 27, n. 10-11, 659-675, 2003.6

24) "Equality of opportunity and equality of outcome: open leagues, closed leagues and Competitive Balance," joint with L. Buzzacchi and S. Szymanski, *Journal of Industry Competition and Trade*, vol. 3, n. 3, 167-186, 2003 (reprinted in B. Gerrard (ed.), *The Economics of Association Football*, Edward Elgar, 2006).

25) "Input price discrimination in Cournot games," *International Journal of Industrial Organization*, vol. 21, n. 7, 969-988, 2003.

26) "Is mobile telephony a natural oligopoly?", *Review of Industrial Organization*, vol. 22, n.1, 47-65, 2003.

27) "Additive and multiplicative uncertainty revisited: What explains the contrasting biases?", joint with Ciaran Driver, *Journal of Economics*, vol. 79, n. 2, 187-198, 2003.

28) "Location choice and price discrimination in a duopoly," *Regional Science and Urban Economics*, vol. 32, n. 3, 339-358, 2002.

29) "Universal Service Obligation and competition: the role of uniform pricing and coverage constraints," joint with Pedro P. Barros and Steffen Hoernig, *Journal of Regulatory Economics*, vol. 21, n. 2, 169-190, 2002.

30) "The interplay between regulation and competition: the case of Universal Service Obligations", joint with Steffen Hoernig, *ifo Studien*, vol. 48, n. 1, 57-71, 2002.

31) "Telecommunication reforms, access regulation, and Internet adoption in Latin America," joint with A. Estache and M. Manacorda, *Economia-Brookings Institution*, vol. 2, n. 2,153-217, 2002.

32) Review of *Privatization, Restructuring, and Regulation of Network Utilities*, by D. Newbery, MIT Press, Cambridge (MA), *Economica*, vol. 69, n. 275, 526-528, 2002.

33) "Spectrum property rights," *Info*, vol. 3, n. 5, 375-380, 2001.

34) Review of *Competition in Telecommunications*, by J.-J. Laffont and J. Tirole, MIT Press, Cambridge (MA), *Economica*, vol. 68, n. 271, 458-460, 2001.

35) "Competition in communication networks: Pricing and regulation," joint with Robin Mason, *Oxford Review of Economic Policy*, vol. 17, n. 3, 389-415, 2001.

36) "Spectrum Trading", *Telecommunications Policy*, vol. 25, n. 10-11, 655-670, 2001.

37) "Spectrum Auctions Versus Beauty Contests: Costs and Benefits", joint with A. Prat, *Rivista di Politica Economica*, vol. 91, n. 4-5, 59-109, 2001.

38) "Switching costs in vertically related markets," *Review of Industrial Organization*, vol. 17, n. 4, 395-409, 2000.

39) "Price discrimination and price dispersion in a duopoly," *Research in Economics*, vol. 54, n. 4, 351-374, 2000.

40) "Minimum quality standards under Cournot competition," *Journal of Regulatory Economics*, vol. 18, n. 3, 237-247, 2000.

41) "Symposium on Universal Service Obligations and competition," Guest Editor and Introduction, *Information Economics and Policy*, vol. 12, n. 3, 205-210, 2000.

42) "A model of competition in mobile communications," *Information Economics & Policy*, vol. 11, n. 1, 61-72, 1999.

43) "Are spectrum auctions ruining our grandchildren's future?" joint with M. Cave, *Info*, vol. 4, n. 2, 347-350, 2000.

44) "Access pricing and deregulation in the telecoms industry," *world markets in 2001*, 64-68, September 2000.

45) "The practice of access pricing: telecommunications in the United Kingdom," *Utilities Policy*, vol. 8, n. 2, 83-98, 1999.

46) "Two-part access prices and imperfect competition", *Information Economics & Policy*, vol. 10, n. 3, 305-323, 1998.

47) "Mobile telecoms in the UK," joint with M. Cave, *The Utilities Journal*, vol. 1, 35-40, March 1998.

48) "Competition in UK mobile communications," joint with M. Cave, *Telecommunications Policy*, vol. 22, n. 2, 109-131, 1998.

Book chapters

1) "Parallel imports of patented medicines", in M. Pugatch and A. Jensen (eds.) *Healthy IPRs*, The Stockholm Network, London, 2007.

2) "Scoring Rules", in N. Dimitri, G. Piga and G. Spagnolo (eds.) *Handbook of Procurement*, Cambridge University Press, Cambridge, 2006.

3) "The interplay between regulation and competition", joint with Steffen Hoernig, in G. Illing and U. Klüh (eds.) *Spectrum Auctions and Competition in Telecommunications*, MIT Press, Cambridge (MA), 2004.

4) "Mobile Telecommunications and Regulatory Frameworks," joint with H. Gruber, chapter 9 in G. Madden (ed.) *The International Handbook of Telecommunications Economics,* vol. II - Emerging Telecommunications Networks, Edward Elgar, Chelthenham, 2003.

5) "Spectrum Auctions Versus Beauty Contests: Costs and Benefits", joint with A. Prat, in M. Baldassarri and L. Lambertini (eds.) *Antitrust, Regulation and Competition*, Palgrave McMillan, Basingstoke, 2003.

6) "Regulation and Competition in Telecommunications", joint with M. Cave, in G. Galli and J. Pelkmans (eds.) *Regulatory Reforms and Competitiveness in Europe*, vol. II - Vertical Issues, Edward Elgar, Chelthenham, 2000.

Selected policy reports

1) "Review of the Recommendation on Markets Subject to *ex ante* Regulation", joint with M. Cave and U. Stumpf, report prepared for the European Commission, 2006.

2) "Call termination", report prepared for OFCOM, 2004.

3) "Access services to public mobile networks", paper prepared for the European Commission as Economic Expert on Remedies that can be imposed on operators with Significant Market Power under the New Regulatory Framework for Electronic Communications, 2003.

4) "Telecommunication reforms, access regulation, and Internet adoption in Latin America," joint with A. Estache and M. Manacorda, Policy Research Working Paper 2802, The World Bank, 2002.

5) "Spectrum trading", report prepared for OFTEL, 2001.

6) "Spectrum auctions", joint with A. Prat, report for the Working Party on

7) Telecommunications and Information Services Policies, DSTI/ICCP/TISP(2000)12, OECD, Paris, 2000.

8) "The theory of access pricing: an overview for infrastructure regulators," joint with A. Estache, Discussion Paper 2133, CEPR, and Policy Research Working Paper 2097, The World Bank, 1999.

Current discussion papers and working papers

1) "Price discrimination in input markets", joint with R. Inderst, *mimeo*, 2006 (submitted).

2) "Testing the 'waterbed' effect in mobile telecommunications", joint with Christos Genakos, *mimeo*, 2007.

3) "Active and passive waste in government spending: Evidence from a policy experiment", joint with A. Prat and O. Bandiera, *mimeo*, 2007 (submitted).

4) "Indirect vs. Direct Constraints in Markets with Vertical Integration", joint with R. Inderst, *mimeo*, 2007 (submitted).

5) "Buyer power and the waterbed effect", joint with R. Inderst, *mimeo*, 2007.

6) "Assessing Market Power in the Presence of Indirect Constraints", joint with R. Inderst, *mimeo*, 2007.

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Matteo Aquilina

A2.18 Matteo, a Senior Consultant, joined Europe Economics in 2006, prior to that he worked as programme officer at the Development Cooperation Office of the Italian Embassy in New Delhi (India) where he was in charge of following the Italian-funded UNIDO projects on the development of clusters of SMEs and worked on the supervision and evaluation of many other projects. At Europe Economics, he has been involved in a number of different projects across various industries, recent examples include: the development of a model to evaluate the impact of chemical in toys on human health, estimating the predictors of consumer loss using panel data techniques, developing a model for the competitiveness of London vis-à-vis other emerging cities. In addition he advised clients on the use of econometric techniques in a number of different situations.

A2.19 Matteo developed considerable experience in the telecommunications sector having been repeatedly involved in projects for Agcom, the Italian NRA, Ofcom, Comreg, the Irish NRA and private clients in the UK and abroad.

A2.20 Matteo holds a PhD in Economics from the University of Rome and an MSc in Economics for Development from the University of Oxford. He has also published papers on international peer-reviewed journals such as the Journal of International Development and Small Business Economics.

Stefano D'Ambrosio

A2.21 Stefano holds a BA in Economics at "L. Bocconi University – Milan" (where he worked as Assistant to the courses of Microeconomics and Applied Econometrics) and an MSc in Economics at the London School of Economics.

A2.22 Immediately after achieving the MSc. Stefano joined Europe Economics working his way through from the position of Research Assistant (in 1999) to that of Principal (in 2006). Stefano has contributed to many of the projects undertaken by EE in the telecommunications sector, more recently often as project manager or project director, and has an extensive experience of cost modelling in the fixed telecommunications network.

A2.23 A list of projects which Stefano has recently managed includes:

- a long-term project for Mazars, providing assistance for the auditing of the regulatory accounts of Telecom Italia, Telecom Italia Mobile and Vodafone for the benefit of the final client, the Italian telecommunications regulator Agcom;
- a study for NITA, the telecommunications regulator in Denmark, aimed at modifying an existing cost model for the production of an extra list of wholesale services, including Bitstream access at different levels of network connection and sub-loop unbundling;

- a project for the Italian Telecoms NRA on the assessment of the net cost incurred by Telecom Italia in providing the Universal Service in 2002 and 2003 and the quantification of the indirect benefits associated with it;
- a project assisting ComReg, the Irish Telecoms NRA, in drafting the consultation document aimed at setting operating costs within the Local Loop Unbundling LRIC model;
- a study for EC DG Competition, aimed at explaining the difference around Europe in wholesale charges for Local Loops;
- the development of a bottom-up LRIC model, for the Spanish Telecoms NRA, in order to calculate interconnection and access charges with the incumbent's network (both circuit-switched and IP networks);
- a long-term project for the Danish Telecommunications NRA aimed at estimating Tele Danmark's (the incumbent operator) interconnection charges, access lines and co-location facilities, based on a LRAIC costing methodology;
- a study looking at the costs of mobile telephone services and their relationship to prices (for the InfoSoc of the European Commission);
- a paper, for Infostrada, on the principles and practice of ex-ante regulation in Italy to prevent anti-competitive behaviour by the incumbent operator;
- the development of the adaptable cost model for the LRIC estimation of interconnection charges in the Member States (for the InfoSoc of the European Commission).

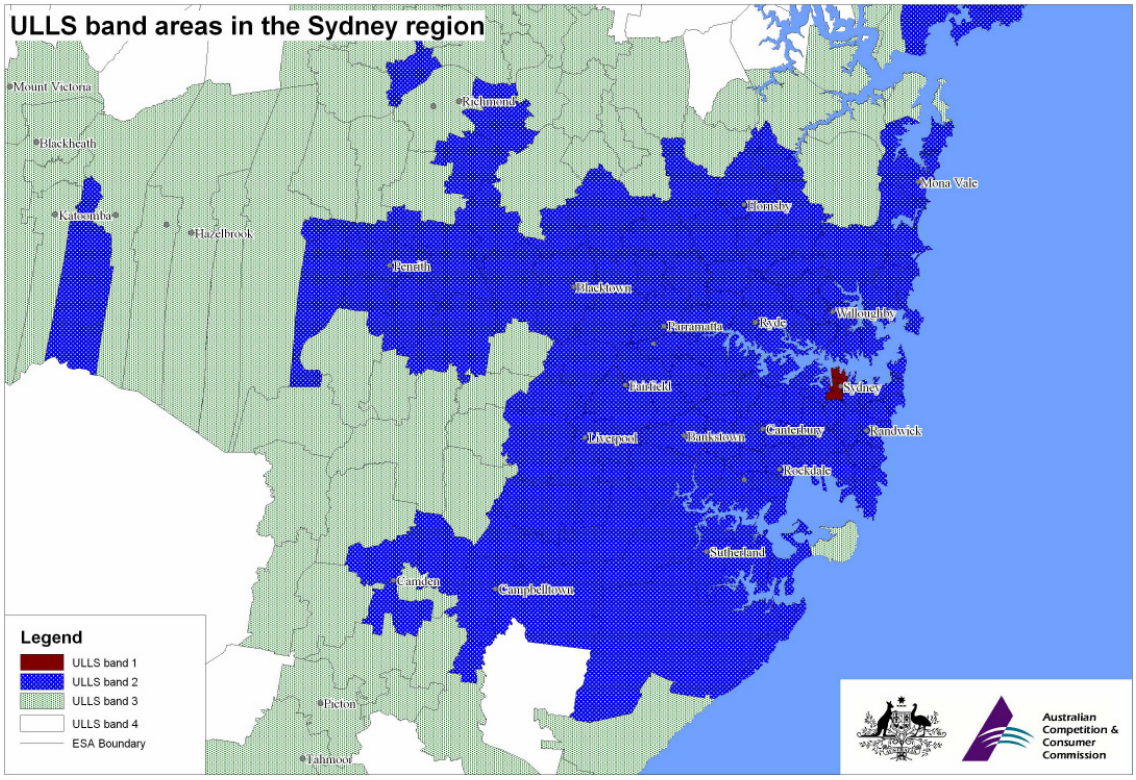
A2.24 Stefano was seconded for a period by Europe Economics to Ofcom as financial analyst within a predatory pricing investigation.

APPENDIX 3: THE PROPOSED NATIONAL BROADBAND NETWORK

Overview

A3.1 To illustrate the definitions of ULLS Bands, the map below depicts exchange areas in the Sydney region which fall within each of the four Bands (where Band 1 is CBD areas with highest teledensity and Band 4 is remote areas with lowest teledensity).

Figure A3.1: Map of ULLS band areas in Sydney region



Source: Optus

A3.2 Information is available about the number of services in operation (SIOs) and ULLS SIOs for each Band - see the following table.

Table A3.1: Telstra's Customer Access Network

Snapshot of Telstra's customer access network as at 31 December 2008

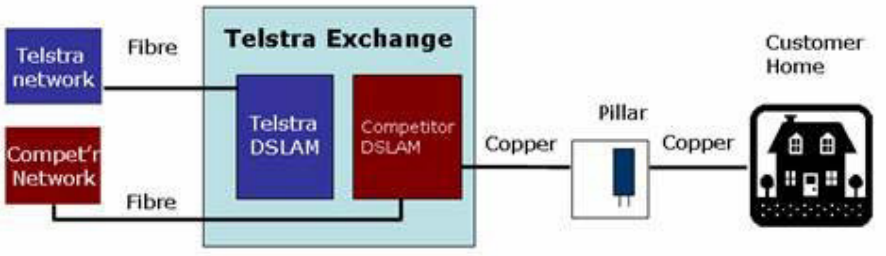
Table 1: SIO, DSL, ULLS and LSS information by ULLS band

	Telstra voice only SIOs[1]	Telstra wholesale and retail ADSL[2]	Other Telstra DSL products SIOs[3]	ULLS SIOs[4]	LSS SIOs[5]	Total SIOs
Band 1	205,797	33,321	5,052	28,453	22,147	272,623
Band 2	4,278,171	1,925,430	38,629	574,465	463,690	6,816,695
Band 3	1,126,089	873,696	11,057	7,555	13,151	2,018,397
Band 4	734,622	267,636	5,437	127	833	1,007,822
Total	6,344,679	3,100,083	60,175	610,600	498,988	10,115,537
Growth index (since Sept 07)	92.92	99.15	117.6	199.34	147.54	98.09

Source: ACCC website

A3.3 A stylised diagram of the existing ULLS network is given below :

Figure A3.2: Existing ULLS network

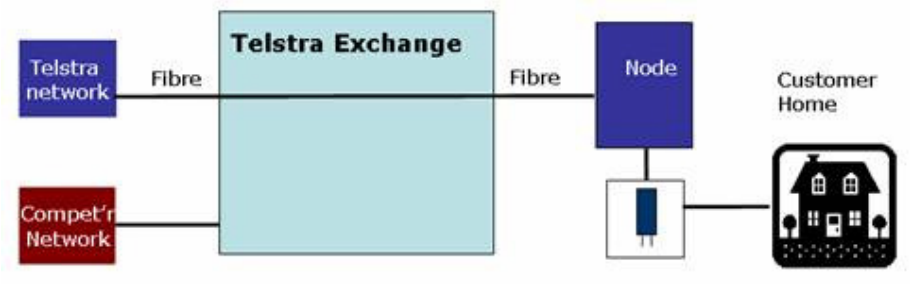


Source: Optus

A3.4 The approximate total length of Telstra's copper local loop network in use (i.e., the total length of copper pairs) is 39 million km of copper pairs (this is significantly greater than the cable [or trench] length as one cable contains many copper pairs).

A3.5 The following diagram depicts an FTTN network as might be rolled out by *Telstra* (although the diagram would also apply for the case of any NBN operator which deployed a network based on FTTN architecture).

Figure A3.4: FTTN network



Source: Optus

A3.6 Until decisions have been made about the physical configuration of the NBN and about its regulatory framework, it will be impossible to identify with precision how the NBN will affect Telstra's assets. Nevertheless, for the purposes of illustration, one could assume that if an FTTN network were deployed, then in those areas where the FTTN was rolled out (assume [■] per cent of addresses nationally):

- The existing copper between exchange and pillar would be replaced altogether. Approximately [■] million km of copper pairs (exchange to node) is assumed to be made redundant in this way.[58]

- The existing copper between pillar and customer premises would be used in a different way after the NBN is rolled out (that is, the copper lines would be cut over and connected to the fibre network at the node instead of the exchange). Approximately [■] million km (node to premises) is used by the FTTN operator. The length of copper for the FTTN operator's loops (node to premises) is around [■] m for metropolitan and regional areas.

A3.7 Approximately [■] million km is outside the geographic area of the FTTN. Given that the NBN proposals are intended to serve 98 per cent of the population, and that the FTTN network would reach [■] per cent, the remaining [■] per cent would be served via wireless or satellite – it is therefore possible that these lines ([■] million km) would be decommissioned. There is also the final 2 per cent of the population to consider, who are outside the scope of the Government's NBN scheme. These lines may be maintained in current use – however, we are advised that the ULLS is practically never used for such remote lines in any case.

[58] The derivation for this and other figures in this section is set out below under the heading 'Distance made redundant'.

NBN specifications

A3.8 Before the 2007 election, the Australian Labor Party (ALP) issued its policy statement *New Directions for Communications, A Broadband Future for Australia – Building a National Broadband Network*.[59] In this statement the ALP committed, if elected, to provide funding of up to $4.7 billion and to consider the regulatory changes necessary to facilitate the deployment, over five years, of the NBN. Following ALP's success in the elections, the Request for Proposals (RFP) issued on 11 April 2008 gave effect to this policy commitment.

A3.9 The complete list of the Commonwealth's objectives for the NBN as stated in the RFP[60] are to create a national broadband network that:

- covers 98 per cent of Australian homes and businesses;
- is able to offer broadband services with a minimum 12 Mbps dedicated downlink transmission speed over each connection provided to a premises;
- supports symmetric applications such as high-definition video-conferencing;
- is able to support high-quality voice, data and video services;
- uses fibre-to-the-node or fibre-to-the-premises network architecture;
- enables uniform retail prices on a national basis;
- is rolled out and made operational progressively over five years from the date of execution of a contract between the Commonwealth and successful Proponent;
- continues to promote the long-term interests of end-users;
- has sufficient capacity to meet current and foreseeable demand and has a specified upgrade path within clear timeframes, consistent with international trends;
- facilitates competition through open access arrangements that ensure equivalence of price and non-price terms and conditions, and provides scope for access seekers to differentiate their product offerings;

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59 Australian Labour Party, ALP Broadband Statement "New Directions for Communications, A Broadband Future for Australia – Building a National Broadband Network " – March 2007 http://www.iia.net.au/files/ALP_Broadband_Statement.pdf

60 Australian government department of broadband, communications and the digital economy, request for proposals to roll-out and operate a national broadband network for Australia, http://www.dbcde.gov.au/communications_for_business/funding_programs__and__support/national_broadband_network/request_for_proposals

- enables low access prices that reflect underlying costs while allowing Proponents to earn a rate of return on their investment commensurate with the risk of the project;
- provides benefits to consumers by providing choice to run applications, use services and connect devices at affordable prices;
- provides the Commonwealth with a return on its investment of up to $4.7 billion;
- is compatible with the Government's related Fibre Connections to Schools initiative;
- meets Government requirements for the protection of Australia's critical infrastructure;
- is consistent with national security, e-security and e-safety policy objectives, including compliance with laws relating to law enforcement assistance and emergency call services;
- is consistent with Australia's international obligations; and
- facilitates opportunities for Australian and New Zealand small and medium enterprises (SMEs) to provide goods and services to the project.

A3.10 The network would represent the single largest investment in broadband infrastructure in Australia's history. It is claimed:

> This network will help position Australia as a competitive, innovative, knowledge-based economy that can compete and win in global markets.[61]

A3.11 The Department of Broadband, Communications and the Digital Economy (DBCDE) received six bids in response to its Request for Proposals. These were from Acacia, Axia NetMedia, Telstra, Optus, the Tasmanian Government and TransACT. Details of the five tenders are confidential. Some information was, however, provided in the bidders' media announcements, and in response to the DBCDE's invitation for written submissions on regulatory issues associated with the NBN process; and is summarised in the table below.

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61 Australian Labor Party, ALP Broadband Statement "New Directions for Communications. A Broadband Future for Australia – Building a National Broadband Network " – March 2007, p.3, http://www.iia.net.au/files/ALP_Broadband_Statement.pdf

Table A3.2: Bidders for the NBN

Bidder	Coverage	Details
Acacia	National	• Proposes 100% population coverage.[62] • Bid is based exclusively on a wholesale model; Acacia will not retail services. • Pledged a fair return for Telstra and other asset owners for use of their facilities. • Selected a mix of technologies, including fibre-to-the-home, fibre-to-the-node, wireless and satellite. HTTP://EN.WIKIPEDIA.ORG/WIKI/NATIONAL_BROADBAND_NETWORK - CITE_NOTE-2
• Axia NetMedia Corporation[63]	National	• The group's cost modelling is based on what it expects to offer in Singapore. • Proposes use of a fibre to the premise (FTTP) network in metropolitan areas and a fibre to the node (FTTN) network in regional areas.[64] • Basic charge of $15 a month.[65]
Telstra	National	• Proposal was rejected by Federal Government on 15-12-2008.[66] • Telstra submitted a summary proposal. Telstra stated that "issues have not yet been able to be addressed in a manner that would enable Telstra to submit its fully detailed bid".[67] • The full NBN footprint would be between 80 per cent and 90 per cent of the Australian population. • Demanded no further separation of Telstra (including no sub-loop unbundling) over the life of the project.
Optus	National	• Optus proposed a bid backed by TERRiA. [68]

[62] http://www.australianit.news.com.au/story/0,24897,24710253-5013040,00.html

[63] This is a Canadian Group. Axia has broadband projects underway in France, Canada and Singapore. http://axia.com/documents/investors/news/2008/081125_Australia_bid.pdf

[64] http://www.australianit.news.com.au/story/0,24897,24780196-5013041,00.html

[65] http://www.theaustralian.news.com.au/story/0,25197,24782904-2702,00.html

[66] http://www.asx.com.au/asxpdf/20081215/pdf/31f5s2sd5t98tp.pdf

[67] http://www.telstra.com.au/abouttelstra/media/docs/nbn_proposal_261108.pdf

[68] TERRiA is a consortium of major infrastructure-based telecommunications companies that currently provide independent and competitive telecommunications services in Australia. The companies represented are iinet, Internode, Macquarie Telecom, Optus and Primus Telecom. http://www.optus.com.au/portal/site/aboutoptus/menuitem.813c6f701cee5a14f0419f108c8ac7a0/?vgnextoid=787b38f8ab6dd110VgnVCM10000002cd780aRCRD&vgnextchannel=b54ce67d77677110VgnVCM10000029867c0aRCRD

		• Proposes an FTTN build that will use over 70,000 nodes and 100,000km of fibre.
Tasmanian Government[69]	Tasmania	• One of the worst-performing states/territories in Australia on indicators such as penetration of household internet use, household broadband penetration and business use of broadband. • In economically important areas, technologies such as fibre to the premise (FTTP) could be directly subsidised. • The entire Tasmanian broadband network would be open-access. • Priority construction of new optic-fibre cable across Bass Strait to link with the State's independent on-island network.[70]
TransACT (TransACT currently provides ACT residents and businesses with fixed-line, mobile phone broadband and subscription television services.)	Australian National Territory, ACT	• Proposed coverage to more than 98 per cent of ACT homes and businesses at speeds of up to 100Mbps, in less than five years.[71]

Timing of the NBN fibre roll-out

A3.12 With estimates of the total number of nodes required being between 50,000 and 70,000, this translates to an average of between 833 and 1,167 nodes per month (given the timeframe of 5 years). It may be assumed that there are approximately 40 nodes per exchange, therefore in the region of 20-30 exchanges would need to be fibred each month.

A3.13 On the timing of the FTTN rollout, Telstra stated that:

> "within 9 to 12 months [of receiving the necessary assurances from the Government] Telstra will begin switching on the first FTTN enabled exchanges. From 9 to 36 months Telstra will activate the FTTN network progressively as each exchange area is upgraded.

69 http://www.media.tas.gov.au/release.php?id=25396

70 http://www.dbcde.gov.au/communications_for_business/funding_programs__and__support/national_broadband_network/submissions/Government_of_Tasmania.pdf

71 http://www.transact.com.au/news/Article.aspx?id=930

> We expect to complete up to 33% of exchange areas within the first 18 months and up to 67% within 36 months." [72]

A3.14 Furthermore, Telstra has said that the NBN will require the cutover of up to 6,000 lines per day, peaking at 20,000 lines per day.[73]

A3.15 The FANOC Special Access Undertaking also contained some information on the roll-out they were proposing, as detailed in the table below:

Table A2.6.1: Initial roll-out schedule by FANOC

	%	Nodes	Node/Year	Node/Month
Sydney	40	8,000	2,667	222
Melbourne	30	6,000	2,000	167
Brisbane	16	3,200	1,067	89
Adelaide	7	1,400	467	39
Perth	7	1,400	467	39
			Total	556

Source: FANOC Special Access Undertaking, Submission to the ACCC

A3.16 This initial network roll-out by FANOC was only planned to cover approximately 4 million homes in five capital cities over three years, so the numbers are of a smaller scale than the corresponding figures for the NBN.

A3.17 In addition to FANOC's withdrawn SAU described above, there have been other plans from the private sector for the construction of a fibre network in Australia.

A3.18 Telstra piloted Fibre-to-the-Premises (FTTP) technology as early as 2004 and is currently selectively deploying FTTP, now trademarked Telstra Velocity, as part of its Smart Community initiative.[74] Telstra explains that:

> Telstra Velocity is a commercial venture and will only be deployed in new Greenfield developments where there is appropriate investment by the developer, where the developer has signed a Telstra Smart Community agreement, and where Telstra can make a commercial return on its investment.[75]

A3.19 There are presently a total of 94 Telstra Smart Communities located within the Commonwealth.[76]

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72 Telstra, May 2007, Advertisement in major newspapers, Telstra has a broadband plan for Australia

73 iTnews, Inside Telstra's technical plans for the NBN, http://www.itnews.com.au/News/90450,inside-telstras-technical-plans-for-the-nbn.aspx

74 http://www.telstra.com.au/abouttelstra/media/announcements_article.cfm?ObjectID=32055

75 http://www.telstra.com.au/abouttelstra/media/announcements_article.cfm?ObjectID=39957

76 http://www.telstra.com.au/smartcommunity/findyourtelstrasmartcommunity.html

Distance made redundant

A3.20 Until decisions have been made about the physical configuration of the NBN and about its regulatory framework, it will be impossible to identify with precision how the NBN will affect Telstra's assets. Nevertheless, for the purposes of approximate estimation of the distance of Telstra's copper local loop network which may be made redundant by the introduction of a FTTN-based NBN, we are advised by Optus that one could make the following assumptions.

> The approximate total length of Telstra's copper local loop network in use (i.e., total length of copper pairs) = 39 million km of copper pairs.

6.28 (Note: this is significantly greater than the cable [or trench] length as one cable contains many copper pairs.)

A3.21 Of the 39 million km:

- approximately [■] million km of copper pairs (exchange to node) is made redundant;
- [■] million km (node to premises) is used by the FTTN operator; and
- [■] million km is unaffected, since it is outside the geographic area of the FTTN.

A3.22 The length of copper for the FTTN operator's loops (node to premises) is around [■] m for metro and regional.

A3.23 The length of Telstra copper in metro is generally less than [■] km; regional exchanges also have the majority of service with less than [■] km with a fraction of much longer, say [■] to [■] km loops.

A3.24 Construction proceeds at the rate of [■] per cent each year over five years:

- a typical metro exchange has a [■] km radius;
- the exchange area covered ~ [■] km^2;
- half the area is ~ [■] $km^{2;}$
- the radius of half the area is [■] km.

A3.25 So the average straight line distance from exchange to subscriber is [■]km.

A3.26 The loop length is about [■] per cent greater than a straight line.

> Loop length = [■] km * [■]=[■] km

A3.27 The FTTN operator's node is no more than [■] m from the customer (straight line).

A3.28 By similar argument to the above the FTTN operator's average loop length is about [■] m.

A3.29 So on average cutting a service over from Telstra exchange to one of the FTTN operator's nodes will make [■]km of copper redundant:

- [■] per cent of addresses have their Telstra copper connected to the FTTN (the rest are wireless and satellite);
- Telstra has [■] million local loops;
- total distance = [■] million km of copper;
- total distance made redundant = [■] million km * [■]% * [■] km each = [■] million km.

APPENDIX 4: SOME ALTERNATIVE PRICING METHODOLOGIES

A4.1 The paragraphs that follow describe the principal characteristics of a number of different pricing methodologies which could be used in setting limits for the price of ULLS, selected to illustrate major issues. Each is assessed against the criteria set out above. (The criterion of any–to–any connectivity could be equally well met by any of the costing criteria, and so does not help to differentiate between them.)

Historic Cost Accounting / Rate of Return Regulation

A4.2 Under Historic Cost Accounting (HCA), the regulated undertaking would be allowed to recover costs actually incurred to provide the services, plus a normal rate of return (RoR) on the investment. This was the basis of traditional US rate of return regulation.

A4.3 This system has the advantage that there is no risk of an undertaking being paid for services it did not provide, nor being paid more than it spent to provide services. It offers a reasonable guarantee that the rate of profit made by regulated undertakings would be about the normal rate.

A4.4 However, this system offers very poor incentives for efficiency. Regulated undertakings may feel that they can ”gold plate” their investments, and avoid a normal level of risk while earning a normal rate of return; or they may feel able to provide higher levels of service to some customers than those for which they would have been willing to pay if there were a competitive alternative. Regulators may therefore feel a need to intrude into management decisions.[77]

A4.5 HCA / RoR might seem to be in the interests of the incumbent, particularly if the incumbent management were risk-averse. It might nonetheless be less profitable than a form of regulation providing greater incentives for efficiency, and has been criticised for leading to supine management. It has generally been abandoned as a theoretical basis for regulation (and for good reason) although analyses of historic cost accounts (HCA) continue to be relevant in some circumstances.

A4.6 Assessing the advantages and disadvantages of HCA (and bearing in mind the objectives set out in the Australian legislation) it is clear that HCA does not usually score well in terms of economic efficiency and would therefore not be in the LTIE.

A4.7 HCA / RoR would also be inconsistent with regulatory precedent in Australia.

[77] In some cases regulators disallowed a return on investments they decided had not been ‘used or useful’.

Yardstick regulation

A4.8 Under a system of yardstick regulation, price limits are set according to the prices charged by other undertakings, in comparable circumstances. This system is used by regulators in many sectors to check the reasonableness of conclusions reached in other ways, and by health services in many European countries that set the prices at which patented medicines are reimbursed according to the prices in other jurisdictions.

A4.9 Yardstick regulation has the advantage of avoiding the need for detailed analysis of costs, and so may be relatively economical to apply. It resembles a competitive market in focusing operators' attention on what rivals are able to accomplish.

A4.10 However, although evidence about comparable prices for similar services is often taken into account in telecommunications regulation, yardstick comparisons are not generally used as the main basis for price setting. Costs of supply may differ significantly between different locations for reasons outside managerial control, for example because of differences in terrain, or in population density. This means that equally efficient undertakings charging the same price may have either unnecessarily high profits, or be unable to make sufficient profit to justify investment. The differences between Australia's geography and demography and that of other countries argue against heavy reliance on yardstick comparisons.

A4.11 However, it is good practice to consider international benchmarks and make relevant comparisons of prices.

Retail minus

A4.12 One of the challenges that regulators may have to face in order to create a level playing field in telecommunications retail markets is to ensure that the wholesale arm of a vertically integrated operator with market power does not discriminate in favour of its own retail arm and against alternative retailers. This is necessary to ensure that the vertically integrated operator does not leverage its market power in upstream (wholesale) markets to create market power in potentially competitive downstream (retail) markets.

A4.13 Under "retail minus" access pricing, price limits for wholesale products are set by subtracting from the retail price of the relevant product a margin judged large enough to cover efficient retail costs.[78] The intention is that this should allow healthy competition in the retail market.

A4.14 However, discrimination may take the form of variable service quality as well as prices. Moreover, "retail minus" can easily translate into a wholesale charge that, having nothing to do with the costs of providing the service in the first place, can easily be undercut by

[78] It is a form of Efficient Component Pricing.

the wholesale arm of the vertically integrated operator giving covert favours to its retail arm. This could crowd out competition from the market. Another risk is that the retail arm might be satisfied with low recorded profits, effectively cross–subsidising the wholesale operation

A4.15 For these reasons, some National Regulatory Authorities (NRAs) in Europe have fought hard battles with the operators holding significant market power, and have entered contentious debates about structural and/or administrative separation between their wholesale arm and the rest of the company. An example is the "Open Access" process in the UK by which BT's access network has been administratively separated from the rest of the company in order to ensure equal terms of wholesale Local Loop provision for all broadband providers. A similar process is now taking place in Italy.

A4.16 Even assuming, for the sake of argument, that an effective system for avoiding discrimination between the retail arm of the vertically integrated operator and the other retailers was in place, a "retail minus" methodology would not provide the correct access price but just move the relevant issues to the regulation of the relevant retail tariffs. On the other hand, if non-discrimination is not efficiently ensured, an access price based on a "retail minus" methodology might crowd out all competition.

A4.17 Despite these major difficulties "retail minus" may have some validity for new services where there is very little information about efficient costs.

A4.18 On balance, however, a "retail minus" methodology would not perform well against the criteria on which access pricing is being assessed.

Ramsey Pricing

A4.19 The term Ramsey Pricing is taken from the work in the 1920s of the outstanding young British mathematician, philosopher and economist, Frank Ramsey, on the most efficient forms of taxation. He analysed which tax interfered as little as possible with the levels of economic activity than would have taken place in a competitive market, in the absence of tax. The Ramsey scheme is that tax.

A4.20 This insight is extremely relevant to pricing systems, hence the adoption of the term Ramsey Pricing or the Ramsey pricing principle. Ramsey Pricing is pricing that maximises sales by charging different mark-ups according to the elasticity of demand – in general, those most willing and able to pay are charged the most.

A4.21 In the case of utilities with high sunk cost and low short-run marginal cost this approach means that the assets are used as much as possible, helping to maximise overall consumer welfare.

A4.22 However, in the absence of some other cost–related method of setting a limit for overall network revenues, this principle gives little guidance to the overall level of charges that should be allowed to a monopoly supplier. It is also problematic in contexts in which high demand elasticity is the result of competitive entry. However, it is relevant to relative

prices (for example, to off-peak and peak charging, and to tariff structures including both fixed and variable elements), since in referring to demand conditions it is on firmer ground than in requiring the use of arbitrary mark-ups to recover common costs.

Total service long run incremental cost (TSLRIC+)

A4.23 As indicated earlier, the Total Service Long Run Incremental Cost (TSLRIC+) approach is the method currently used in Australia to determine price limits for both the ULLS and the core network.

A4.24 TSLRIC+ can be considered through the definitions of its components.

A4.25 "Total Service" refers to the cost of production of an entire service, not to the cost of a particular unit.[79]

A4.26 "Long run" means a period where all factors of production can be varied, including capital equipment.

A4.27 "Incremental cost" means the additional costs of supplying the service compared with the situation where the service was not supplied, assuming all other production activities remain unchanged. Thus the concept refers only to those costs caused by the production of the service, in the present case to the costs of the Unbundled Local Loop Service (ULLS).

A4.28 An operator providing the ULLS in conjunction with other services will have some costs common to all – the head office being a classic illustration. In order to recover such common costs equitably from customers for different services they are allocated between them on some conventional basis, so that an addition is made to the estimated TSLRIC. This is referred to by the "+" sign in "TSLRIC+".

A4.29 A fundamental feature of the TSLRIC+ concept is that the costs measured are all forecast future costs; it is a "forward–looking" measure of the costs that would be incurred by an efficient operator in providing the service. Another way of expressing this is that TSLRIC+ refers to economic as opposed to accounting costs.

[79] The cost is usually expressed on a per-unit basis by dividing by the number of units supplied so in some contexts the name 'Long Run Average Incremental Cost (LRAIC)' is used.

A4.30 The following extract from the ACCC is one of a number through which the ACCC makes explicit its objective of applying the TSLRIC+ standard so as to measure efficient levels of cost :

> "As noted previously, the ACCC considers that Telstra's application of the TEA model results in an estimated access price that does not reflect efficient forward-looking costs."[80]

A4.31 The underlying theory is that in a competitive market business decisions are made on the basis of assessments of future demand for services, and of the costs that would be incurred in meeting that demand. If entrepreneurs expect that there will be a continuing demand for a service sufficient to cover the costs of supply including the cost of capital, then investment will be forthcoming.

A4.32 The technology used in telecommunication networks has changed significantly over time; so that the forward–looking TSLRIC+ estimates are of the costs that would be incurred in providing the services in a modern manner. For example, if advances in technology mean that it would be cheaper and better to provide links through wireless rather than underground or over-ground cabling, then that is the basis on which that part of the TSLRIC+ estimate should be made.

A4.33 There are in practice often protracted arguments between incumbents, competitors and regulators about the precise assumptions to be used; naturally enough, since there is much room for genuine differences of opinion about future efficient cost levels, and the higher the cost estimates the more profit the incumbent can expect to make. Some of these debates turn on whether a "bottom-up" or "top–down" approach should be used in preparing the estimates; best practice is probably to use both, treating top-down or "delta" methodology as a cross-check on the bottom-up estimates.[81] Top-down methods may suffer from some of the same problems as HCA methods.

A4.34 A weakness of the TSLRIC+ approach in present circumstances is that it assumes a long run perspective, whereas parts of the Telstra copper network will be rendered technically redundant by the proposed NBN. If an asset is made obsolete, then its avoidable cost is zero; and it would be a mistake to cost it as if it were to be replaced for long-term use. In this situation, no-one in a competitive market would be investing in a new network designed for the long run. That would not be profitable, nor in the best interest of consumers.

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[80] ACCC, 2008, Assessment of Telstra's Unconditioned Local Loop Service Band 2 monthly charge undertaking, Draft Decision, p. 56

[81] The term 'bottom up' means that the estimates are made on the assumption of a clean sheet, and the ability to design as seems best for current demand and technology. 'Top-down' estimates are based on the costs actually incurred in a recent period, as recorded in the incumbent's accounts or other records, with adjustments where inefficiencies are recognised. This is also referred to as the 'delta' method; assuming future costs will be similar to present costs, with adjustments in some specific areas (delta). A compromise is the 'scorched node' method, in which it is arbitrarily assumed that the bottom up estimates are constrained by the assumption that the existing nodes (locations for switches) are to be maintained.

A4.35 Another aspect of TSLRIC+ as applied to the local loop has attracted controversy in countries other than Australia, and was discussed in our report to the European Commission mentioned in the introduction.[82] This is the treatment of underground trenches and ducts, to which the following extract from a recent ruling by the ACCC refers:

> The ACCC also considers that the inclusion of surface barriers, for example, concrete footpaths and roads, as a component of the asset value for determining network costs would overly compensate Telstra for its investments in facilities used to supply the declared service. In a substantial majority of cases**,** local copper pairs were installed in turf and only subsequently paved over. Telstra has proposed that forward-looking costs should include the retrenching and re-paving of trenches where local copper pairs were initially laid. The result would be that Telstra would be compensated for costs that it (in most cases) never incurred and is not likely to incur within the economic life of the existing copper pairs.[83]

A4.36 The principles of TSLRIC+, like any other method of estimating forward-looking rather than historic costs, do allow for the possibility that an incumbent may be paid more for an asset than it cost. On the other hand, the fact that the costs of paving over were paid by others (and perhaps at a time when Telstra was state-owned) argues against their being included in such estimates. To allow existing shareholders to benefit from this type of estimate would be a windfall that would not reflect any future costs of supply nor help to provide incentives for efficient future investment. In order to overcome this problem it would have to be assumed that the efficient new entrant has access to the existing ducts and trenches, rather than needing to incur the cost of an uneconomic rebuilding programme.

A4.37 Ramsey pricing is the superior technique in analysing relative prices but does not deal with the major issue of the overall revenue limits that need to be applied to a monopolist.

A4.38 TSLRIC+ scores well for core networks, for which it was originally designed, but this may be seriously misleading in the circumstance of the NBN and of the local loop.

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[82] Europe Economics' report for the European Commission (DG Competition) Pricing Methodologies for Unbundled Access to the Local Loop, 2004

[83] ACCC, 2008, Assessment of Telstra's Unconditioned Local Loop Service Band 2 monthly charge undertaking, Draft Decision, p. 53

APPENDIX 5: RENEWALS ACCOUNTING IN PRACTICE

A5.1 The principles of renewals accounting have been applied in a number of different contexts. Here we draw mainly on experience in the water and sewerage industry in England and Wales (the "water industry"), where the issues were thoroughly explored and generally applied.

A5.2 The regulator of this industry was established at the time of privatisation under the Water Act in 1989 originally as Office of Water Services or "Ofwat" and since April 2006 as Water Services Regulation Authority. It regulates the maximum charges that can be levied by all the companies in the industry:

Water Only Companies
Bournemouth and West Hampshire
Bristol Water
Cambridge Water
Cholderton and District Water
Dee Valley Water
Essex and Suffolk Water
Folkestone and Dover Water
Hartlepool Water (Anglian Water)
South East Water (Mid Kent)
Three Valleys Water
Portsmoth Water
South Staffordshire Water
Sutton and East Surrey Water
Tendring Hundred Water

Water and Sewerage Companies
Anglian Water
Dwr Cymru (Welsh Water)
Northumbrian Water
Severn Trent
South West Water
Southern Water
Thames Water
United Utilities
Wessex Water
Yorkshire Water
Northern Ireland Water

6.29 The following text, taken directly from a report published by the CIPFA[84], describes how the water industry prepares its financial statements for OFWAT:

[84] Annexe J, Local Authority Transport Infrastructure Assets, Review of Accounting, Management and Finance Practices, June 2008 p.107-108. Published by the CIPFA

"Water companies prepare two different forms of financial statements. Their statutory company accounts are compiled in accordance with either UK GAAP or International Financial Reporting Standards (IFRS), as required by the Companies Act. They also prepare Regulatory Accounts which are submitted to OFWAT for the purposes of regulatory monitoring.

Statutory Accounts under UK GAAP: Where statutory company accounts are prepared under UK GAAP, it is common for companies to use historic cost accounting and within this to use the renewals accounting provisions under FRS 15. [..]

Statutory Accounts under IFRS: IFRS must be used where the water company is a listed entity that prepares group accounts, and it may be used in other cases where the company so elects. At the time of transition to IFRS, there was consensus within the water industry that renewals accounting was not possible under the international standards. Most water companies adopted historic cost accounting for their infrastructure assets by utilising the provision that allows them to treat the carrying value at the date of transition as the 'deemed cost' under IFRS. Thereafter, the assets are not revalued but are depreciated over their estimated useful lives. There is, however, no real consensus in the industry as to the extent to which the overall infrastructure asset should be broken down into significant components, and the full spectrum exists – from companies treating their network as one entire asset to others disaggregating theirs into multiple components.

For the Regulatory Accounts, the requirements for infrastructure accounting are set out in the 'regulatory Accounting Guidelines' issued by OFWAT. These accounts cover only those elements of a water company's operations which are subject to the regulatory regime and comprise both current cost and historic cost accounts. The current cost accounts mirror the price setting regime, and the historic cost accounts are used to assess financial performance in a manner similar to the statutory accounts.

Both sets of regulatory accounts use a modified form of renewals accounting for the infrastructure assets. [..]

In practice, the difference between the historic cost regulatory accounts and the historic cost UK GAAP accounts using renewals accounting is that any shortfall or excess between the estimated and the actual expenditure on the asset in any one year is reflected within 'net current assets' in the regulatory accounts and within the fixed asset balance in the UK GAAP accounts."

A5.3 There are a number of issues to be considered when implementing renewals accounting.[85] These include the following:

[85] The following links lead are a summary of renewals accounting as applied by Ofwat:
RD7/93 - http://www.ofwat.gov.uk/regulating/reporting/ltr_rd0793_infrarenew.pdf
Regulatory Accounting Guideline 2.03- http://www.ofwat.gov.uk/regulating/gud_rag_guideclassexp_203.pdf

What assets should be included in the estimates?

A5.4 All assets that make up the access network, even if asset lives can be estimated with reasonable precision, should be considered when calculating the infrastructure renewals charge (IRC).

What costs should be included in the estimates?

A5.5 All the costs that are incurred in order to preserve the network in its present state and in protecting it from decreasing in value should be included in the estimate of the renewals charge. These costs are, according to Ofwat:

- the cost of renewing any components that fail, for whatever reason, during the year;
- the cost of planned maintenance of any element of the system;
- the cost of emergency repairs to any part of the system;
- the cost of that part of any planned improvement or expansion of the system which relates to the otherwise unplanned renewal or maintenance of an existing part of the system; and
- overheads directly associated with the planning and carrying out of renewals and maintenance.

What happens if outturn expenditure differs from the calculated renewals charge?

A5.6 The amounts spent on renewals and maintenance will not necessarily be the same amount as the estimated charge because of yearly variations and unforeseen events. However, on average these two amounts should coincide.

A5.7 In accounting terms every difference between these two values should be recorded either as a prepayment or an accrual depending on whether there is an over or under expenditure.

A5.8 However, if the difference is systematic then it may be that the renewals charge had been wrongly estimated in the first place and it would be necessary to re-assess the estimates.

Is the system of renewals accounting likely to suffer from weaknesses similar to those of historic cost accounting as a basis for regulation?

A5.9 Renewals accounting estimates are based on forward–looking engineering costings rather than historic records of actual expenditure, and so are free from many of the weaknesses of HCA costings. However, they are potentially vulnerable to a second weakness of HCA, namely that the incumbent is likely to have a major advantage over the regulator or other interested parties in its access to relevant information.

A5.10 In order to overcome this, the regulator has two main techniques at his disposal:

- the "bottom up" approach, in which experts independent of the incumbent make their own estimates of how much it should cost to maintain a system of this sort; and
- the use of statistical analysis of the incumbent's historic accounts. If, for example, in the past there had been $A X spent on repairs and maintenance, and N breakdowns, then this would be at least a check on the plausibility of any claims that significantly more than $A X would have to be spent to keep the number of breakdowns to the historic average.

Overview of similar public sector finance practices in the UK

A5.11 Renewals accounting has been used in the UK in respect to infrastructure assets in various public sectors. Infrastructure assets are those assets that an entity must maintain in order to provide a service. Public drainage systems and underground rail systems are examples of infrastructure assets where the service capacity of the assets as a whole depends on maintaining the components. To keep the asset productive, the component parts must be replaced and renewed.

A5.12 The CIPFA June 2008 report *Local Authority Transport Infrastructure Assets: Review of Accounting, Management and Finance Mechanisms*[86] gives a useful overview of accounting practices in the water, rail and transport sectors. The water industry has been discussed above; the following information is given relating to rail and to transport infrastructure.

The rail industry

A5.13 The national rail network treats its infrastructure as one entire asset and its income is derived from Train Operating Companies. As an income-generating asset, the infrastructure assets accounting is different to that of other public sector assets which are held for the purpose of service delivery, and does not use renewals accounting. The value used to measure the asset is the "value in use" figure, or the present value of future income that can be obtained from using the asset. The asset is depreciated over its useful economic life of 25 years on a basis of the underlying network components.

A5.14 However, other rail networks, such as sub-surface railways (including the London Underground), Light Rail and Tramways are considered separately under transport infrastructure assets and are included in renewals accounting.

[86] http://www.cipfa.org.uk/pt/infrastructure/download/final_report_jun08.pdf

Transport infrastructure

A5.15 Transport infrastructure assets are defined differently according to the type of government (central, local) and country within the United Kingdom.

A5.16 Infrastructure assets for local government generally include urban transport systems and highways. Definable major assets or components within a system would be separated and depreciated over their useful economic lives, but renewals accounting would be used to estimate the depreciation of the system or network as a whole.

A5.17 Central government bodies currently apply renewals accounting to roads, though they are set to change this to become compliant with IFRS sometime in 2009/10. In England, the Highways Agency uses a combination of renewals accounting and conventional depreciation for its network assets. Among other things, renewals accounting is applied to some pavements and sub-pavement layers, fencing, drainage, signage and road markings. Conventional depreciation is applied to assets such as road bridges, tunnels and retaining walls.[87]

A5.18 Annexe F of the CIPFA final report gives further details about the type of transport infrastructure accounting used throughout the UK, as well as a list of network assets included in renewals accounting.

[87] Annexe F, Local Authority Transport Infrastructure Assets, Review of Accounting, Management and Finance Practices, June 2008. Published by the CIPFA

APPENDIX 6: TOWARDS IMPLEMENTATION

A6.1 Some effort would be necessary in Australia to implement the recommended system for the access network in a relatively short time-span.

A6.2 The following steps would be recommended:

- to prepare bottom up estimates of the efficient costs of maintaining in use, for as long as required, those parts of the ULLS network expected to be replaced by the NBN;
- to compare these with any evidence put forward by Telstra on this issue; and to reach a judgement on the costs to be allowed;
- to prepare bottom up estimates of the efficient costs of maintaining in use for the long term those parts of the ULLS network not expected to be replaced by the NBN (the assumption would be that an efficient entrant management would have access to existing ducts and trenches);
- to compare these estimates with any evidence on the same assumptions put forward by Telstra, and to make a judgement on the costs to be allowed.

A6.3 It would be desirable to review an inventory of the Telstra assets that currently make up the access network. It would then be necessary to employ engineers and cost accountants with experience of the maintenance of access networks in the telecommunications industry, and assess the likely expenditure necessary to maintain the network at the current level of serviceability. This independent assessment would be the equivalent of a bottom up model under the conventional TSLRIC+ methodology although with a more limited scope. It would then be appropriate to compare this with estimates made by Telstra's own engineers in the same way that "top-down" estimates under TSLRIC can be compared with the bottom up estimates.

A6.4 A second check could initially use the maintenance expenditure incurred by Telstra in the past (from Telstra's regulatory accounts) and average it over a number of years. If the network is in steady state we would expect such expenditure to vary little over time (however, there would be no guarantee that the costs incurred in the past were efficient).

A6.5 Assumptions would need to be made about the roll-out of the NBN, so that the dates could be estimated by which different parts of the Telstra network would no longer be needed. These physical estimates would be the basis for the engineering/cost accountancy estimates

The normal rate of return on depreciated assets

A6.6 The calculation of a normal rate of return on the value of the assets that make up the access network could be assumed to be equal to the cost of capital applied to Telstra's assets used by the ACCC.

A6.7 The value of the depreciated assets in Telstra's access network can be obtained from Telstra's accounts.

A6.8 According to the Accounting Separation of Telstra report for the second half and full year 2007-2008 done by the ACCC, the value of Telstra's ULLS total fixed assets is $362 million based on historical cost accounting (HCA), and $729.6 million based on current cost accounting (CCA) , as shown in the ULLS column of the following table.

Table A6.2: Telstra fixed asset statement as at 30 June 2008

A(1) Fixed Asset Statement as at 30 June 2008	ULLS			PSTN OTA			LCS		
values in $m's	HCA	CCA	Δ	HCA	CCA	Δ	HCA	CCA	Δ
2-3-20-4 Land	2.9	2.9	0.0	2.8	2.8	0.0	10.4	10.4	0.0
2-3-25-4 Other	53.8	53.8	0.0	28.9	28.9	0.0	113.3	113.3	0.0
Total Other Non-Current Assets	**54.6**	**54.6**	**0.0**	**31.1**	**31.1**	**0.0**	**110.8**	**110.8**	**0.0**
Total Fixed Assets	**362.0**	**729.6**	**367.6**	**567.8**	**568.4**	**0.6**	**1,957.5**	**3,440.5**	**1,483.0**

Source: Accounting Separation of Telstra report from the ACCC

A6.9 The *Telecommunications Act 2002* introduced a statutory framework for the enhanced accounting separation of Telstra's wholesale retail operations. The Act required the ACCC to establish a regular reporting regime under which Telstra would prepare half-yearly financial statements for the unconditioned local loop service (ULLS) based on both HCA and CCA.

A6.10 These reports were prepared consistently with the existing Telecommunications Industry Regulatory Accounting Framework (RAF).

A6.11 The ACCC requires the use of modern equivalent asset valuations (MEA) and the use of financial capital maintenance (FCM) as the basis of reporting.[88]

Qualifications to the financial statements

A6.12 *Common costs:* Because a high proportion of the reported costs for the core services are common costs, it is necessary to allocate costs from common cost pools. Changes in costs over time or between services can reflect changes in the proportion of costs allocated to services as well as changes in the overall cost base.

[88] Under MEA, the replacement costs of an asset is based on the cost of a modern equivalent asset, which is an asset with the same service potential as the existing asset and can produce the same stream of services and at the same level of quality. FCM is concerned with maintaining the real financial capital of a firm so that it can continue financing its functions

A6.13 *Cost of capital*: The cost of capital is the opportunity cost of the debt and equity funds that finance the operations of the firm. The average opportunity cost of the firm's debt and equity financing is weighted to give a weighted average cost of capital (WACC).

A6.14 *Approach to CCA asset valuation*

- Under CCA asset valuation, assets are to be valued at their current replacement cost through indexation.

  i. Assets are valued by indexing the written down value (WDV).[89]

  ii. The valuation uses composite indexes of labour, material and other costs to index these assets over their service lives to the end of the relevant periods.

  iii. Those assets representing less than 10 per cent of the historical cost base are not being revalued because revaluing these asset classes would be unlikely to have a material effect on the overall accuracy of the CCA financial statements.

A6.15 Financial capital maintenance (FCM)

- FCM determines the level of profit reported in the CCA profit and loss statements. It is concerned with maintaining the real financial capital of the company. Profit is measured after provision has been made to maintain the purchasing power of opening–period financial capital. Profit reported under FCM will therefore be less than that reported in nominal terms.

- The CCA profit and loss statements are adjusted to reflect the effects of inflation on Telstra's resources. CCA also includes adjustments to reflect the holding gains or losses coming from changes in the value of assets over the relevant time period, and changes to depreciation allowances.

A6.16 Issues to be analysed further would include:

- how to obtain estimates of the dates on which different parts of the present ULLS network would become redundant;

- how to obtain geographically de-averaged prices, if this is a requirement of the ACCC;

[89] The write down value of an asset is its original purchase cost minus the accumulated depreciation.

- what assumptions to make about the residual value of Telstra's technically redundant assets, since this would depend on whether they are able to be used in competition with the NBN and on what terms.