



**Assessment of Proposals
National Broadband Network Process**

Report to Expert Panel

Appendices

Confidential version

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Glossary

Australian Energy Regulator (AER)	The AER regulates the wholesale electricity market and is responsible for the economic regulation of the electricity transmission and distribution networks in the national electricity market (NEM). The AER is also responsible for the economic regulation of gas transmission and distribution networks and enforcing the national gas law and national gas rules in all jurisdictions except Western Australia.
Common costs	A cost incurred with the production of multiple products or services that remains unchanged as the relative proportion of those products or services varies. If a cost is common to a subset of services it is only avoided when each service within the subset is not provided. It is incurred if any one of the subset of services is provided, but is not causally attributable to any particular service within the subset.
Customer Access Network (CAN)	The CAN lies between a network termination point at the customer's premises and the network switch at which, conceptually, an access seeker could establish a point of interconnection. It consists of infrastructure such as network termination points, copper lines, trenches, pillars, and line cards.
Dynamic efficiency	Firms having the appropriate incentives to invest, innovate, improve the range and quality of services, increase productivity and lower costs through time.
Gross value	An asset's gross value does not take into account any decline in its value (depreciation) since it was built. An asset that has been fully or partially depreciated will have a positive gross value (that is, their gross value equals their full original cost, whether this is based on a historical cost or a replacement cost), but their net value will be lower than this, reflecting past depreciation.
Incremental costs	The difference between the total costs of producing all services, including the particular service under investigation; and the total costs when the service under investigation isn't produced, but the same amount of all other services is produced.
Inter-exchange network (IEN)	Connects exchanges to each other and includes infrastructure such as optical fibre, trenches, multiplexers, remote concentrators and switches.

Modern Equivalent Available asset (MEA)	A modern asset that can produce the same stream of services at the same quality as the existing asset.
Net value	An asset's net value takes into account the decline in its value (depreciation) since it was built.
Return on capital	The opportunity cost of the debt and equity funds used to finance the operations of a firm (including its investments). The ACCC usually calculates the cost of capital as the weighted average cost of capital (WACC).
Standalone and incremental costs	For a single product/service firm, standalone costs and incremental costs are equal, and refer to the costs of providing the total volume of the service/product. However for a multi-product firm, standalone and incremental costs diverge, because some costs are likely to be shared across products/services. The standalone cost of a service is then the total cost of producing the total volume of that service if no other services are produced. On the other hand, the incremental costs of the product/service are the costs that would be avoided if the total volume of that service was no longer produced, but all other services are produced.
Static efficiency	Productive efficiency — firms having the appropriate incentives to produce services at least cost, and production activities being distributed between firms such that industry-wide costs are minimised — and allocative efficiency — firms employing resources to produce goods and services that provide the maximum benefit to society.

Appendix A. Regulatory Framework for a NBN

A.1. Executive Summary

- The RFP requires the Panel to assess Proposals against the criterion of the ‘nature, scope and impact of any legislative and/or regulatory changes that are necessary to facilitate the Proposal’.¹ This appendix discusses the regulatory framework in so far as it relates to competition and economic regulation.
- Effective competition drives efficiency which is crucial to maintaining and improving the welfare of Australians. All Australian governments have agreed that legislation should not restrict competition unless it can be demonstrated that the benefits of the restriction to the community as a whole outweigh the costs, and the objectives of the legislation can only be achieved by restricting competition.
- A key component of the 1997 telecommunications regime was the creation of a more open market including by removing restrictions on the number of licences that could be issued, and creating an access regime that covers services to which access is required to compete in the same market (as many communications services require any-to-any connectivity).
- A Proposal that seeks a statutory monopoly in respect of the NBN is less likely to meet the evaluation criteria and Commonwealth’s objectives, in particular the objective of continuing to promote the long-term interests of end-users.²
- However, some limited forms of barriers to competition may be justified. Restrictions that may require further consideration include:
 - supplementation of existing competition laws (section 46 and Part XIB of the TPA) via an express statutory prohibition against overbuild in the roll-out and cut-over period
 - the Australian Government providing a competitive advantage to the Proponent through, for example, funding the NBN project or awarding Government contracts to the Proponent
 - an exclusive right to cut-over lines, in order to facilitate any FTTN roll-out.
- An access regime is likely to be required to promote competition where a facility is a natural monopoly, and businesses require access in order to compete in upstream or downstream markets. The incentive for an NBN provider to negotiate with an access seeker depends on the extent to which the NBN provider has market power and operates in a market in which the NBN service is a production input (vertical integration). Competition in related markets is more likely to be achieved if a Proponent proposes a statutory restriction on the Proponent (and related entities) being involved in a related business. Experience suggests that other forms of ring-

¹ RFP clauses 1.4.1 and 10.3.1 criterion 3.

² RFP clause 1.3.1 objective 8.

fencing (such as business, operational or accounting separation) do not necessarily eliminate the incentive to discriminate against access seekers.

- If a Proponent proposes a statutory restriction on vertical integration, then the declare/negotiate/arbitrate access regime in Part XIC of the TPA provides an appropriate starting framework for the regulation of wholesale access to the NBN. However, changes could be made to:
 - provide greater certainty for the NBN provider and access seekers by allowing the ACCC to set the values of certain inputs to be used in any future undertakings or arbitrations in respect of the NBN
 - ensure that the regime governing access to facilities in Schedule 1 of the *Telecommunications Act 1997* is incorporated into Part XIC of the TPA.
- If a Proponent is not vertically separated, then a Proposal that proposes an ex ante access regime (where the terms and conditions of access are set upfront) is more likely to promote competition in related markets than the ex post regime in Part XIC. Experience suggests that, where an access provider has market power and an incentive to deny access, the negotiate/arbitrate model is less effective than an ex ante regime in delivering timely access on reasonable terms and conditions.

A.2. Introduction

The RFP requires the Panel to evaluate Proposals against six evaluation criteria, including criterion 3: ‘The nature, scope and impact of any legislative and/or regulatory changes that are necessary to facilitate the Proposal’. Clause 1.5.39 of the RFP states:³

to the extent that legislative and/or regulatory changes are required in relation to the development and operation of the NBN, these changes will be limited to those necessary to directly facilitate investment in the NBN, and will not jeopardise the Commonwealth’s other objectives

This Appendix A discusses the regulatory framework for a NBN in so far as it relates to competition and economic regulation. The appendix reviews the regulatory issues in respect of promoting competition in the NBN market and related markets.

A.3. Promoting competition in the NBN market

This section considers the following issues:

- What is a statutory barrier to competition in the NBN market?
- How should such restrictions be assessed?

The section discusses forms of statutory barriers to competition that may justify further consideration.

³ See also RFP Schedule 2 Section 3.

A.3.1. What is a statutory barrier to competition?

Market power is the power held by a single supplier (business) to set a higher price of a good and maintain their market share. A necessary precondition for such power is some constraint on market entry (for example, due to patents, brand or technology advantage) which makes it difficult for competing companies to respond to such a price rise. An NBN provider will have market power if it is a natural monopoly (where a single supplier can more efficiently serve a particular market than two or more suppliers). However, an NBN provider may also obtain market power through a statutory barrier to competition. This could be achieved through, for example, a regime that:

- prohibits other businesses from constructing certain infrastructure (overbuild protection) or supplying certain services
- requires businesses to obtain a licence to provide certain services, and limits the number of licences that may be issued
- requires consumers to obtain certain services from the NBN provider
- prevents other businesses from charging lower prices or offering better services than the NBN provider
- significantly alters the costs of some suppliers relative to the NBN provider
- allows the NBN provider exclusive use of a facility, to which other businesses would also require access in order to compete
- affects the ability of some types of firms to participate in public procurement processes.

A.3.2. Assessment of statutory barriers to competition

The National Competition Policy Reforms agreed to by Australian governments in 1995 and 2007 affirmed the importance of effective competition to maintaining and improving the welfare of Australians.⁴ The competitive process encourages firms to produce goods and services at least cost (productive efficiency), use resources to produce the goods and services that are most valued by consumers (allocative efficiency) and innovate by developing new products and production processes (dynamic efficiency).

In 2007, all Australian governments recommitted to the *Competition Principles Agreement* (11 April 1995), including the principle that:

legislation (including Acts, enactments, Ordinances or regulations) should not restrict competition unless it can be demonstrated that:

- (a) the benefits of the restriction to the community as a whole outweigh the costs;
- and

⁴ Aust, Independent Committee of Inquiry, *National Competition Policy* (Report, August 1993) (Hilmer Report) p 1.

- (b) the objectives of the legislation can only be achieved by restricting competition.

This is reflected in the Australian Government's requirements for the preparation of a regulatory impact statement,⁵ which is essentially intended to ensure that regulation is effective (in that it addresses an identified problem) and efficient (in that it maximises the benefits to the community, taking account of the costs).

Consistent with this, the main object of the 1997 telecommunications regime is to promote the long-term interests of end-users of telecommunications services, and the efficiency and international competitiveness of the Australian telecommunications industry.⁶ An essential component of the regime was the creation of a more open market by removing regulatory barriers to entry including by removing restrictions on the number of licences that could be issued, and creating an access regime that covers services to which access is required to compete in the same market (as many communications services require any-to-any connectivity).

A Proposal that seeks to create statutory restrictions on competition in respect of the NBN is less likely to meet the Commonwealth's objectives, in particular the objective of continuing to promote the long-term interests of end-users.⁷

However, as the Hilmer Report observed, competition policy is not about the pursuit of competition *per se*. Rather, it seeks to facilitate effective competition to promote efficiency and economic growth while accommodating situations where competition does not achieve efficiency or conflicts with other social objectives. This is reflected in the sanctioning of statutory restrictions on competition on public benefit grounds. The remaining part of Section A3 discusses:

- overbuild protection limited to the roll-out and cut-over period
- an exclusive right to cut-over lines
- Government financial support of the NBN project.

A.3.3. Overbuild protection

'Overbuild' has been used to refer to the construction of competing alternative facilities. Although the terminology implies that competing facilities is inefficient, this is not necessarily the case.

A number of parties⁸ have argued that careful consideration should be given to ensuring that the regulatory environment for a NBN does not encourage economically irrational decisions to invest in competing infrastructure and/or technologies. Submissions cite the case of Telstra closely duplicating Optus' HFC rollout during the 1990s in order to induce Optus to cease further expansion of its rollout.

⁵ Australian Government, *Best Practice Regulation Handbook* (August 2007) p 29.

⁶ *Telecommunications Act 1997* s 3.

⁷ RFP clause 1.3.1 objective 8.

⁸ For example, Terria, AAPT and PowerTel and Acacia.

A firm with market power can unilaterally respond to rivals in two ways. It can undertake activities that are efficient and promote lower consumer prices and/or improved consumer service. Alternatively, it can engage in activities that undermine the competitive process with no efficiency benefits.

In the former case, the regulatory regime should not prevent the emergence of efficient facilities-based competition. Such ‘overbuild’ is in the long-term interest of end-users.

In the latter case, the aim of section 46 in Part IV of the TPA is to prevent such action from occurring. Section 46 prohibits a corporation that has a substantial degree of power in a market from taking advantage of that power for the purpose of, amongst other things, eliminating or substantially damaging a competitor. The section is intended to distinguish between vigorous competitive activity by a firm (even if such conduct has the ancillary effect of lessening competition) and conduct by a firm which is designed to prevent the competitive process from continuing to operate effectively with no offsetting efficiency benefits.

The telecommunications-specific competition regime in Part XIB of the TPA contains ‘additional features’ to ‘reduce the damage that can be inflicted by those wielding ... market power’.⁹ Part XIB prohibits carriers and carriage service providers from engaging in anti-competitive conduct (the competition rule).¹⁰ The competition rule incorporates certain provisions in Part IV (including section 46) but carriers and services providers are subject to an additional prohibition against taking advantage of market power with the *effect* of substantially lessening competition.¹¹ In addition, in order for proceedings to be instituted under Part XIB, the ACCC must issue a ‘competition notice’. In certain cases, a competition notice reverses the evidentiary burden in a court proceeding.¹²

However, the recent amendments to section 46¹³ are untested. Section 46 and Part XIB cases can be difficult to prove and time-consuming, and may not be sufficient to prevent ‘predatory overbuild’. A more effective approach may be to prevent such behaviour from occurring in the first place via alternative regulatory measures.

⁹ In particular, the Second Reading Speech stated:
[T]here remain good reasons for there to continue to be industry specific competition regulation for telecommunications. The removal of regulatory barriers to entry does not automatically result in the appearance of normal competitive market structures. Telstra continues to wield significant market power derived primarily from its historical monopoly position. There is also scope for incumbent operators generally to engage in anti-competitive conduct because competitors in downstream markets depend on access to the carriage services controlled by them. ... The fast pace of change and complex nature of horizontal and vertical arrangements of firms operating in this industry mean that any anti-competitive behaviour could cause rapid damage to the competition that has already developed and severely hamper new entry.

See Second Reading Speech on the Trade Practices Amendment (Telecommunications) Bill 1996: Commonwealth, *Parliamentary Debates* (Hansard): House of Representatives, 5 December 1996, 7803-7805 (Warwick Smith, Minister for Sport, Territories and Local Government and Minister Assisting the Prime Minister for the Sydney 2000 Games).

¹⁰ TPA s 151AK.

¹¹ TPA s 151AJ.

¹² TPA s 151AN (where the ACCC has issued a ‘Part B competition notice’).

¹³ *Trade Practices Legislation Amendment Act 2008*.

Temporary measures that are constrained and limited (for example, targeted protection limited to the roll-out and cut-over periods) may have a net pro-competitive effect.

A.3.4. Exclusive right to a mandatory cut-over of lines

The transition arrangements in respect of the timetable for upgrades of nodes and exchanges will be critical to ensuring that access seekers have time to adjust their business plans to accommodate a FTTN network so competition can be preserved and promoted into the future. These issues are examined in further detail in Appendix I. However, one issue is whether an NBN provider will require an exclusive right to a mandatory cut-over of lines.

Some Proponents propose to construct a fibre optic network that will connect to the copper pairs that run from street-corner pillars to each premises. These copper pairs are owned by Telstra. A Proponent may propose to seek access to all of Telstra's copper pairs at each street-corner pillar, and to then cut each copper pair over, in a single operation, to connect them to the Proponent's proposed fibre network. 'Cut-over' refers to accessing the network at an existing cross connect point built into the network (for example, in an exchange or in a pillar); and redirecting the connection via a jumper lead to the NBN provider's DSLAM or cable connector. For example, this kind of reconnection occurs at exchanges currently whenever a customer orders a broadband service.

Most of the industry appears to have accepted that in transitioning to a NBN environment, it will be necessary for copper lines to be cut-over to the new fibre link on a 100% of lines, node by node basis,¹⁴ although the question remains whether the current regulatory regime facilitates or allows such an arrangement.

The information available to the ACCC suggests that this assessment is accurate for three reasons:

- the technical aspects of end-users on a single node being supplied by either a signal on a ULLS/LSS line from an exchange and a service supplied from a DSLAM or MSAN at a node and the crosstalk effects of these two signals
- the economic feasibility of multiple truck rolls to a node to cut-over copper lines to a node once a request for a service is made by a specific end-user
- the number of customers at a node needs to be sufficient to make it economically viable for the NBN provider to place dedicated equipment at that node.

One of the key issues associated with a line-by-line (or less than 100 per cent) cut-over is 'cross-talk' or 'mid point injection interference'. Cross-talk occurs when one xDSL service interferes with other xDSL services transmitted over copper pairs, which are in close proximity to each other (i.e. within the same binder cable). Cross-talk increases the further the copper pairs run in parallel, the closer they are together, and the larger (more powerful) the interfering signals. Cross-talk also increases with the frequency of

¹⁴ See regulatory submissions of all Proponents and Communications Day, *Internode backflip: now supports full copper cutover*, *Terria monopoly*, 10 September 2008.

the transmitted signals: ADSL2+ is affected to a greater extent than ADSL while VDSL2 is affected to a greater extent than ADSL2+.

As the signal strength over a copper pair coming out of the remote node is high relative to the signal strength over a copper pair coming out of the local exchange (given signals attenuate over distance travelled), cross-talk can be significant.

The issue is that a copper pair carrying a signal from the node negatively affects a copper pair carrying the signal from the local exchange (illustrated below).

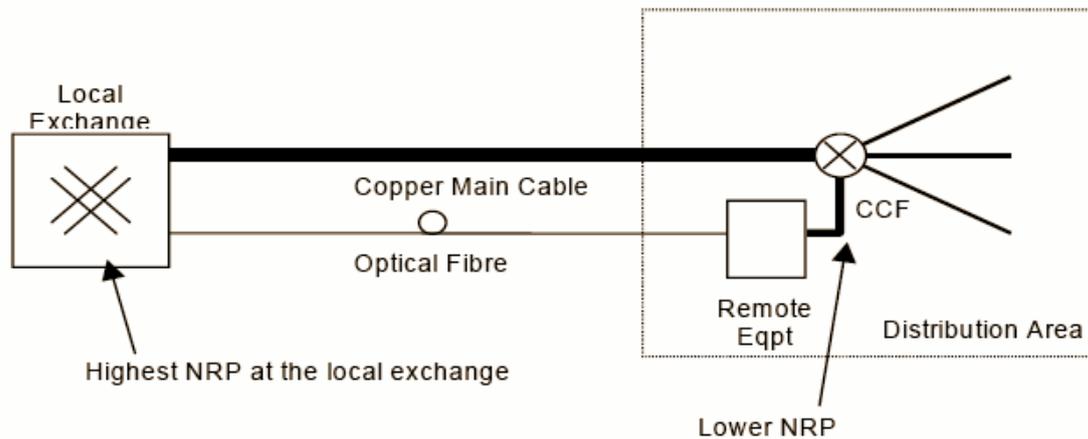


Figure 1 Optical fibre and copper cable feed to a Distribution Area (Source: ACIF C559, Part 1, figure 7.6)

Even if adjustments are made to the power used to transmit signals to prevent the node-served signal interfering with the signals from the exchange, this is likely to result in a significant reduction in the speeds achievable from the node, which would seem to be contrary to the Commonwealth's objective in the RFP to support high quality voice, data and video services and offer broadband services with a minimum 12 Mbps dedicated downlink transmission speed.¹⁵

Further, given the relatively small number of end-users that will be connected to a single node (around 192 or 384) and the cost of a single truck roll (typically more than \$200) for a technician to go to a node and transfer a copper line over to a fibre link at the node, it is likely that the costs for a line-by-line cut-over of the NBN would be prohibitive for a NBN operator.

If a Proponent can automate such a transfer and thereby avoid the truck roll costs, then this may change the economic viability of line-by-line cut-over and could assist in maintaining and promoting competition in downstream markets. However, the benefits for competition of such an approach need to be assessed having regard to the extent to which the suite of services that an access seeker could provide to end-users from an exchange would be sufficient to ensure it can provide competitive offerings to consumers. Further, even this assumes that an exchange would continue to be available, which is by no means assured. (One of the implications of upgrading the current copper exchange-based network to a FTTN configuration is that the number of exchange buildings needed to house electronics for the supply of downstream services is reduced. This is often cited as one of the potential cost-saving benefits of upgrading to a NBN).

¹⁵ See clause 1.3.1 of the RFP.

If it is necessary for the NBN provider to have an exclusive right to cut-over all copper lines to the new fibre link, this may require amendments to the current regulatory regime. The current regime arguably requires two pre-conditions to be met before an access provider is obliged to provide access to an access seeker. First, the access seeker must be making the request for access so as to provide services to its own customer. Secondly, the relevant copper line must not be currently used (nor is there any reasonable expectation of use) by the access provider or another access seeker to provide a service which would conflict with the newly requested service. It is unlikely that both pre-conditions would be met for more than a small number of copper lines.

A.3.5. Competitive neutrality

Competitive neutrality (where competitors compete on an equal footing) is a necessary condition for ensuring an optimal allocation of resources. Government intervention (such as when competitors operate under inconsistent investment, taxation, charging or regulatory frameworks) can distort consumer choice between substitutable services.

This principle is reflected in the *Competition Principles Agreement* (11 April 1995, amended 2007) in which all Australian governments agreed to a policy governing competitive neutrality between public and private businesses.¹⁶ The object of this policy is the elimination of resource allocation distortions arising out of the public ownership of entities engaged in significant business activities. That is, government businesses should not enjoy any net competitive advantage simply as a result of their public sector ownership.¹⁷

In respect of the NBN, Proponents may obtain a competitive advantage through, for example:

- a subsidy of the construction cost
- access to debt and/or equity at rates discounted from what would otherwise be available in the market place
- the Government entering into a ‘take or pay contract’ which underwrites profitability even with little or no private sector market penetration
- exemptions from various taxes
- exemptions from complying with regulatory arrangements imposed on other competitors.

However, such government action can be justified on efficiency or equity grounds. Government subsidies can be used to:

¹⁶ *Competition Principles Agreement* (11 April 1995) clause 3.

¹⁷ See also the *Commonwealth Competitive Neutrality Policy Statement* and *Australian Government Competitive Neutrality Guidelines for Managers*. The competitive neutrality complaints mechanism is administered by the Australian Government Competitive Neutrality Complaints Office within the Productivity Commission.

- promote economic efficiency where there are externalities (where the production or consumption of a good or service has an external effect that is not reflected in the price) or public goods (where the good is a public good or common property)
- promote social objectives such as a universal service obligation.

A subsidy may also be a preferable alternative to a statutory monopoly such as overbuild protection (which is an outright prohibition on competition).

A.4. Promoting competition in related markets

This section considers the following issues:

- General principles for designing an access regime
- Summary of the existing access regime
- How the telecommunications access regime compares to other Australian access regimes
- Effectiveness of operational separation
- Performance of the negotiate/arbitrate model
- Implications for the design of a NBN access regime

A.4.1. General principles for designing an access regime

The Hilmer Report recognised that, in some markets, firms require access to an infrastructure service in order to compete in upstream or downstream markets.¹⁸

The incentive for an access provider and access seeker to negotiate depends on two principal factors. First, the extent to which the access provider is subject to competitive restraints (ie. has market power). If there is no effective competition, there is the potential for the access provider to maximise profits by setting a price too high and selling too few units compared to the social optimum. In such a case, an objective of an access regime is to prevent the exercise of market power.

The second factor arises if the access provider (or a related company) also operates in a market in which the infrastructure service is a production input (vertical integration). The access provider has a potential incentive to use its market power to favour its operations in the related market (for example: by refusing to supply the input; charging a higher access price to its competitor (price discrimination); or providing a lower quality service (non-price discrimination)).

¹⁸ Aust, Independent Committee of Inquiry, *National Competition Policy* (Report, August 1993) (Hilmer Report) p 239.

A.4.2. Overview of the existing access regime

The regime for access to telecommunications services currently consists of the following components:

- competition law (Part XIB of the TPA)
- access to services (Part XIC of the TPA)
- access to facilities (Schedule 1 to the *Telecommunications Act 1997*)
- operational separation (Part 8 of Schedule 1 to the *Telecommunications Act 1997*)
- information provision (Part XIB of the TPA).

An overview of the provisions is set out in chapter 3 of the ACCC's report. In summary, Part XIC of the TPA and Schedule 1 to the *Telecommunications Act 1997* are based on the negotiate/arbitrate model:

- Under Part XIC of the TPA, if a service is 'declared' by the ACCC, a provider of that service is required to comply with 'standard access obligations' including an obligation to supply the service to an access seeker (subject to certain exceptions). Failing agreement (and in the absence of an undertaking), the terms and conditions of access are determined by the ACCC acting as arbitrator.
- Under Schedule 1 to the *Telecommunications Act 1997*, carriers are required (as part of their licence conditions) to provide access to certain facilities such as exchanges, pillars, ducts and towers. If the parties are unable to agree upon the terms and conditions upon which the requirement is complied or on the appointment of an arbitrator, the ACCC acts as arbitrator. The ACCC has also made a facilities access code governing access to mobile towers and underground ducts.

For example, a refusal to supply in respect of the NBN could potentially be covered by:

- section 46 in Part IV of the TPA – the penalty (in respect of a body corporate) must not exceed, for each act or omission, the greatest of \$10 million, three times the value of the benefit obtained by the company, or (where the benefit cannot be determined) 10 percent of the annual turnover¹⁹
- section 151AK in Part XIB of the TPA – the penalty (in respect of a body corporate) must not exceed, (where the contravention continued for more than 21 days) the sum of \$31 million and \$3 million for each day in excess of 21 that the contravention continued²⁰
- section 152BB in Part XIC of the TPA – there is no penalty although the Federal Court may order compliance or compensation²¹ (however, a breach of the standard access obligations is also a breach of a carrier licence condition)²²

¹⁹ TPA s 76.

²⁰ TPA s 151BX.

²¹ TPA s 152BB.

- Schedule 1 to the *Telecommunications Act 1997* – the penalty (in respect of a body corporate) for contravening a carrier licence condition must not exceed \$10 million for each contravention.²³

A.4.3. Comparison with other Australian access regimes

The box below compares the current telecommunications access regime with other access regimes in Australia that are administered by the ACCC / Australian Energy Regulator. The key points are:

- A crucial component of micro-economic reform since the 1990s has been the opening up of markets to competition (although Australia Post continues to have a statutory monopoly in respect of certain letter services).
- Airports, electricity networks and gas pipelines are subject to greater ring-fencing (and thus have a greater incentive to provide access) than telecommunications networks and Australia Post.
- Electricity networks, gas pipelines and airports (under the transitional regime at the time of privatisation) are subject to greater ex ante economic regulation (where the terms and conditions of access are set upfront, in contrast to the negotiate/arbitrate model).
- The electricity, gas and transitional airport regimes were developed under the umbrella of Part IIIA of the TPA, but ‘opted out’ of the negotiate/arbitrate model for greater regulatory certainty.

Box 1: Comparison with other Australian access regimes

Airports

The privatisation of Commonwealth airports commenced in 1996 through long-term (99 year) leases for each airport with the successful lessee determined by competitive tendering. The move to privatisation was accompanied by:

- a transitional (5 year) price cap (CPI-X) regime in respect of ‘aeronautical services’ administered by the ACCC
- an access regime which resulted in certain airport services being deemed to be declared services for the purposes of Part IIIA of the TPA
- monitoring of ‘aeronautical related services’, accounting and reporting requirements on airport operators, and quality of service monitoring by the ACCC
- limitations on airline ownership and cross-ownership of certain airports.

At the end of the transitional regime, price caps were removed (except in respect of regional air services at Sydney Airport) and airport services are no longer deemed to be declared under Part IIIA (although the Government has issued Aeronautical

²² TPA s 152AZ and *Telecommunications Act 1997* s 62.

²³ *Telecommunications Act 1997* (Cth) s 570.

Pricing Principles which specify the Government's expectations on pricing behaviour).

Electricity transmission

In respect of transmission services, the *National Electricity Rules* (NER) defines two categories of regulated services: 'prescribed transmission services' and 'negotiated transmission services'. A 'Transmission Network Service Provider' is required to provide these services, upon application by certain persons, on terms and conditions that are consistent with the requirements of the NER. The NER provides for the arbitration of access disputes by a 'commercial arbitrator' appointed by the Australian Energy Regulator (which is part of the ACCC). However, the service provider is also subject to:

- A 'transmission determination' made by the AER (for a period of at least five years) that: includes a 'revenue determination' in respect of 'prescribed transmission services'; and specifies a 'negotiating framework' and 'Negotiated Transmission Service Criteria' to apply to the negotiation of terms and conditions of access to 'negotiated transmission services'. The revenue determination determines the maximum revenue that the TNSP may earn in a regulatory year, which in turn provides the basis for deriving charges. The NER sets out a building block model for deriving the annual revenue requirement.
- Detailed provisions governing connection applications, and the terms and conditions of connection.
- A requirement, subject to certain exceptions, not to act as an electricity generator or retailer.

Gas pipelines

If a gas pipeline is covered and is a fully regulated pipeline, the service provider is, in general, required to submit an access arrangement to the AER for approval. If the AER does not approve the proposal, the AER must make the access arrangement.

The access arrangement (which is usually for a five year period) sets out the terms and conditions of access (including price), which the AER must apply when arbitrating an access dispute. Tariffs are derived from a total revenue requirement which is determined using a building block approach.

Light regulation service providers are required to publish the terms and conditions of access (including price) on their websites, but may also voluntarily submit a 'limited access arrangement' to the AER for approval.

The regime also governs ring-fencing and information provision. In particular, a covered pipeline service provider must not act as a gas producer or retailer, and is subject to restrictions on contracts with associated companies.

Australia Post

Australia Post has a statutory monopoly over the carriage of certain letters (although

the scope of the reserved services has been significantly reduced since 1901). It is also subject to a community service obligation to provide certain letter services at a uniform rate of postage across Australia.

Under Part VIIA of the TPA, Australia Post must notify the ACCC if it proposes to increase the price of a reserved service or the carriage within Australia of registered publications. The Minister may also disapprove changes to the rates of postage for the carriage within Australia of standard postal articles by ordinary post.

Under the *Australian Postal Corporation Act 1989* (Cth) (APC Act), a person who requests a 'bulk interconnection service' from Australia Post is able to notify the ACCC of a dispute. After conducting an inquiry, the ACCC must provide a report to the Minister who may then direct Australia Post to act in accordance with a recommendation in the report.

The APC Act also provides for the ACCC to require Australia Post to keep certain records, including to identify any cross-subsidies between Australia Post's reserved services and the services that it provided in competition with other businesses.

A.4.4. Is the current operational separation framework effective?

The effectiveness of the operational separation framework that currently applies to Telstra is discussed in Appendix F. In summary:

- Since coming into effect in June 2006, the operational separation arrangements that apply to Telstra have failed to achieve equivalence.
- Experience suggests that the most effective means of ensuring equivalence (and promoting competition in related markets) is to impose a statutory restriction that prevents the infrastructure provider (and related entities) from being involved in a related business (see, for example, the *Airports Act 1996*). Other forms of ring-fencing (such as business, operational or accounting separation) do not necessarily eliminate the incentive to discriminate against access seekers.

A.4.5. Performance of the negotiate/arbitrate model

In the ACCC's experience, the declare/negotiate/arbitrate model of access regulation has been less effective in promoting competition in related markets where the access provider is vertically integrated.

An economy-wide negotiate/arbitrate model for access regulation was first proposed in 1993 by the Independent Committee of Inquiry chaired by Professor Hilmer. The Committee considered that general competition law was not sufficient to resolve access issues.²⁴ The negotiate/arbitrate model was intended to be less interventionist than regulated outcomes and to 'facilitate the evolution of more market-oriented solutions over time'.²⁵

²⁴ The Committee noted the limitations of section 46 of the TPA for access seekers: Hilmer Report pp 242-245.

²⁵ Hilmer Report p 255.

However, the likelihood of parties reaching a negotiated outcome depends principally upon the extent to which the access provider has market power and is vertically integrated. Other determinants include:

- The credibility and extent of the threat (the backstop) if the negotiation fails. Negotiated access is more likely to occur where the regulatory threat is perceived as credible.
- Incomplete information (when at least one party possesses relevant information that the other party does not, whether this is asymmetric or symmetric to both players). This introduces incentives for strategic behaviour and may result in an inefficient bargaining outcome.
- The number of industry participants and the complexity of the issues. Bargaining where there are more than two players or multiple issues introduces the possibility of delay and an inefficient outcome.

The telecommunications industry to date has displayed the following characteristics (particularly in respect of the fixed line customer access network (CAN)):

- Telstra is a vertically integrated operator supplying its downstream competitors with wholesale inputs.
- Telstra (as a vertically integrated operator) holds relevant information about its facilities, services and efficient costs, to which access seekers do not have general or uninhibited access.
- There are multiple issues and multiple players all simultaneously negotiating access to services.

These characteristics suggest that it is less likely that the negotiate/arbitrate model would achieve its aim of market-negotiated outcomes. This is borne out by experience. As at 1 January 2008, 115 telecommunications access disputes had been notified since the commencement of the regime in 1997. This can be contrasted to three access disputes that have been notified in other sectors (in respect of: a gas transmission pipeline; Sydney airport; and a sewerage service).

The Australian Competition Tribunal (Tribunal) recently described Part XIC as a:²⁶

drawn out process by which terms of access, including price, are agreed. ...
[E]xperience shows that there are many disputes that take considerable time to resolve and, when legal issues arise, the parties can end up in court.

In the ACCC's experience, an access provider that has significant market power²⁷ and is vertically integrated can use Part XIC to delay the implementation of efficient prices by:

²⁶ *Applications by Chime Communications for review of an exemption order made by the ACCC in respect of Telstra's local call service and wholesale line rental service* [2008] ACompT [court identifier not yet available] (22 December 2008) at [23].

- introducing serial undertakings that are unlikely to be accepted by the ACCC
- negotiating industry-wide issues on a bilateral basis
- challenging procedural matters and seeking merits and judicial review.

Each of these issues is discussed below.

(1) Introducing serial undertakings that are unlikely to be accepted by the ACCC

Part XIC enables providers to submit voluntarily access undertakings to the ACCC which set out the terms and conditions on which the provider will provide access to their infrastructure services. There are two types of access undertakings:

- ordinary access undertakings (which are submitted in respect of declared services that are currently supplied – ie. active declared services)²⁸ and
- special access undertakings (which are submitted in respect of services not yet declared or not yet supplied).²⁹

There is no requirement for an access provider to submit an undertaking. If an access provider decides to submit an undertaking and the ACCC (or the Tribunal on review) decides that the undertaking is not reasonable, the ACCC/Tribunal cannot impose a revised undertaking (in contrast to the *ex ante* regimes that currently apply to electricity networks and gas pipelines).

Even if an undertaking is accepted by the ACCC, the access provider has the option of unilaterally revoking the undertaking.³⁰

The intention of allowing for voluntary access undertakings was to provide an opportunity for increased regulatory certainty to access providers. However, if an access provider has market power and is vertically integrated, the incentive under the current regime is to delay an arbitration by submitting a series of undertakings that are unacceptable.

The assessment of an undertaking is a highly resource-intensive and time-consuming process (particularly where the decision is appealed to the Tribunal). It involves multiple complex issues, volumes of submissions and other materials, and costly legal and economic expert advice. The undertaking process creates uncertainty in the market and diverts the resources of the ACCC and access seekers away from other tasks (in particular, arbitral determinations). However, at the end of this process, no parameters are locked in, and access seekers still have not obtained access on reasonable terms and conditions.

²⁷ Where around 71 per cent of fixed-voice access lines are supplied directly by Telstra's retail business: ACMA, *Communications report 2006–07*, p 74.

²⁸ TPA s 152BS.

²⁹ TPA s 152CBA.

³⁰ TPA ss 152CA and 152CBI. In contrast, undertakings accepted by the ACCC under Part IIIA of the TPA can only be withdrawn with the ACCC's consent: TPA s 44ZZA(7).

The next time the access provider submits an undertaking, the process starts again. The access provider is able to submit a substantially different approach or inputs (for example, substantially different implied values were generated by Telstra's PIE II and TEA models for the same assets), thereby requiring additional, time consuming assessment.

Lodging of an undertaking allows the access provider to argue that an arbitration (or arbitrations) should be suspended whilst the undertaking is assessed.³¹ In the event that an access dispute is notified by an access seeker, there is an incentive for an access provider to immediately lodge an undertaking – no matter how unsuitable. If it appears that the undertaking will not be accepted (for example, based on the ACCC's draft decision), the access provider can withdraw its undertaking and submit a revised version. This necessitates a re-start of the ACCC's assessment process. Any final decision by the ACCC not to accept an undertaking can then be appealed to the Tribunal, thereby delaying the process further.

An interim arbitration determination may be made and arbitrated pricing decisions can be backdated. However, retail prices will tend to reflect the prevailing prices where access prices remain higher than efficient levels during the course of the access dispute, or (where an interim determination has been made) there is a risk that the interim price may be subsequently increased. Consequently, end-users of telecommunications services will not face efficient prices over that time and will have their consumption decisions distorted. This reduces welfare across society more broadly.

(2) Negotiating industry-wide issues on a bilateral basis

Under Part XIC, if there is no agreement or undertaking, the terms and conditions of access are determined by arbitration by the ACCC. The bilateral nature of an arbitration creates a significant difficulty in that the ACCC can never finally determine prices, terms and conditions to apply across the industry and must arbitrate essentially the same access dispute each time a new dispute is notified (unless all disputes are simultaneously notified so that a joint hearing may be conducted).

The ACCC may make pricing principles and model terms.³² However, as the principles cannot be 'locked-in', each arbitration still creates a significant amount of duplication and delay for industry participants and the ACCC.

(3) Challenging procedural matters and seeking merits and judicial review

Access providers may also delay the implementation of reasonable prices by challenging the procedural steps throughout the course of an arbitration (eg. validity of notification, confidentiality arrangements to apply, specific claims of confidentiality, conduct of joint hearings, process for making a final determination, negotiation directions). There is also scope for late submissions which has resulted in considerable delays in almost all arbitrations.

Over the past 18 month period, judicial review has been sought in respect of almost all final arbitration determinations made by the ACCC.³³

³¹ See TPA s 152CLA(4).

³² TPA ss 152AQA and 152AQB.

The arrangements in respect of access under Schedule 1 of the *Telecommunications Act 1997* have not been tested to any great extent.³⁴ However, there is potential for significant delay as:

- the arbitration regime does not incorporate the amendments that have been made to Part XIC
- the Facilities Access Code contains a number of steps that provide potential scope for disputation
- Schedule 1 (including the Facilities Access Code) is enforced as a licence condition. Establishing a breach of a licence condition in the Federal Court is potentially a protracted process, which can stall the entrance of a competitor
- the ambiguous definitions in Schedule 1 and the existence of two separate legal frameworks creates disputes over which regime imposes the relevant obligation on the access provider.

A.4.6. Implications for the design of a NBN access regime

In summary, the appropriate access regime for the NBN will depend upon the extent to which the NBN provider has market power (either as a natural monopoly or through statutory barriers to competition) and is vertically integrated.

The alternative forms of ring-fencing for an NBN provider are discussed in Appendix F.

However, any regulatory framework also needs to incorporate the following features.

First, the regime should be able to accommodate changing circumstances. For example, the regime should allow regulation to be removed if the NBN ceases to be a bottleneck, and provide for a review of the regime after a certain period of operation (such as five years).

Secondly, the regime should be clearly defined before investment occurs. In *Telstra v Commonwealth* [2008] HCA 7, the High Court held that Part XIC was not an acquisition of property as Telstra had never owned any assets accept in accordance with legislation that created a statutory access regime.

Thirdly, the regime should provide regulatory certainty (and thus reduce price and investment risk) for both the NBN provider and access seekers. The price that an NBN provider will be allowed to charge its customers is a significant determinant of profitability and ability to finance the project. However, it is also important that access seekers have sufficient certainty in order for them to make efficient investment decisions in respect to downstream markets.

³³ As at 13 October 2008, there were 18 final determinations before the Federal Court, challenging the determinations on judicial review grounds.

³⁴ Only one dispute has been notified to the ACCC. In 2007, Telstra notified a dispute in respect of the access charges for access to an Optus tower. the dispute was settled by the parties and withdrawn before substantive issues had been considered by the ACCC.

Fourthly, where both the access provider and terms and conditions of access are to be determined through a competitive tender process for government sponsored infrastructure, then it may be possible to establish access prices through that tender process. This is because any monopoly rents from the infrastructure are more likely to be dissipated. However, this requires particular conditions to be satisfied including that the bidders have accurate information, comparable skills, and substantial financial resources.³⁵ The current stage of the NBN process in isolation is not sufficient to satisfy these conditions.

Fifthly, the regime should include appropriate incentives for compliance. In particular, the penalties for non-compliance should be sufficient to act as an effective deterrent.

A.5. Access regime: Vertically separated NBN provider

This section discusses the design of an access regime for the NBN in the event that the NBN provider is vertically separated.

Full structural separation prohibits a bottleneck provider from operating in potentially competitive segments, thereby eliminating the incentive to discriminate between access seekers. Access regulation is needed only to curtail the use of market power, generally through some measure of constraint on pricing with reference to underlying costs.

If a Proponent proposes a statutory restriction on vertical integration, then the declare/negotiate/arbitrate access regime in Part XIC provides an appropriate starting framework for the regulation of wholesale access to the NBN. However, changes could be made to:

- provide greater regulatory certainty (and thus reduce price and investment risk) for the NBN provider and access seekers (this issue is further discussed below)
- ensure that the regime governing access to facilities in Schedule 1 of the *Telecommunications Act 1997* is incorporated into Part XIC of the TPA (this issue is discussed in section A4.5 above).

A.5.1. Existing mechanisms for regulatory certainty

The current provisions of Part XIC enable regulatory settings to be determined in advance of any new investment being made in telecommunications infrastructure. The *Telecommunications Competition Act 2002* amended Part XIC to give the ACCC the power to:

- grant anticipatory exemptions from the standard access obligations for carriers and carriage service providers that expect to supply a service (s 152ATA)
- accept special access undertakings from carriers and carriage service providers that expect to supply a service (s 152CBC).

The ACCC must ultimately be satisfied that granting an exemption is in the long-term interests of end-users or that the special access undertaking is reasonable.

³⁵ See Armstrong, M and Sappington, D, 'Regulation, Competition and Liberalization' (June 2006) 44(2) *Journal of Economic Literature* 325 at 343.

The use of these mechanisms to obtain investment certainty was canvassed by both Telstra and FANOC (commonly referred to as the G9) in previous FTTN proposals.

Box 2: Use of exemptions and special access undertakings in previous fibre proposals

Note: The following highlighted information is commercial-in-confidence (voluntary information)

Telstra's FTTN proposal of 2006

Telstra, in its preliminary negotiations with the ACCC regarding its proposed FTTN network in five capital cities (Sydney, Melbourne, Brisbane, Adelaide and Perth), indicated that it intended to lodge exemptions with the ACCC for:

- An ordinary individual exemption from the obligation to supply all currently declared services (except PSTN terminating access service and the Mobile Terminating Access Service) within the FTTN footprint for 10 years from the date of completion of the FTTN. Telstra proposed that the exemption would apply:
 - for all declared services except the ULLS and LSS – on an exchange by exchange basis from the date on which an exchange was fibre-enabled
 - for ULLS and LSS – on a line-by-line basis from the date on which the relevant end-user line was equipped by Telstra to supply the High Speed Access Service (essentially a bitstream service).
- An anticipatory individual exemption in relation to all services within the FTTN footprint other than the proposed High Speed Access Service and any future FTTN Terminating Access Service.

Telstra proposed to lodge a special access undertaking in respect of the High Speed Access Service at the same time as the exemption, for the supply of a full wholesale broadband service of up to 24 Mbps with wholesale voice and an entry-level service of 2 Mbps with voice at access prices of \$90-120 per month and \$64-68 per month, respectively. (These prices were derived using a hybrid valuation of assets cost model which was the subject of considerable discussion and iterations).

FANOC (G9) FTTN Special Access Undertaking

On 20 April 2007, the G9 lodged a draft special access undertaking (SAU) with the ACCC. This was followed on 30 May 2007 by FANOC (a company created by the G9) lodging a 15 year SAU with the ACCC for third party access to a bitstream access service on a proposed ADSL2+ fibre-to-the-node (FTTN) network in the five mainland capital cities, and then progressively to densely populated regional centres.

FANOC proposed to offer a wholesale 'Broadband Access Service' (BAS) to access seekers. Initially, it proposed to offer five different BAS products, including a stand-alone telephone access service and four bitstream services that may be used to provide voice and broadband services of varying theoretical peak speeds.

FANOC proposed specific prices for these five services for the first three years and a methodology for calculating annual access prices after the initial access period of three years rather than a price list. The prices proposed were:

Table 1 FANOC SAU Access Prices

Service	Basic service charge [\$ /month]	Sub-loop [\$ /month]	Broadband component [\$ /month]	Total * [\$ /month]
Basic telephone access service	10	5 – 15		15 – 25
Standard broadband service + 1.5Mbps	10	5 – 15	4.23	19 – 29
Standard broadband service + 6Mbps	10	5 – 15	8.46	23 – 33
Standard Broadband service + 12Mbps	10	5 – 15	16.92	32 – 42
Standard broadband service + 24Mbps	10	5 – 15	25.38	40 – 50

* Figures are rounded for ease of interpretation

Source: FANOC, Submission to the ACCC, 30 May 2007, pp 6-7.

On 10 March 2008, following the release of the ACCC's draft decision, FANOC advised that it was withdrawing the proposed SAU. Further details on the FANOC SAU can be found in the ACCC's Assessment of FANOC's Special Access Undertaking in relation to the Broadband Access Service, Draft Decision, December 2007 and on the ACCC's website at: <http://www.accc.gov.au/content/index.phtml?itemId=788471>.

Broadly, the ACCC's view is that these mechanisms are effective and flexible in fulfilling the objective of providing certainty before investment decisions are made. However, the FANOC SAU highlighted the following limitations of the undertaking process:

- the ACCC is unable to accept an undertaking subject to conditions
- access providers are limited in their ability to provide, in an undertaking, for the ACCC to perform functions and powers.

Each of these issues is discussed below.

(1) ACCC is unable to accept an undertaking subject to conditions

The ACCC may only accept or reject an undertaking. An undertaking cannot be accepted subject to conditions. In respect of the FANOC SAU, the ACCC, in its draft decision, found that ‘the G9’s prices for the initial three year period of up to \$29 to \$50 per month (depending on the speed offered) may be within the reasonable range of prices for this type of service and network’ and that the pricing approach was generally acceptable. However, the ACCC found that it would be unable to accept the undertaking as the ‘undertaking gave the network owner a high degree of discretion in unilaterally determining non-price terms and conditions for the 15 year undertaking period, without independent regulatory review’. The ability to accept an undertaking subject to conditions would facilitate acceptance of undertakings, and thus investment in infrastructure (in the case of a special access undertaking) or timely access to existing infrastructure (in the case of an ordinary undertaking).

(2) Access providers are limited in their ability to provide, in an undertaking, for the ACCC to perform functions and powers

The FANOC SAU sought to confer a number of functions on the ACCC including: monitoring and approving changes to prices under the undertaking; approving changes to the services supplied under the undertaking; and arbitrating disputes between the separate entities that would respectively own and manage the FTTN that FANOC proposed to invest in.

However, in contrast to Part IIIA of the TPA,³⁶ Part XIC does not provide for the ACCC to perform functions or powers proposed in an undertaking. The ACCC considered that it did not have the power to carry out the functions proposed in the FANOC SAU.

A.5.2. Providing regulatory certainty for the NBN

The exemption and SAU mechanisms could be utilised in respect of the NBN to provide regulatory certainty (and thus reduce price and investment risk) for the Proponent. However, a possible issue is how the exemption and SAU assessment process interacts with the Commonwealth’s NBN process. Possible approaches to address this include:

- Requiring a Proponent to have a SAU and/or exemption application in respect of services supplied on the NBN accepted by the ACCC before the Commonwealth accepts the Proposal.
- Deeming prescribed NBN services to be declared services for the purposes of Part XIC. A deeming process was used in the transition from the managed competition approach under the *Telecommunications Act 1991* to the more open competition approach under the 1997 regime.³⁷ (The issues around the appropriate

³⁶ See TPA s 44ZZA(6A).

³⁷ In particular, section 39 of the *Telecommunications (Transitional Provisions and Consequential Amendments) Act 1997* required the ACCC to prepare a statement, in consultation with AUSTEL (then the regulator responsible for technical and competition regulation in telecommunications markets), deeming certain services as declared services with effect from 1 July 1997. The deeming process was intended to achieve a smooth introduction of the new telecommunications access regime by essentially retaining existing access rights for carriers, extending those rights to existing service providers and new entrants and providing access to the carriage of broadcasting services over cable networks.

services to regulate and the descriptions that should be used are considered in more detail in Appendix G of this report.)

- Amending Part XIC to allow the ACCC to prescribe (or ‘lock-in’) methodologies, values of certain inputs (such as the value of the assets, or the rate of return) or other terms or conditions to be used by the ACCC in any undertakings or arbitrations in respect of the NBN.

A.6. Access regime: Vertically integrated NBN provider

This section discusses the design of an access regime for the NBN in the event that the NBN provider is vertically integrated.

If the NBN provider (or a related entity) also competes in potentially competitive related markets, it has the incentive to discriminate between access seekers in order to inhibit retail competition. In this case, a Proposal that proposes an ex ante access regime (where the terms and conditions of access are set upfront) is more likely to promote competition in related markets than the ex post regime in Part XIC.

This could be achieved by amending Part XIC in order to:

- deem prescribed NBN services to be declared services
- require the NBN provider to submit an undertaking(s) in respect of those services
- provide for the ACCC (or Tribunal on review), in the event that the undertaking(s) is not accepted, to impose an undertaking (similar to the power to make an arbitration determination, except that the undertaking would apply to all access seekers)
- prevent the NBN provider from unilaterally withdrawing the undertaking without the consent of the ACCC.

Part XIC could be amended to prescribe the values of certain inputs to be used in the undertaking.

Such a model would be no more interventionist than the arbitration procedures that have applied to date, but would introduce a far less complex and resource intensive regime for the NBN, and would provide significantly less opportunity for delay and gaming.

Appendix B. Valuing the sunk network

B.1. Executive Summary

- Infrastructure is regarded as ‘sunk’ if it cannot be redeployed to an alternative use. The opportunity cost of such infrastructure — the amount lost by not using the infrastructure in its best alternative use — is therefore low, or zero. However, the owner of the infrastructure will value it in terms of the value of the future cash flows the infrastructure is expected to generate. For an unregulated monopolist, this value reflects the cash flows earned from monopoly pricing.
- Economic theory suggests that a sunk asset’s value should be its scrap value (that is, its value in its best alternative use, which, by definition, is its scrap value). Prices based on this asset value would lead to static (allocative and productive) efficiency. However, valuing the assets at scrap would not encourage asset owners to replace them in the future, whereas a higher value may be more likely to. Hence, there is a trade-off between static efficiencies and creating investment incentives over the long term. The choice of which value to attribute to sunk assets (within the range of scrap value to a value that reflects monopoly cash flows) is effectively arbitrary.
- Usually, bottleneck infrastructure providers subject to cost-based regulation can also attribute a value higher than scrap value to their sunk assets, despite the opportunity cost of these specialised assets being very low. The value attributed is typically established with reference to the costs of investing in the infrastructure. The infrastructure provider is therefore able to recover the costs of past infrastructure investment, and may be more willing to invest in the future.
- The value attached to existing sunk assets to be used as part of the NBN will be a significant input to access and end user prices. Other considerations that will affect access prices, and their path over time, include:
 - the regulated cost of capital (discussed in chapter 2);
 - levels of operational and maintenance expenditure and how these change over time;
 - how and when the value of existing sunk assets will be recovered – over what time period, and from which services in what proportions;
 - how *future* capital investment expenditures are to be reflected in access prices; and
 - the amount of flexibility afforded to the NBN operator in determining access prices for itself, and any constraints imposed on that flexibility (eg. ‘cost reflective access prices’) (discussed in chapter 3).
- It is not possible to advise, from only an examination of different sunk network values, the effects on access and end user prices resulting from alternative values. The net impact on prices following the NBN upgrade will flow from the choices made by Proponents in relation to all of the above considerations.
- Elements of Telstra’s Customer Access Network (CAN) can be considered to be sunk. For example, ducts and pipes cannot practically be dug up and reused for another purpose, and the trenching work undertaken to run these ducts and pipes cannot be sold on. With the National Broadband Network (NBN) upgrade, it is prudent to consider what value should be attributed to these assets, because they will continue to be used on the upgraded network.

- So long as the approach to treating future NBN investment is clearly defined, how *existing* sunk assets are treated will have little implication for investment signals going forward. The value that is attributed to existing sunk assets represents a windfall gain or loss to Telstra, as the current owner of these assets, whether the value is rolled into their asset base, or whether they receive compensation for the sale of these assets if another Proponent is awarded the tender.
- However, each of the different approaches that can be used to value CAN investment going forward have different effects on cost-recovery, investment and end-user prices. Therefore, when considering which approach to use for new CAN investment, it is important that it is consistent with the specific objective of the regulatory regime that will apply to the NBN.
- There are two broad approaches to valuing sunk assets — ‘value-based’ and ‘cost-based’ approaches. Value-based approaches are sometimes argued to increase investment, but this would be at the expense of the allocative and productive efficiencies that cost-based approaches aim to achieve. The starting point for a value-based approach would be the CAN’s future revenue stream. This revenue stream would be determined by Telstra’s unregulated as well as regulated service provision. Hence to some extent (assuming the CAN continues to be subject to cost-based regulation), its future revenue stream is influenced by cost-based regulation. A value-based approach would therefore partly generate a circular value. Cost-based approaches typically use efficient investment costs as a benchmark, and are preferred by regulatory agencies in most jurisdictions and industries.
- There are several cost-based approaches that could be used — historic/actual costs, depreciated historic costs, current replacement costs, depreciated current replacement costs, optimised replacement costs and depreciated optimised replacement costs. Broadly, replacement cost approaches offer a ‘forward looking’ perspective, whilst historic costs have a ‘backward looking’ perspective. At the point in time at which an investment takes place, each approach should derive the same value.
- The forward looking perspective:
 - is argued to reflect the outcomes that would occur in perfectly contestable markets — it therefore aims to create investment and use (build-or-buy) signals, and promote productive and allocative efficiency.
 - creates uncertainty over whether the access provider will over- or under-recover the costs of their investment, because the asset’s value is recalculated/revalued at intervals shorter than the period over which the costs of the asset are recovered. This may deter future investment if the infrastructure provider believes they will not be able to recover their investment costs, or encourage over-investment if they believe they are able to earn a return above their costs.
 - is used to value the CAN in the current regulatory regime. This was based on the view that, in an environment of rapidly changing technology, and therefore falling costs of providing telecommunications services, basing access prices on historic costs would inefficiently encourage access seekers to build their own infrastructure to bypass the access provider’s.
 - is only appropriate if the benefits of revaluation exceed the costs. Revaluation adds a ‘risk cost’ that is only justifiable if the corresponding benefits — the prevention of inefficient bypass — outweigh it. If inefficient bypass is thought unlikely going forward, it would seem that revaluation is no longer justified.

- The backward looking perspective (historic/actual costs):
 - provides more certainty with regard to investment cost recovery.
 - doesn't aim to create the build-or-buy signals that a perfectly contestable market would.
 - may not lead to productive and allocative efficiency (though neither do forward looking costs).
 - suggests that at this point in time, based on information on historic costs provided by Telstra to the ACCC under the Regulatory Accounting Framework (RAF) reporting requirements, the gross historic cost value of the CAN is around \$17 billion {RKR CiC} and the depreciated historic cost value is around \$8 billion {RKR CiC}.
- The approach used to value the CAN cannot be considered in isolation of the pricing model that will apply to the NBN. In theory, a TSLRIC pricing model could be applied using either a backward or a forward looking approach to asset valuation. Likewise, other pricing models, such as the Building Block Model used by the Australian Energy Regulator in the gas and electricity industries, could also be applied using either a backward or a forward looking approach to asset valuation.
- A number of features of the forward looking pricing framework create uncertainty as to whether investment costs will be over- or under-recovered. These features include:
 - The assumption that a new network is built at each pricing determination (that is, valuing the CAN at optimised replacement cost, rather than depreciated optimised replacement cost at each pricing determination). In line with the ACCC's conservative approach to telecommunications access pricing, the current application of optimised replacement costs means that the past decline in the CAN's value has never been (and never is) taken into account. As the above information suggests, it appears that just over half {RKR CiC} of the historic cost of CAN assets has been paid off by users. Because these recovered costs are *never* taken into account, the period over which Telstra is able to recover its investment costs on these assets is, in effect, never-ending. This is in contrast to the approach adopted in the energy industry, where at the commencement of the regulatory regime, the regulated bundle of assets was valued at their *depreciated* optimised replacement cost, and the proportion of costs recovered in each regulatory period is taken into account in subsequent regulatory periods.
 - The subjectivity involved in estimating optimised replacement costs using bottom-up cost models. Estimates of optimised replacement costs have varied widely because the output of any bottom-up cost model relies on how the large range of inputs to the model are manipulated. In this regard, the asset values presented in this appendix that are produced by the TEA model relate only to services located in Band 2 areas. These represent around two thirds {RKR CiC} of the total services in operation throughout the country, and cover around 0.2 per cent {RKR CiC} of the geographic territory (in square kilometres) covered by the CAN. As such, the optimised replacement costs that the TEA model estimates for all four ULLS bands will be a lot higher than the \$20.7 billion {ACCC CiC} figure presented for Band 2 in this appendix. The PIE II model produces an optimised replacement cost for all four bands of around \$33 billion {ACCC CiC}.

- Choices surrounding technology deployment on the optimised network. The optimised replacement cost of the CAN has most recently been estimated in the context of it being infrastructure that is used to provide the ULLS. Because this service is defined as being provisioned over unconditioned copper facilities, it has been assumed that the network is comprised of unconditioned copper facilities. Fibre has not been assumed to be deployed, because the access service provided over fibre (bitstream) is different to the ULLS. When estimating the optimised replacement cost of the CAN in the context of it being infrastructure that is used to provide a generic access service however, the technology assumed to be deployed should arguably be fibre. To the extent that fibre cable provides additional functionality to copper cable, the cost of fibre cable (which is already likely to be lower than copper cable) would be adjusted downwards.
- Alternative pricing models, such as the AER's current application of the Building Block Model, can over time reduce a number of the aforementioned uncertainties associated with the current application of forward looking costs in telecommunications.
 - With such a 'set-and-forget' pricing model, an opening asset value/base is established. At subsequent pricing determinations, the CAN's value would be rolled forward from the previous pricing determination, less the investment costs that were recovered (depreciation) and plus any capital expenditure (at actual cost) that occurred since the last pricing determination.
 - The AER is currently moving towards a system whereby forecast capital expenditure will be approved as being reasonable at the start of the regulatory period for the duration of that period. This is aimed at improving investment certainty, and may act as a check on the efficiency of investment.
- If a set-and-forget approach is considered desirable for the NBN, it is likely that:
 - a policy or regulatory decision will need to be made about the level of the opening asset base; and
 - this will need to be 'locked in' contractually between Government and the NBN provider and/or through legislative change to the telecommunications access regime to broaden the scope of regulated pricing to encompass the whole NBN facility.
- The chosen level of the opening asset base, and decisions made around the treatment of depreciation and future capital expenditure, would have fundamental consequences for the incentives for a Proponent to accept the opening asset base and incentives to undertake timely and efficient upgrades to the NBN in future.

B.2. Introduction

The capital value of infrastructure may be regarded as ‘sunk’ if the infrastructure cannot be redeployed to an alternative use. That is, once the investment in creating the asset has been made, the outlay cannot be recouped by selling the asset for some other purpose. From an economic perspective, the opportunity cost — the amount lost by not using the asset in its best alternative use — associated with such assets (once the investment has been made) is very low, or zero. The value of such infrastructure to its owner reflects the future cash flows the infrastructure is expected to generate. For an unregulated monopolist, these cash flows will be determined by monopoly prices and output levels. These are precisely the prices and output levels that regulation aims to prevent.

In regulated infrastructure industries, bottleneck infrastructure providers are allowed to include a value for the bundle of sunk assets in their asset base that is above the assets’ opportunity cost, but below the value implied by the revenues the infrastructure would earn if unregulated. Typically, this value is established with reference to the efficient costs of investing in the infrastructure. This value becomes an important component of the regulated access prices that the access provider is permitted to charge.

The aim of attributing a value to sunk assets is to allow the infrastructure provider to recover the costs of their regulated investments, including a normal commercial return. If the regulated infrastructure provider was not allowed to include this component in access prices, it may be unwilling to replace assets when they wear out, which could jeopardise dynamic efficiency and the long run provision of services.

Standard regulatory objectives, both overseas and in other industries, include the promotion of efficient investment in and use of infrastructure. Under the current telecommunications access regime, section 152(AB)(2)(e) of the *Trade Practices Act 1974* (TPA), lists one of the objectives to which the ACCC must have regard in promoting the Long Term Interests of End Users (LTIE) as:

- the objective of encouraging the economically efficient use of, and the economically efficient investment in:
 - the infrastructure by which listed services are supplied; and
 - any other infrastructure by which listed services are, or are likely to become, capable of being supplied.

Furthermore, section 152(AH)(1) of the TPA states that, amongst other things, the criteria against which reasonable terms of access are to be judged include the legitimate business interests of the carrier or carriage service provider concerned, and the carrier’s or provider’s investment in facilities used to supply the declared service concerned.³⁸

³⁸ Section 152(AH)(1) states that in determining whether particular terms and conditions are reasonable, regard must be had to the following matters:

- (a) whether the terms and conditions promote the long-term interests of end-users of carriage services or of services supplied by means of carriage services;

Elements of Telstra's Customer Access Network (CAN) have no alternative use other than to provide access to end users for the supply of telecommunications services. For example, ducts and pipes cannot be dug up and reused for another purpose, and the trenching work undertaken to run these ducts and pipes in cannot be sold on. These network elements are therefore regarded as sunk infrastructure. Not attributing a value to the CAN, and thus potentially jeopardising future investment in the network, would be inconsistent with the current legislative criteria. As such, under the current regime, Telstra charges access prices that cover the full costs associated with providing telecommunications services, including the sunk costs of the infrastructure they have invested in.

In the transition to the National Broadband Network (NBN), if a value is not attributed to sunk CAN assets, investors may no longer expect to be able to recover the funds they have invested in existing CAN assets. When it comes time to replace elements of the CAN that continue to be used on the NBN, they may be unwilling to replace the infrastructure, and the long-run provision of telecommunications services could be jeopardised. Given that capital investment in the CAN does not occur as infrequent 'one offs', but rather occurs on an ongoing basis, continuity of supply could be jeopardised immediately.

However, so long as the approach to treating future NBN investment is clearly defined, how existing sunk assets are treated will have little implication for investment signals going forward. The value that is attributed to existing sunk assets therefore represents a windfall gain or loss to Telstra, as the current owner of these assets, whether the value is rolled into their asset base, or whether they receive compensation for the sale of these assets if another Proponent is awarded the tender.

Given that a high proportion of the costs associated with the telecommunications sector are capital costs, assumptions about the value of the CAN will impact substantially on the average level and path of NBN access prices over time. Indeed, capital costs³⁹ contributed to just over 75 per cent {ACCC CiC} of the access price proposed in Telstra's most recent Unbundled Local Loop Service (ULLS) Undertaking.

This appendix raises a number of issues involved in valuing the CAN. Section B.3 outlines the approaches that can be used. Broadly, these include value-based and cost-based approaches. There are a number of different cost-based approaches, each of which has different outcomes, which the section describes. Section B.4 examines the advantages and disadvantages of the ACCC's current approach to valuing sunk assets in telecommunications; section B.5 the strengths and weaknesses of the approach adopted in other areas of the ACCC, such as the gas and electricity industries. Finally, section B.6 outlines possible ways forward in the NBN context.

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- (b) the legitimate business interests of the carrier or carriage service provider concerned, and the carrier's or provider's investment in facilities used to supply the declared services concerned;
 - (c) the interests of persons who have rights to use the declared service concerned;
 - (d) the direct costs of providing access to the declared service concerned;
 - (e) the operational and technical requirements necessary for the safe and reliable operation of a carriage service, a telecommunications network or a facility;
 - (f) the economically efficient operation of a carriage service, a telecommunications network or a facility.

³⁹ That is, depreciation and a return on capital (proposed by Telstra to be a post tax Weighted Average Cost of Capital of 11.86%). Based on ACCC estimates using the TEA model version 1.2.

B.3. Approaches to asset valuation

There are a number of approaches that can be used to attribute a value to sunk assets. Broadly, cost-based approaches relate the value of the asset to the cost of purchasing or building the asset, whilst value-based approaches determine the value of an asset from its future net income earning capacity.

The most common cost-based approaches include:

- historic cost/actual cost — the original cost of acquiring or building the asset;
- depreciated historic/actual cost (DHC/DAC) — adjusts the historic cost of an asset by the proportion of the asset’s service potential which is assumed to have expired (in an accounting sense, rather than an economic sense);⁴⁰
- current replacement cost — how much it would cost to replace the asset in substantially the same form at today’s prices (current costs may also be depreciated);
- optimised replacement cost (ORC) — values the asset at the cost of replacing it with a modern equivalent available asset (MEA); and
- depreciated optimised replacement cost (DORC/ODRC) — values the asset at the cost of replacing it with an asset that is both a) adjusted for the proportion of the service potential of the existing asset that has expired and b) optimised to provide the required service potential in the most efficient way possible.

Replacement cost approaches are often described as being ‘forward looking’, and historic/actual cost approaches as ‘backward looking’.

When an investment is first made, each of these approaches should arrive at the same value. This is because the firm making the investment will invest in the most up to date technology, and because the asset is undepreciated (at the start of its life). Over time, the optimisation incorporated into optimised replacement cost approaches means that, in theory, they should trend lower than (inflation adjusted) historic costs. This is because optimisation allows historic network inefficiencies to be excluded from the asset base, and technological change allows the same services to be provided at lower cost. In practice however, optimised replacement cost approaches often trend higher than their historic cost counterparts, particularly when asset prices have been rising such that they offset cost savings from optimisation.

Over time therefore, a ‘bundle’ of assets which have been invested in at different points in time will contain some assets for which historic/actual costs, depreciated historic/actual costs, optimised replacement costs and depreciated optimised replacement costs are very similar (if not the same), and some assets for which they may differ a great deal.

⁴⁰ The difference between accounting and economic depreciation is discussed in section 1.4.1.

Value-based approaches differ from cost-based approaches. In its submission to the NBN Expert Panel on regulatory issues, Telstra propose a move away from cost-based regulation for the NBN, and a move towards ‘value-based’ regulation:

“If not cost-based, what should be the approach to the NBN access policy? In Telstra’s view, an NBN-specific access pricing regime needs to be built around three principles:

(a) a shift to access pricing...that considers...investment incentives and pricing for value (we call this a value-based pricing approach to distinguish it from today’s (below) cost approach)...

...the costs of the upstream inputs [to next generation network services] are likely to vary much less than the value that consumers put on the downstream products. In this environment, value-based pricing is justified...Dynamic value — rather than cost reflective — pricing is an efficient means of promoting investment.”⁴¹

‘Dynamic value pricing’ is not a concept recognised in economic literature, and as such, how it would promote investment is unclear. To the extent value based approaches are referred to in economic literature, they include:

- net present value — which values an asset as the present value of the cash flows generated by the asset; and
- net realisable value — which is the price that the asset would achieve in an open market.

There is also a hybrid approach referred to as optimised deprival value (ODV), which is defined as:

$$\text{ODV} = \min(\text{DORC}, \max[\text{NPV}, \text{NRV}])$$

If valuing an asset based on the revenues that are expected to be earned by the asset (a net present value approach), it should be considered that the future revenue stream of the CAN is based on future prices. If these prices are guided by the regulator and based on a cost-based assessment of the CAN’s value, using such a value would be circular. Alternatively, valuing the CAN based on the maximum amount that users are willing to pay for CAN services would effectively mean assuming future expected revenues are determined by monopoly prices. In this case, investment incentives would not be heightened. Rather, this would lead to the traditional monopoly concerns of higher prices and reduced output — that is, reduced investment — that access regulation is aimed at preventing.

Using a net realisable value is also not possible, as the assets are sunk, which, by definition, means there is no open market for them. And in light of the preceding discussion, ODV collapses to DORC, because each of the other approaches is untenable.

⁴¹ Telstra, *Public Submission on the Roll-out and Operation of a National Broadband Network for Australia*, 2008, pp 13—14.

B.4. What approach has the ACCC adopted in telecommunications to date?

In light of the criteria set out by Section 152(AH) of the TPA, the ACCC has generally set prices for fixed line access services based on the Total Service Long Run Incremental Cost (TSLRIC) of providing the service.⁴² TSLRIC is the incremental costs the firm incurs in the long term in providing the particular service, assuming all of its other production activities remain unchanged. It is the cost the firm would avoid in the long term if it ceased to provide the particular access service. In practice, the ACCC has priced services on the TSLRIC+ of providing a service. The '+' incorporates a contribution to fixed costs such as trenching (which arguably were not a cost incurred by the incumbent, and would not be a cost incurred if a new entrant were to build an optimised replacement network today).

The costs of investing in the infrastructure which provides the service (the 'capital costs') are a large proportion of TSLRIC+. The ACCC has considered an optimised replacement cost approach to valuing the CAN to be most consistent with TSLRIC+ access pricing.

Under the existing regime the ACCC's approach at the time of a pricing determination has been to assume that a brand new network is instantaneously constructed at its optimised replacement cost. Of note, in line with the ACCC's conservative approach to telecommunications access pricing, applying this approach since the regime commenced has meant that the past decline the CAN's value has never been taken into account. This is in contrast to the approach adopted in the energy industry (discussed below), where at the commencement of the regulatory regime, the regulated bundle of assets was valued at their *depreciated* optimised replacement cost.

This investment cost is allocated over an assumed CAN asset life to determine annual capital costs (known as annualisation).⁴³ The ACCC uses an annuity approach for annualisation, as it incorporates a return on capital as well as a return of capital (depreciation). Also, annuity approaches generate access prices that are unrelated to the age of the underlying infrastructure. This is necessary due to the assumption that a new network is built at each pricing determination. Annual capital costs are then added to other relevant cost categories (for example, operations and maintenance expenditure) to determine an access price for that pricing determination. At subsequent pricing determinations (which under the current regulatory framework can, at the access provider's discretion, occur even more frequently than annually), the process is repeated — a brand new network is assumed to be built, and its investment costs are annualised and added to other relevant costs to determine an access price.

The following sections discuss the strengths and weaknesses of this approach.

⁴² The approach used to price particular services depends on both the approach put forward by the access provider and that approach being assessed as reasonable by the ACCC for that specific service. For example, the unconditioned local loop service and the line sharing service are priced using the TSLRIC approach. A 'retail minus retail costs' approach has been used for pricing the wholesale line rental and local carriage services. Benchmarking approaches have also been used, particularly for the mobile terminating access service.

⁴³ In practice, the cost of investing in each individual element of the CAN is allocated over that element's assumed asset life and then summed across all elements to arrive at a total annual capital cost.

B.4.1. The strengths and weaknesses of using forward looking costs

The ACCC has valued the CAN at optimised replacement cost for TSLRIC+ access pricing because it was thought that estimating TSLRIC+ requires assets to be valued at their economic cost.⁴⁴ The forward looking nature of optimised replacement costs is argued to better capture economic costs than either backward looking historic costs or current costs.⁴⁵

This is because they reflect the ongoing efficient costs of providing a service, which is no more than a firm could expect to recover in a contestable market. (In practice however, the ACCC has been conservative in its approach, and has based prices on the costs of building a replacement network, as opposed to the ongoing costs to the incumbent of providing services.) Prices based on this standard are therefore thought to reflect the ‘build-or-buy’ signals that would be created in a contestable market. This was thought to be important, because, when the regime began, there was believed to be the prospect of inefficient bypass.

Hence, with regard to historic costs, at the time of developing its access pricing principles for telecommunications, the ACCC assumed that rapid advances in telecommunications technology would mean that:

“...historically incurred expenditures have little relationship with (and generally overstate) the true economic costs of replicating an asset’s service potential. As such, it will often inflate the access price and encourage inefficient by-pass.”⁴⁶

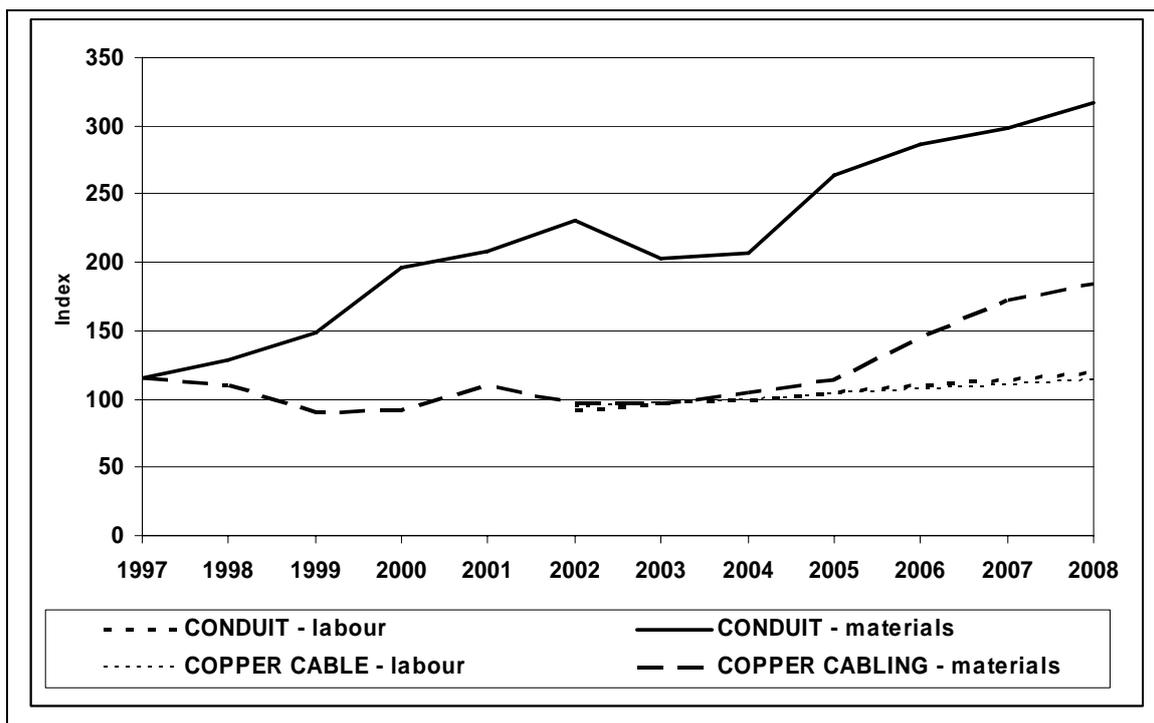
However, as chart 1 shows, the costs of replacing the components of the CAN that make up the largest proportion of replacement costs (copper cables and ducts and pipes) have *increased*, rather than decreased as was assumed would occur when the regime began. Information on current costs provided by Telstra to the ACCC under the Regulatory Accounting Framework (RAF) reporting requirements suggests that the current replacement cost of the CAN increased by **23 per cent {RKR CiC}** over the period 2004-05 to 2007-08. (Issues with this current cost data are discussed in section B.6.2).

⁴⁴ Gans and King argue that TSLRIC can be estimated using either a forward or a backward looking perspective. They quote the Centre for Research in Network Economics and Communications: “Because the practise is so widespread, it is often implicitly assumed that TSLRIC pricing must always be based on an optimised model of the network, and valued at replacement cost of modern equivalent assets. This is not correct, however. It would, for example, be possible to construct TSLRIC prices for a real rather than a notional network valued at historic rather than replacement cost.” Centre for Research in Network Economics and Communications, *The Estimation of Telecommunication Service Costs Using TSLRIC: A Draft of a Report for the Ministry of Economic Development*, University of Auckland, May 2001, para. 7, cited in Gans and King, ‘Regulating Interconnection Pricing’, in A. Grant (ed.), *Australian Telecommunications Regulation*, 3rd ed., 2004, pp 55—85.

⁴⁵ ACCC, *Access Pricing Principles in Telecommunications — A Guide*, 1997, p. 41.

⁴⁶ *Ibid.*, p. 43.

Chart 1 Copper cable and conduit labour and materials price trends.⁴⁷



Note: Base for: materials price index = 1989-90; labour price index = 2004.

The assumption that a competitor would be likely to build a competing CAN, and therefore that the market is potentially contestable and inefficient bypass a possibility, is thus questionable. There is therefore somewhat of a tension in valuing the CAN using forward looking costs in order to reflect the build-or-buy signals that would occur in a potentially contestable market, when the market is actually not contestable and inefficient bypass unlikely. Indeed, had access prices been based on historic costs, they may have been lower.

In contrast to the ACCC, UK telecommunications regulator, Ofcom, considered that measuring long run incremental costs using variants of optimised replacement cost (either optimised deployment of current technology or optimised deployment of new technology) would be inappropriate.⁴⁸ Rather, Ofcom measures the long run incremental costs of BT's service provision using historic costs for a certain proportion of BT's asset base and current costs for the remainder.

A shift from historic cost accounting (HCA) to current cost accounting (CCA) in 1997 led to an upward revaluation, and over-recovery of investment costs, on BT's pre-1997 asset base. This was premised on the need to promote additional access infrastructure competition, which was thought to be best achieved by basing costs on those of a new entrant. The upward revaluation was anticipated to be counterbalanced by the emergence of strong facilities-based competition. By 2004 this had not emerged, so Ofcom concluded that BT had been earning a return above cost on its pre-1997 assets.

⁴⁷ ABS, 6345.0, 'Labour Price Indexes June 2008', Table 22 (construction & communications services, private and public, excluding bonuses); and ABS 6427.0, 'Producer Price Indexes, September 2008', Table 10, indexes 2562 and 2852.

⁴⁸ Ofcom, *Valuing Copper Access — Final Statement*, 2005.

In 2005, Ofcom split BT's asset base into a pre- and post-1997 asset base to prevent further over-recovery on the pre-1997 assets.⁴⁹

In 2005, Ofcom established a regulatory asset value for BT's pre-1997 assets, set equal to the closing historical cost accounting value for those assets in the 2004-05 financial year. The regulatory asset value is adjusted upwards by a retail price index to ensure it is not eroded by inflation and downwards to account for depreciation. It will therefore gradually 'unwind' as pre-1997 assets are retired and replaced. After this time, Ofcom anticipates that all BT's assets will be treated under a full CCA basis, because "entry signals are still a major consideration."⁵⁰

Although the forward looking perspective aims to reflect more closely the build-or-buy signals that would be sent in a contestable market, the current approach has some weaknesses. These will now be discussed.

The way in which optimised replacement costs have been annualised

Access prices are influenced not only by the level of investment costs, but also by how the investment costs are annualised. Annualisation involves considering how investment costs will be recovered over time, in particular:

- the period of time over which the investment will be recovered — ideally the useful economic life of the asset; and
- the profile of recovery over time — that is, in equal amounts each year, or in greater or lesser amounts in earlier years (front-loading or back-loading respectively).

Different approaches treat these considerations differently. In a regulatory context, the most commonly used are straight line depreciation and annuities. In the past, the ACCC has used an annuity approach in telecommunications, because, as opposed to straight line depreciation:

- annuities simultaneously take into account both depreciation and the return on capital in annualising investment costs; and
- the resulting access prices bear no relationship to the vintage of the underlying infrastructure.

There have been both advantages and disadvantages to using an annuity approach in conjunction with optimised replacement costs under the current regulatory framework and TSLRIC+ pricing model, which are discussed in the following section.

Cost-recovery and annuities

When applied consistently throughout the fixed period over which costs are to be recovered (the 'cost recovery period' — which would ideally be the life of the assets), annuities ensure that the compensation received from annual access charges (in net present value terms) is equal to the initial cost of investing in an asset. However, if an

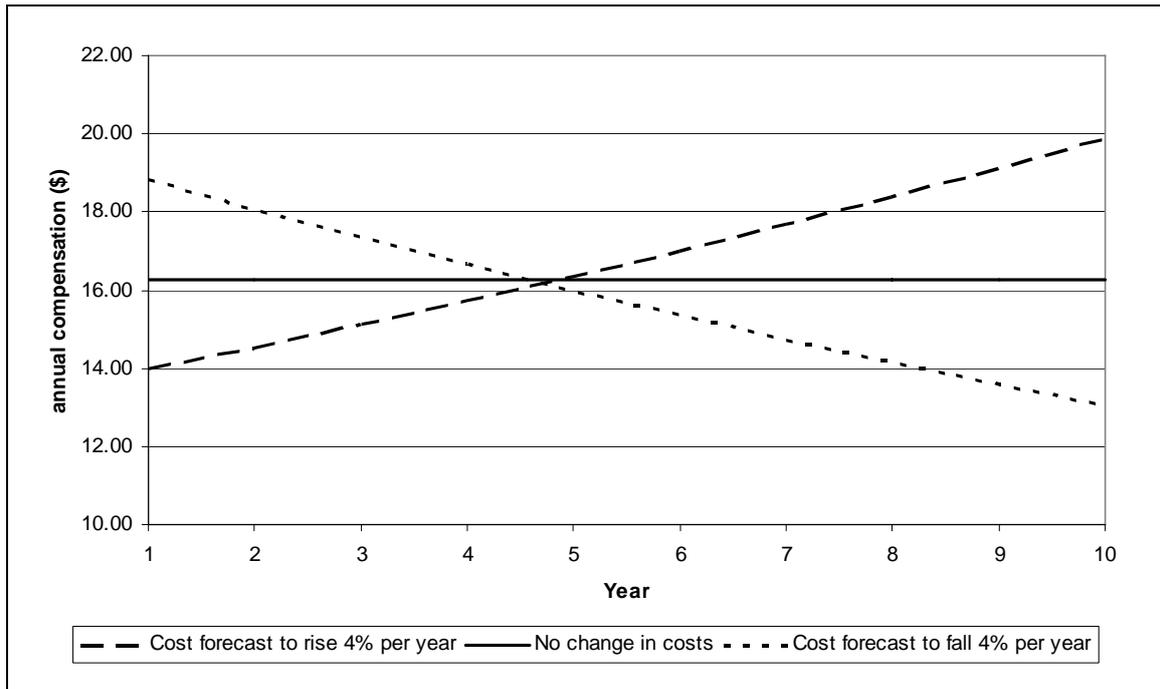
⁴⁹ Ibid., p. 2.

⁵⁰ Ibid.

annuity is not applied consistently throughout the cost-recovery period, cost over- or under-recovery can occur.

There are two broad types of annuities — standard (flat) annuities and tilted annuities. Although the net present value of the compensation each type of annuity allows is the same, the *path* of cost recovery over time differs. Chart 2 shows differences in the cost recovery path under both approaches for an asset with a cost-recovery period of ten years and an investment cost of \$100.

Chart 2 Standard and tilted annuities — annual payments



A standard annuity recovers the investment cost in equal annual sums — in this example of around \$16 per year — over the cost recovery period.⁵¹ In contrast, tilted annuities take into account expected changes in asset prices. If asset prices are expected to fall, the annuity is ‘tilted’ so that more cost-recovery is allowed earlier on in the cost recovery period (front-loading). If asset prices are expected to rise, more cost recovery is allowed later in the cost recovery period (back-loading). As chart 2 shows, the annual compensation (access price) changes over time consistent with changes in the replacement value of the asset. For example, an annuity with a ‘tilt’ of -4 per cent implies that asset prices are expected to fall by 4 per cent for each year of the asset’s life. It provides the same net present value of compensation as a standard annuity (that is, the areas under each curve in chart 1 are the same), but that compensation starts higher and falls by 4 per cent each year. The reverse is true of a positively tilted annuity.

When the ACCC commenced regulating telecommunications assets, there was a general assumption that telecommunications asset prices would fall over time. In light

⁵¹ In the beginning of an asset’s life, this sum will consist of more ‘return on capital’ and less depreciation. Over time, the increase in the depreciation charge exactly counterbalances the decrease in the capital charge, resulting in a constant access price over the period.

of that assumption, the ACCC has accepted a tilted annuity approach. In principle, this addresses the potential for assets to be de-valued at the time of a new price review by allowing front-loading of cost recovery. It also more closely approximates the cost recovery that would occur in a potentially contestable market than other methods of annualisation. In such markets, if asset prices are falling, later entrants should always be able to undercut the incumbent. The incumbent would therefore only invest if they could recover a higher proportion of costs in early periods, since they know they will have less cost recovery in the later periods.⁵² Conversely, where asset prices are rising, later entrants will not be able to undercut the incumbent, rather, they will only be able to enter at a higher price. All else being equal, a current incumbent could therefore compete by lowering its retail prices now, knowing that it can get greater cost recovery later.⁵³ In practice, despite rising replacement costs, Telstra has not sought to compete in this manner, perhaps highlighting the aggressive price competition (or threat of) that would be required for an incumbent to lower its prices now. One analyst report suggests that the average price discount required before a consumer will consider changing a fixed line Telco provider is 27 per cent.⁵⁴ If correct, this provides Telstra with a 25 — 30 per cent price premium, suggesting price competition in the fixed line retail market is not particularly aggressive.

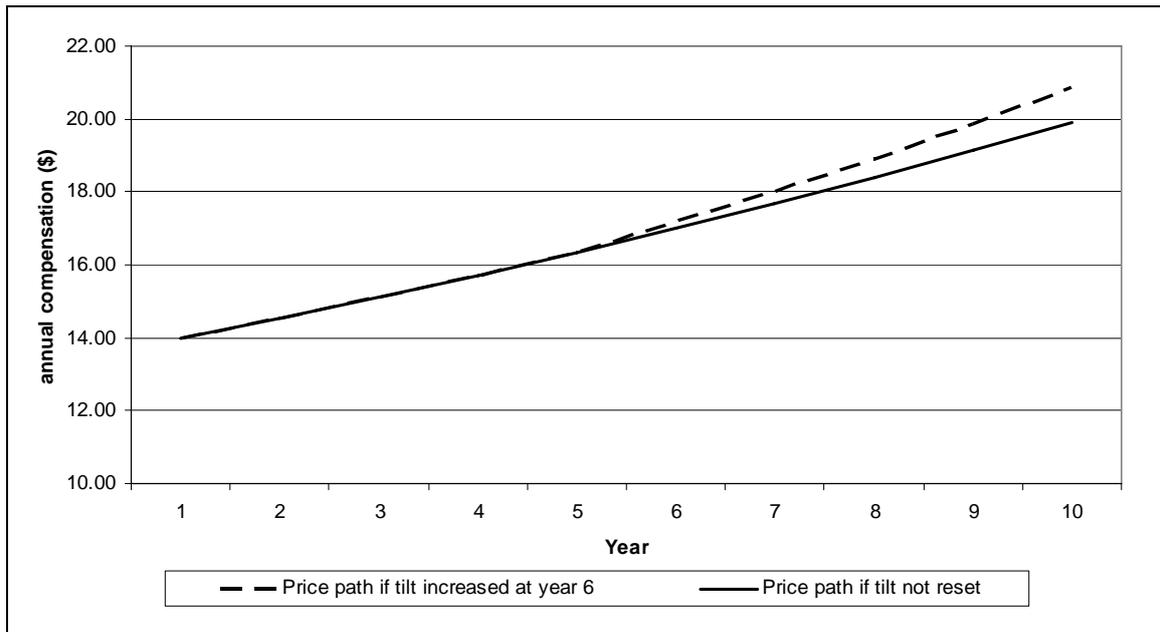
As noted, applying the annuity consistently over the cost recovery period ensures that there is no under- or over-recovery of investment costs. By contrast, chart 3 shows that if the annuity's tilt is increased from 4 to 5 per cent mid-way through the cost recovery period, the net present value of the annual compensation earned over the period exceeds the net present value of the cost of the investment — the areas under both curves in the chart are not the same.

⁵² MJA, *Comments on the TSLRIC model for Declared Transmission Services: A Report Prepared for the CCC*, 2007.

⁵³ Ibid.

⁵⁴ T. Smeallie & P. Campbell, 'FTTN: Price It Right and They Will Come', *In the Loop*, Issue 7, Citigroup Global Markets, 21 May 2008.

Chart 3 Effect on annual payments when annuity's tilt is reset



Under the current telecommunications regulatory framework, the ACCC cannot make a single determination that fixes the path of access prices over a fixed cost-recovery period. Rather, at each pricing determination, the optimised replacement cost is recalculated, the tilt of the annuity can be changed, and the access price for that determination is set with reference to the investment costs the annuity attributes to 'year one'. The approach is labour intensive, and impacts upon investment certainty.

Further, under the current regulatory regime, the only way in which under- or over-recovery is avoided is if the actual change in replacement costs between 'pricing determination one' and 'pricing determination two' matches the change that was forecast in pricing determination one. Despite the recalculation of investment costs at pricing determination two, the resulting price path and overall net present value of compensation is the same as if the price path was set for the whole cost recovery period. In this circumstance, recalculation does not lead to over- or under-recovery of investment costs.

On the other hand, if the actual change in replacement costs that occurs from pricing determination one to pricing determination two *differs* from the change in replacement costs that was forecast and reflected in the tilt of the annuity at pricing determination one, investment costs may be over- or under-recovered.

Chart 4 shows the difference between the path of cost recovery when access prices are set for a fixed cost-recovery period in a single determination and when access prices are recalculated intermittently throughout the cost-recovery period.

Chart 4 Effect on annual payments of annual revaluation of asset base and reset of tilt

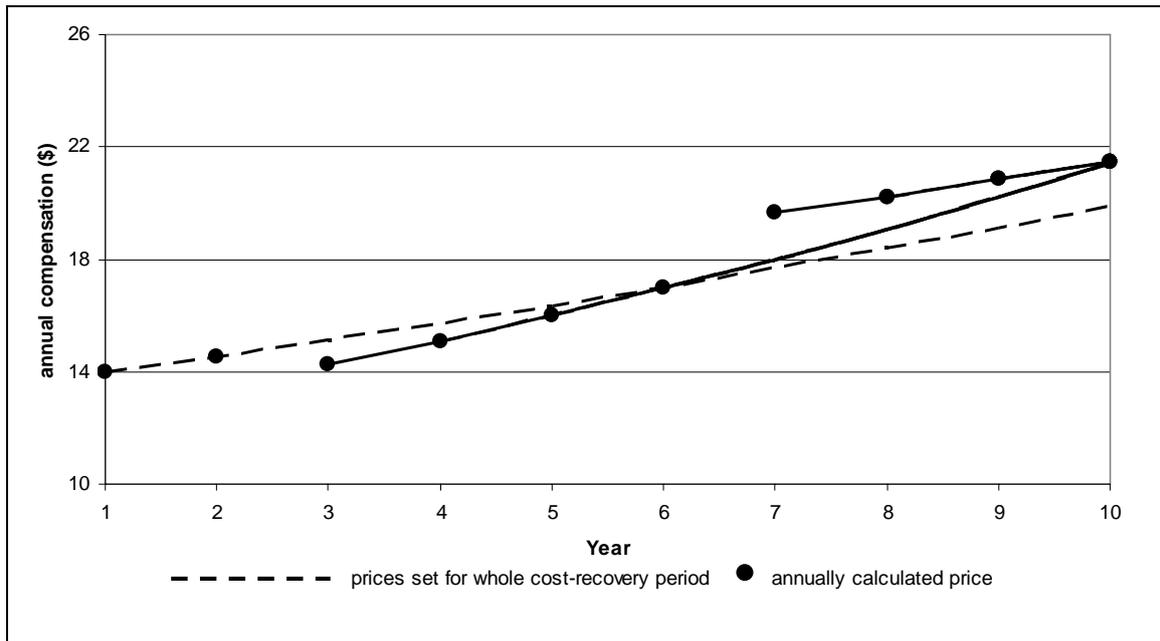


Chart 4 shows that from year one to year two, the actual change in the replacement cost of the asset matched that which was forecast and reflected in the tilt of the annuity in year one. The price path follows that which would have occurred had prices been set in a single determination for the whole of the asset's life.

In contrast, from years two to three, the actual change in the replacement cost of the asset was greater than forecast and reflected in the tilt of the annuity at the year two pricing determination. Revaluing the asset in year three and changing the tilt of the annuity to reflect the new forecast change in replacement costs changes the path of the annuity. This changes the net present value of the annuity payments that will be recovered, such that they no longer reflect the net present value of the payments that were expected at the time the investment was made in year one. The same occurs from year six to year seven, but this time the actual increase in replacement costs was less than that forecast.

If the actual increase in replacement costs is consistently higher than forecast, the original costs of investing in the asset will be under-recovered. On the other hand, if the actual increase in replacement costs is consistently lower than forecast, the original costs of investing in the asset will be over-recovered.

On the one hand, if forecasts of changes in replacement costs turn out to be incorrect, periodically correcting for these errors might ensure that end-user prices better reflect the true replacement cost of the assets over time, in turn possibly improving allocative efficiency. On the other hand, correcting for errors in replacement cost forecasts may be at the expense of dynamic efficiency, in the sense that any subsequent over or under-recovery of the initial investment cost could distort investment decisions.

Because the current telecommunications regulatory regime allows access providers to put forward access pricing proposals that can only be deemed reasonable or not

reasonable, proposals that assume that a new network valued at optimised replacement cost is built at each pricing determination are not a priori considered unreasonable. A consequence of this however, is that there is no pre-defined, fixed period over which investment costs are to be recovered. The cost recovery period is, in effect, never-ending. Access prices therefore bear no relationship to the proportion of investment costs that have already been recovered. This has important implications for cost-recovery, as the next section discusses.

Cost-recovery and asset lives

It is important to distinguish between two types of depreciation — accounting and economic depreciation. Accounting depreciation deals with the allocation of investment costs over a period of time, which is typically an assumed asset life (or ‘book life’). On the other hand, economic depreciation is the period-by-period change in the market value of an asset, or the decline in earning power of the asset over a period. It therefore involves a process of assessing changes in an asset’s value over time, where the asset’s value is determined using a value-based approach to asset valuation. The profile of economic depreciation over time therefore depends on:

- changes in technology, trends in capital equipment prices and trends in the productivity of new capital assets;
- the future pattern of output;
- the pattern of operating costs over the asset’s life; and
- the cost of capital, as it directly affects the value of the asset.⁵⁵

Under some circumstances, accounting depreciation and economic depreciation are equivalent, for example when there is:

- a regulated market with no competition in which the regulator commits to full capital recovery over the assets’ lives (that is, the regulator commits to a zero net present value for the firm’s total investment); or
- a competitive market with long-term contracts — as long as the contract amount fully recovers the initial capital investment and the contract period is equal to the asset life.⁵⁶

In general however, accounting depreciation does not reflect economic depreciation.

In a regulatory context, economic depreciation is the most theoretically correct method of depreciation. However, it is based on a market-based assessment of the asset’s value, which as noted, is not the approach typically used by regulators to value sunk assets. Estimating how this value will change over time requires that a number of assumptions are made about various parameters. The uncertainties and impracticalities surrounding

⁵⁵ NERA, *Estimating the Long Run Incremental Cost of PSTN Access: Final Report for ACCC*, 1999.

⁵⁶ A. Hardin, H. Ergas and J. Small, *Economic Depreciation in Telecommunications Cost Models*, NECG, paper prepared for Industry Economics Conference Regulation, Competition and Industry Structure, 1999.

the calculation of these parameters means that economic depreciation profiles are typically not applied. Some form of accounting depreciation is most commonly used by regulators in regulated industries.⁵⁷ As discussed above, the ACCC uses a tilted annuity approach (a form of accounting depreciation) to allocate investment costs over time because, in taking into account changing asset prices, it more closely approximates economic depreciation than other forms of accounting depreciation.

If the asset life assumed for cost allocation purposes (an asset's book life) is shorter than the useful life of the asset, an asset that has been fully depreciated in an accounting sense is still able to be used. Marsden Jacob Associates note that the book lives of assets tend to be shorter than their economic lives. For example, in considering the asset lives used in the PIE II model (discussed below), they conclude that:

“With regard to the asset lives, we note that these should correspond to the economic lifetime of the assets. Book asset lives are likely to be shorter than economic asset lives, due to conservative accounting practices. We have reviewed the values used and have a number of concerns with the figures adopted...”⁵⁸

PIE II was put forward by Telstra from 2003 until late 2007 as a model for determining forward looking, efficient ULLS access prices. With respect to the Telstra Efficient Access (TEA) Model, which Telstra has put forward as a forward looking, efficient cost model for determining Band 2 ULLS access prices since late 2007 (also discussed below), Ovum Consulting note that:

“...lower asset lives mean that assets are replaced earlier than the actual or historical replacement date and therefore the calculated monthly ULLS cost in the TEA model is higher. If the modelled asset lives in the TEA model are replaced with the actual reported asset lives, then the ULLS monthly charge decreases by 2%– 3%...The asset lives should be re-valued to their economic lives, the period of time during which an asset is usable...Following this principle...the asset lives could be further extended, at least in the case for copper cables. In the case of longer asset lives, the calculated monthly ULLS cost in the TEA model will decrease.”⁵⁹

Furthermore, Telstra Chairman Donald McGauchie noted in his speech, *It's Time To Get Serious About Australia's Next Generation Network*, that:

“By the early part of this century, over 30 per cent of the copper pairs in the Australian network were more than 30 years old, with more than 5 per cent pre-dating 1950.”⁶⁰

In contrast, both the TEA and the PIE II models assume that copper main cabling has a life of **10 years {ACCC CiC}**. If the asset life assumed by the regulator in allocating investment costs over time is the asset's book life, this means that all of the costs of the incumbent's investment will have been recovered from end users prior to the end of the asset's useful life. The above statements suggest that the asset lives that have been

⁵⁷ NERA, *Estimating the Long Run Incremental Cost of PSTN Access: Final Report for ACCC*, 1999.

⁵⁸ MJA, *Comments on Discussion Paper — Telstra's Undertaking in Relation to the Unconditioned Local Loop Service*, confidential version, 4 May 2006, pp 27-28.

⁵⁹ K. Ip, V. Petinis & L.H. Campbell, *Review of the Economic Principles, Capital Cost and Expense Calculations of the Telstra Efficient Access Cost Model: A Report to the ACCC*, Final Report, 2008, p. 21.

⁶⁰ D. McGauchie, 'It's Time To Get Serious about Australia's Next Generation Network', accessed on 25 June 2008 at <http://www.businessspectator.com.au/bs.nsf/Article/Donald-McGauchies-speech-FVSM7?OpenDocument&alerts&loc=center>.

assumed in allocating investment costs over the life of CAN assets, such as those assumed in PIE II, are shorter than the useful life of the assets. As such, the full costs of investment in CAN assets are likely to have been recovered, even though the assets are still being used.

Depending on the pricing and regulatory regime, this raises the potential for end users to be charged more than once for assets where the full costs of investment have already been passed on to them. It is possible for this to occur under the current regulatory regime, as explained below.

If investment costs have been fully recovered and the regulated asset continues to be used, access prices that only reflect the marginal costs of operating the asset would ensure that access seekers, and ultimately end users, are not charged more than once for the costs of past investment. This could create incentives for new investment to occur, and for efficient use of the existing infrastructure. If the asset is replaced once the costs of investing in it are recovered, access prices should reflect the costs of investing in the replacement asset.

However, the current regime, in assuming that a new asset is constructed at each pricing determination, allows for the costs of a replacement asset to be reflected in access prices without requiring that investment in the replacement asset to actually take place. Hence, the access provider is able to be overcompensated on their existing assets and be paid to replace assets which it does not actually replace. Dr Tony Warren, Telstra's General Manager of Regulatory Affairs, has effectively acknowledged as much:

“...As I was saying, the TSLRIC models bear no resemblance to actual cost; they are hypothetical cost models. What that means is that the model is actually already optimised, so the cost pool out of which access prices are determined is already in place and in fact is already almost a [FTTN] network. What that means is that we could spend multiple billions of dollars doing a [FTTN] roll-out — multiple billions — and the total cost pool we are allowed to recover from wholesale and retail prices would not go up a jot.”⁶¹

Therefore, there is little incentive for the incumbent to replace an asset that has been fully paid for — under the ACCC's current conservative approach to access pricing, it is able to charge the access prices it would earn as if it replaced the asset, without actually having to make the investment.

Linking access prices to the proportion of investment costs that have been recovered, for example, by basing access prices on depreciated asset values, would ensure that the investment costs of existing assets are not passed on to end users multiple times. By basing access prices on an undepreciated value only when investment actually takes place, greater incentives to invest in replacement assets are created.

Of note, in its regulatory submission to the Expert Panel, Telstra note that in non-remote rural areas, much of their asset base is written down (that is, partially depreciated) or written off (that is, is fully depreciated).⁶² Information on historic costs provided by Telstra to the ACCC under the RAF reporting requirements suggest that

⁶¹ T. Warren, Senate ECITA Committee, 13 February 2006, p. ECITA 75.

⁶² Telstra, *Public Submission on the Roll-out and Operation of a National Broadband Network for Australia*, 2008.

just over half of the historic cost of CAN assets has been paid off by users {RKR CiC}. The gross historic cost of fixed CAN assets is around \$17 billion {RKR CiC}, whilst their net value is around \$8 billion {RKR CiC}. It appears that around 58 per cent {RKR CiC} of the historic value of copper cables has been depreciated. In addition, 40 per cent {RKR CiC} of the value of ducts and pipes, 64 per cent {RKR CiC} of the value of pair gain systems and 72 per cent {RKR CiC} of the value of radio bearer equipment have been depreciated.

Linking access prices to depreciated asset values may create concerns over large jumps in prices when assets are actually replaced. For example, assume that an asset cost \$100 to build, has a useful life of ten years, has been depreciated on a straight line basis over this period, and its replacement cost is not changing. In the last year of the asset's life, the access price would be based on a net (depreciated) value of \$10. In the following year when that asset is replaced, the access price would be based on a gross (yet to be depreciated) value of \$100. There may therefore be a large and sudden increase in access prices. However, investment in the CAN takes place on an incremental basis — for example, the incumbent does not replace all copper wires on an instantaneous basis, rather, it replaces the assets progressively over time. Price shocks may be less of a concern the less lumpy investment is.

The subjectivity involved in estimating optimised replacement costs

A number of models have been developed since the telecommunications regime was implemented that estimate the costs of providing access services — the NERA model, PIE I, PIE II, the TEA model, and the Analysys model. Typically, the models employ engineering data to develop a bottom-up estimate of the cost of building replacement network elements associated with particular services. This cost is then annualised and combined with other annual costs (such as operational and maintenance and indirect costs), then allocated across relevant services, to determine access prices for the relevant service.

These cost models have been the subject of considerable debate since the telecommunications access regime commenced. This is because the output of any bottom-up cost model relies on how the large range of inputs to the model are manipulated. For example as the replacement costs generated by the models are based on a wide range of varying assumptions (for example, regarding optimisation, technology deployed etc) it is not surprising to see reasonable differences between estimates of replacement costs. Furthermore, the assumptions made in converting these costs into annual investment costs (for example, regarding asset lives, depreciation, asset price trends and the WACC) lead to a wide range of estimates of annual costs.

Whilst it is typically proposed that the models are TSLRIC+ models, all models are actually Total Element Long Run Incremental Cost (TELRIC) models. TELRIC are the incremental or additional costs a firm incurs in the long run to provide a network element, as opposed to a service. The starting point for estimating TELRIC is to consider an element-by-element break-down of the network, and then to price individual elements on the basis of the cost of the individual element and the traffic flow across that element.⁶³ The approach

⁶³ Gans & King, *Comparing TSLRIC and TELRIC A Report on behalf of AAPT Ltd*, Core Research, 2003.

therefore prices discrete network elements, such as the unbundled local loop, rather than services.

It has been noted that there may be risks in using the TELRIC approach to proxy an estimate of TSLRIC+. ⁶⁴ Too much fixed and common cost could be allocated to regulated services if the cost of certain network elements is wholly or in large part allocated to the regulated service, despite this element also being used for the production of other services which are disregarded. The problem does not arise if the model models a network that carries all the traffic that the operator would offer and allocates the costs of network elements to all services using them. ⁶⁵ TELRIC models are used to proxy TSLRIC+ as the former are computationally more manageable, and have generally been seen to generate a reasonable estimate of TSLRIC+.

The first generation of cost models include the NERA model and PIE I. The NERA model was commissioned by the ACCC and developed by NERA in 1998 to estimate the TSLRIC of providing domestic PSTN O/TA services. ⁶⁶ The model is based on the cost of re-building a network using modern equipment to provide the existing grade of PSTN O/TA service. This cost is annualised using an annuity formula. The NERA model assumes the network is operated efficiently within the existing architecture and node locations. The network is dimensioned to carry Telstra's traffic for 1997-98.

PIE I was put forward in 1999 by Telstra in support of its PSTN O/TA arbitration with AAPT. Telstra claimed the model was a superior bottom-up TSLRIC model of building and operating the PSTN network to the NERA model. The network is proposed to be built using best in use technology, and is a 'scorched node' network using the number and location of Local Access Switches that existed at that time in Telstra's PSTN. ⁶⁷ Investment costs are annualised using a standard annuity.

Being designed to model the costs of the PSTN O/TA service, the network elements that are modelled by both PIE I and the NERA model are largely in the inter-exchange network — detailed modelling of network elements of the CAN was not undertaken for the purpose of estimating PSTN O/TA prices. In contrast, estimating ULLS access prices requires more detailed modelling of the CAN. Although not ideal, several modifications were made to the NERA model in 2002 for this purpose. ⁶⁸

Given that the first generation models were not designed to model the investment costs of the CAN, a second generation of cost model — PIE II — was developed in 2003 by Telstra to support its undertakings for PSTN O/TA services, the LCS and the ULLS. ⁶⁹

⁶⁴ Ibid.

⁶⁵ M. Brinkmann, K.D. Hackbarth, D. Ilic, W. Neu, K. Neumann and A.P. Figueras, *Mobile Termination Cost Model for Australia*, wik-Consult, 2007.

⁶⁶ ACCC, *Assessment of Telstra's Undertakings for Domestic PSTN Originating and Terminating Access*, Final Decision, June 1999.

⁶⁷ Scorched node means that the location of network nodes is assumed to be fixed, but the operator chooses the best technology to configure the network around these nodes. This is opposed to a 'scorched earth' approach, which assumes that none of the existing infrastructure and flows are fixed — that is, using a given set of demands, this approach constructs a hypothetical network to satisfy those demands in the most efficient way.

⁶⁸ ACCC, *Pricing of Unconditioned Local Loop Services, Final Report*, March 2002.

⁶⁹ Telstra, *Telstra's Submission in Relation to the Methodology used for Deriving Prices Proposed in its Undertakings of 9 January 2003*, 2003.

The model determines, on the basis of various inputs, the network elements which would be necessary to construct the CAN and the inter-exchange network and the costs of those elements. It then annualises these costs using an annuity formula.

As noted, the output of any bottom-up cost model is dependent on assumptions made about the range of inputs to the model. Bottom-up cost models therefore need to be transparent so that the reasonableness of the assumptions made about inputs can be assessed. For example, PIE II is designed to reflect a network, and therefore the number of services in operation and asset prices, for the period 2001-02 to 2004-05. In its 2007 assessment of Telstra's 2005-06 ULLS undertaking, the Australian Competition Tribunal (the Tribunal) concluded that it was not satisfied that the inputs to the model — such as the asset prices used to estimate replacement costs and the number and distribution of services in operation — reflected those of the 2006—2008 period. Hence the model could not be relied upon to accurately estimate Telstra's ULLS costs for 2006 — 2008.⁷⁰ PIE II's lack of transparency and users' inability to manipulate the model's inputs have been major concerns of the ACCC.⁷¹ These concerns have led to doubts as to the forward looking nature of the model and its ability to generate reasonable estimates of TSLRIC+.

Given these concerns, PIE II has been used by the ACCC (cautiously) to inform itself of the broad quantum of network costs, but has never directly been used to set prices in the market.⁷²

In light of this, Telstra has replaced PIE II with a new cost model, the TEA model. The model was submitted to the ACCC in December 2007 in support of Telstra's 2007 and 2008 Band 2 ULLS undertakings. The model has been subject to consultation through the ACCC's discussion appendix on Telstra's 2008 ULLS Undertaking, and it has undergone a review by an independent consultant, Ovum, as part of this process.⁷³ However, the TEA model is still very much in its formative stages and has not been subject to comprehensive review by the ACCC. In particular, the review and consultation processes to date have only been undertaken in the context of the TEA model's ability to measure ULLS costs in Band 2. The model has not been subject to review of its usefulness for modelling costs in other bands.

According to Telstra, the TEA model estimates the efficient cost of a replacement CAN that provides the ULLS service; since the ULLS is defined as being provided over 'unconditioned copper facilities', the TEA model estimates the cost of a network comprised of unconditioned copper facilities.⁷⁴ It does not model areas which are fibre

⁷⁰ Australian Competition Tribunal, *Telstra Corporation Limited (No 3)* [2007] ACompT 3 Summary.

⁷¹ ACCC, *ULLS Undertakings Final Decision*, 2006.

⁷² PIE II was most recently used, with reservations and appropriately considered inputs, to set 2008-09 indicative prices for the ULLS. The ACCC noted that this was because its own network cost model was unavailable, and because the TEA model had only recently been re-submitted by Telstra.

⁷³ ACCC, *Telstra's Access Undertaking for the Unconditioned Local Loop Service Discussion Paper*, June 2008.

⁷⁴ The model also allows the option of modelling a 'basic access service' which models fibre fed distribution areas. This option is yet to be subject to any review by the ACCC or other parties.

fed as the ULLS is not supplied in these areas.⁷⁵ Telstra also claims that the model uses forward-looking, best practices engineering standards and placement procedures and best equipment.⁷⁶ While the model currently estimates costs in Band 2 areas, Telstra expect that it will eventually be able to model costs in all bands.

The TEA model determines the volume of plant, labour and equipment required to deploy the distribution network (from the pillar to the home) and the main network (from the exchange to the pillar), then calculates the total investment cost associated with these networks. It then annualises the investment cost using a flat annuity.

Independent consulting firm Analysys has been commissioned by the ACCC to develop a fixed network cost model, which will estimate the forward looking, long-run incremental cost of existing declared services in all four ULLS bands for the period 2007–2012 (the Analysys model). The Analysys model is still in its developmental stages, but it is anticipated that it will be able to produce useful cost estimates for a number of different scenarios, from a fully modern network, through to a fully Next Generation Access network. It is anticipated that the Analysys model will be used to inform proposed undertaking prices and the appropriate prices to set in access disputes.

Table 1 provides a summary of the major substantive differences between the three most recent cost models.

Table 1 Comparing PIE II, the TEA model and the Analysys model

	PIE II	TEA	Analysys
Network modelled	The entire network for declared fixed services. Dimensions the inter-exchange network and the CAN.	Models unconditioned copper facilities in the existing CAN in Band 2 areas. Dimensions a 'distribution' network (pillar to the home) and a 'main' network (exchange to the pillar).	Estimates the entire fixed network using a sampling approach. Dimensions a 'core' network (local exchange back to the local area switch) and an access network (local exchange to the customer premises).
Services provided	PSTN OTA; LCS; ULLS.	ULLS (Band 2)	PSTN OTA; LCS; ULLS (Bands 1-4); WLR; LSS.
TSLRIC or TELRIC?	TELRIC	TELRIC	TELRIC
Period modelled	Assumes distribution of SIOs as at 2000; number of SIOs are those from 2001-02 to 2004-05. Limited updating of replacement costs for January 2006 to June 2008 using selective price	Estimates access prices up until 31 December 2010.	Estimates access prices over the period 2007 — 2012.

⁷⁵ Telstra, *ULLS Undertaking, Telstra Efficient Access (TEA) Model Documentation*, 6 August 2008.

⁷⁶ Telstra, *ULLS Undertaking, Telstra Efficient Access (TEA) Model Overview*, 21 December 2007.

	trends.		
Optimisation	<p>Appears to use algorithms to determine the efficient location of pillars.</p> <p>Uses distance techniques to estimate trench lengths.</p> <p>Reflects a hypothetical network.</p>	<p>Dimensions network using actual customer locations, actual pillars and exchange locations and actual cable routes.</p> <p>Some optimisation and efficiencies are built into the model. Whether these reflect the most efficient practise is currently being reviewed.</p>	<p>Deployment of a forward-looking, modern, efficient fixed network operator. Network therefore differs in parts from today's actual network.</p> <p>Applies a scorched node approach, with scorching occurring at the Remote Access Unit, Local Area Switch and Transit Network Switch.</p>
Technology deployed	<p>All distribution areas less than 6km {ACCC CiC} from the nearest remote access unit are dimensioned using copper.</p> <p>Radio technologies not included as a technology choice.</p> <p>Efficient provisioning determined with reference to the capital costs of the technology — O&M costs of different technologies not considered.</p>	<p>As modelling costs for providing the ULLS, estimates the cost of a network comprised of unconditioned copper facilities.</p>	<p>The cost-efficient solution for each modelled ESA is deployed. In urban areas, either copper or fibre is deployed; in rural areas, a cost-based decision is made between copper and wireless solutions, and subsequently, between wireless and satellite solutions.</p>
Annualisation	Tilted annuity formula	Flat annuity formula	Tilted/flat annuity formula

The effect of assumptions made about technology

The optimised replacement cost concept defines the replacement asset as a modern equivalent asset (MEA). The ACCC has considered optimised replacement cost to be the present-day cost of replacing the asset with another asset that provides the same service potential.⁷⁷

The MEA concept assumes that the replacement asset does not provide a superior grade of service. In cases where the MEA provides additional functionality, capacity or quality, adjustments are made for these differences, so that only the level of functionality which is reflected in the existing asset is taken into account.⁷⁸ For example, assume that an operator has an installed asset which can service X number of lines. If the operator were to replace the asset today it would acquire an asset costing \$C which would be able to service X+20% number of lines. Thus the cost of the MEA with the same service potential as the existing asset would be \$C / 1.2.⁷⁹ This would reflect the fact that the existing asset provides less capacity, in terms of lines serviced, than the new asset.

⁷⁷ ACCC, *Access Pricing Principles in Telecommunications — A Guide*, 1997, p. 41.

⁷⁸ ACCC, *Current Cost Accounting Methodology for Telstra's Subsequent Reports Under the Accounting Separation Regime*, 2004.

⁷⁹ Ibid.

The optimised replacement cost of the CAN has most recently been estimated in the context of it being infrastructure that is used to provide the ULLS. Because this service is defined as being provisioned over unconditioned copper facilities, it has been assumed that the network is comprised of unconditioned copper facilities. Fibre has not been assumed to be a MEA, because the access service provided over fibre (bitstream) is different to the ULLS. When estimating the optimised replacement cost of the CAN in the context of it being infrastructure that is used to provide a generic access service however, the technology assumed to be deployed should arguably be fibre. To the extent that fibre provides additional functionality to copper, its cost would be adjusted downwards, as discussed in the preceding paragraph.

Assumptions about the technology deployed may have implications for investment incentives. Indeed, one of the reasons for using optimised replacement costs was that they were thought to create incentives for the incumbent to provide services in the most efficient way possible, for example, by using ‘best in use’ technology, as they would be unable to charge access prices that would cover the costs of using inefficient technology.⁸⁰ In theory, if a regulated service is priced on the basis of the legacy technology, but could be provided at a lower cost using a different technology, the incumbent would want to invest in this alternative technology to improve efficiency. However, if regulated prices are based on the costs of providing the service, as soon as the access provider invests in the new technology, the prices they are allowed to charge will decrease relative to those they are able to charge using the legacy technology. This may remove the incentive to invest in the different technology.

Incentives to invest in the different technology may be further reduced if it provides a greater service potential than the legacy technology. For example, assume that it costs the same amount to build and operate a copper network and a fibre network. Both networks can provide a medium speed access service, but the fibre network can also provide a high speed service. If access prices are cost-based, the access provider could build the fibre network and charge higher prices for the high speed service and lower prices for the medium speed service, relative to the price of a copper-based medium speed service. However, the *overall* revenues that the access provider can earn are the same for both networks/technologies because they cost the same to build and operate. If a fibre network cost *less* to build and/or operate than a copper network, the overall revenues the access provider could earn if they built a fibre network would be *less* than if they built a copper network, despite the fibre network being able to offer a superior grade of service. Hence, the incentive to invest in the new technology may be reduced, because, under the current approach, the regulated revenues that can be earned fall once the investment is undertaken.

B.5. What approach does the ACCC adopt in other industries?

The ACCC and other regulatory agencies have engaged in the process of valuing sunk assets in a number of contexts outside of the communications industry, particularly in the gas and electricity sectors. These valuation exercises were often conducted in the 1990s as State governments across the country privatised assets. This section provides a summary of the approaches taken to valuing sunk assets in these sectors, following a brief overview of the Building Block pricing model that these valuations feed into.

⁸⁰ ACCC, op. cit.

B.5.1. The energy sector — Building Block Model and historic costs

The common approach to setting the maximum allowable revenue (MAR) of a regulated firm in the energy sector is described as the building block model. It basically sets a maximum allowable revenue sufficient to recover the operating and capital costs of the service provider over time. This model is defined by two equations:

$$\text{MAR}_t = \text{WACC}^{81} * \text{RAB}_{t-1} + \text{Depreciation}_t + \text{Opex}^{82}_t$$

Where RAB (the regulated asset base) is defined over time as:

$$\text{RAB}_t = \text{RAB}_{t-1} + \text{Capex}^{83}_t - \text{Depreciation}_t$$

This formulation of the RAB over time is described as the asset base roll forward equation. Notably, the RAB is not re-calculated or optimised in each regulatory period. The RAB in the current period is simply the RAB in the previous period adjusted for capital expenditure (capex) and depreciation. This roll forward method is seen to have a number of advantages, including that it promotes certainty relating to the possibility of continual RAB re-valuation and that it improves regulatory efficiency as the RAB does not need to be continually re-calculated in each regulatory period. For these reasons it is sometimes described as a ‘set-and-forget’ approach.

Although currently the RAB is not revalued or optimised in each period, it would be possible to do so under the BBM. However, as discussed below, in electricity, whilst the regulatory regime initially permitted revaluations, more recently, the potential for re-optimisation of the asset base was removed, and in gas, revaluations have never been permitted. This is largely due to the uncertainty created by revaluations, and the subsequent negative effects on investment.

Sunk assets in the energy sector were valued by the ACCC or state based regulatory authorities as part of the asset privatisation process in the 1990s. These state regulatory bodies included the Office of the Regulator General (ORG) in Victoria and the Independent Pricing and Regulatory Tribunal (IPART) in NSW. As these valuations were being done at roughly the same time with respect to assets with similar economic properties, the approach taken to the valuation of both electricity and gas assets was generally consistent.

Where the ACCC/Australian Energy Regulator (AER) took regulatory authority over some or all of these services it inherited the asset valuations that had been conducted by state regulatory agencies; these valuations became the initial Regulated Asset Base (RAB₁) in the building block equation.

In both gas and electricity, the respective industry codes (now law) set out valuation methodologies directing the regulator to use specific methodologies. However, the ACCC/AER has only engaged in the process of valuing sunk assets with respect to those assets which were not covered by the relevant code prior to the time that the asset came under the ACCC/AER’s regulatory authority.

⁸¹ Weighted Average Cost of Capital (WACC).

⁸² Operational Expenditure (Opex) in the regulatory period.

⁸³ Capital Expenditure (Capex).

In order to facilitate third party access in the gas industry, regulators (including the ACCC and state-based agencies) during the 1990s undertook one-off valuations of regulated gas pipelines in order to establish an initial RAB. These valuations were largely governed by the National Gas Code (the Code), or under identical or substantially similar provisions. The Code was highly prescriptive in its valuation mechanism.

Under the Code, the regulators effectively faced a choice between depreciated actual cost (DAC) and depreciated optimised replacement cost (DORC). Notably — in contrast with the way in which the TSLRIC+ model is applied in telecommunications — both approaches use *depreciated* asset values. (This perhaps explains why access providers in telecommunications have consistently proposed models that assume a new network is built at each pricing determination). The only other recognised valuation methodology that appears to have been considered was deprival value (DV) which would have required an assessment of the full value that the asset owner could expect to extract from ownership of the asset. However, as the value of the asset is intrinsically linked to the regulatory valuation process, this method was seen to suffer from an unavoidable problem of circularity. In addition, this valuation would likely have resulted in significant increases in tariffs, which may have been inconsistent with parts of the code and various policy positions of State Governments that users would not experience increased prices following privatisation.

The valuation of electricity assets was largely governed by various state-based regulations, as the National Electricity Code (NEC) did not specify a valuation method for assets that were privatised prior to 1 July 1999. The valuation methodology that is specified in the NEC for post-1 July 1999 assets is deprival value, however this appears to have been treated as DORC by the relevant regulators and asset owners. State regulators appear to have had choice around limited though well recognised valuation methodologies, although as with gas, the choice was generally presented as between DAC and DORC.

Ultimately valuations based on DORC were accepted, though the full DORC value was often discounted to avoid tariff shocks or due to idiosyncratic factors. For example, IPART discounted the initial Capital Base for AGL at around 80 per cent of DORC (or roughly the mid-point between DORC and DAC) based on reservations about the methodology.

Consistent with the NEC requirements, the ACCC's Statement of Regulatory Principles⁸⁴ indicated that the ACCC's preferred approach to asset valuation was to lock in the RAB. However, in recognition that the NEC provided for asset revaluation, the ACCC stated that it would consider a proposed revaluation on its merits if proposed by a Transmission Network Service Provider (TNSP).

In 2005, new national electricity laws and rules took effect which replaced the NEC and further amendments were made in 2006 and 2007. These new provisions removed the need for DORC valuations or re-optimisation of the asset base. In particular, Schedules 6.2.1 and 6A.2.1 of the National Electricity Rules (NER) set out the RAB values to be applied by the AER to distribution network service providers (DNSPs) and

⁸⁴ AER, *Statement of Principles for the Regulation of Electricity Transmission Revenues*, 2004.

TNSPs respectively, which were based on those previously set by regulators. (The values set out in the schedule can be adjusted by actual capex incurred since the RAB value was determined less economic depreciation and disposals.)

(The approach taken by the ACCC and other state regulators to the valuation of sunk rail assets has also generally been based on a DORC methodology.)

Constructing DORC from ORC

Traditionally, DORC has been estimated by adjusting optimised replacement costs for accumulated depreciation. So, if 50 per cent of historic costs have been written down, 50 per cent of the optimised replacement cost is also written down. However, DORC can also be estimated using economic depreciation. The approach taken affects the depreciated value.

As noted, book lives are often shorter than economic lives. If optimised replacement costs are depreciated by taking into consideration the remaining useful life of the asset, rather than the remaining years of its book life, the depreciation profile applied to optimised replacement costs will be different to the depreciation profile applied to the corresponding historic costs. For example, the Productivity Commission note that:

“...an asset might have a nominal expected life of 25 years when it was built, but with minor maintenance and modification may turn out to last 50 years. At say, year 20, a DAC [depreciated actual cost] value will be low since the asset will be depreciated by 80 per cent. However, a DORC valuation conducted at this time would be based on an engineering assessment of the asset with a remaining life of 30 years.”⁸⁵

So, whereas the depreciated historic cost value assumes 80 per cent of the asset’s life has been used up, the DORC value assumes only 40 per cent of the asset’s life has been used up. All else equal, DORC will therefore be higher than depreciated historic costs.

An approach to economic depreciation that has recently been debated — the ‘net present value DORC’ approach — constructs DORC as the net present value of the future income from the asset, where:

- the income is consistent with the prices that would be charged by an efficient new entrant; and
- recognising that the income stream for the DORC valuation will have a life equal to the remaining life of the existing assets, that life being less than the life of the new entrant’s assets.⁸⁶

The value of the new entrant’s assets is ‘optimised replacement cost’. The access price (and revenue stream) in each year of this asset’s life is determined using an annuity. The DORC value for the *existing* asset is then determined as the net present value of the first x years of the new asset’s revenue stream, where x is the remaining life of the *existing* asset.⁸⁷ So, if the new entrant’s revenue stream is constant, and the remaining

⁸⁵ Productivity Commission, *Review of the National Access Regime*, 2002.

⁸⁶ Agility Management, *The Construction of DORC from ORC*, 2000.

⁸⁷ Ibid.

life of the existing asset is 30 years, the DORC is the net present value of the first 30 years of the hypothetical new entrant's net income.

Of note, when considering the approach taken for gas networks, the High Court recently upheld the Australian Competition Tribunal's decision to reject the straight line depreciation approach for deriving the DORC from the ORC in favour of the NPV DORC approach.⁸⁸

B.5.2. Strengths and weaknesses of the approach taken in other industries

The opening RAB in these industries was set based on a forward looking approach to asset valuation — DORC and additions to the asset base are valued at actual cost, which as noted, at the point in time at which it is added, is the same as optimised replacement cost. In subsequent regulatory periods, these additions to the asset base are not re-valued, but rather, are valued at their historic cost, less depreciation.

Historic costs are backward looking in that they reflect the costs the incumbent actually incurred in building the asset. They therefore provide a return to the access provider independent of the quality of their investment decisions. There may therefore be concerns that the approach does not encourage efficient investment. However, the general approach in the energy sector has been to permit any actual capex to be added to the RAB in the period following the expenditure, subject to some form of check on incurred expenditure to ensure it is prudent. The AER is currently moving towards a system whereby forecast capital expenditure will be approved as being reasonable at the start of the regulatory period for the duration of that period. This is aimed at improving investment certainty and reducing regulatory issues associated with denying past capital expenditure on the basis of a post hoc determination that the expenditure was unreasonable.

Furthermore, investment in telecommunications networks is typically ongoing — for example, the access provider does not replace all the copper wires on the CAN at once, rather, it does so on an incremental basis over time. Therefore, for a certain proportion of its asset base, the access provider will always face the same *actual* investment costs as would be estimated using a forward looking perspective.

The RAB roll-forward approach arguably removes the uncertainty caused by the re-optimisation associated with the current telecommunications access pricing model. Debate over an appropriate value for sunk assets takes place only at the establishment of the opening regulatory asset base, rather than at each pricing determination. These features may improve regulatory efficiency.

In contrast to the current approach in telecommunications, this approach links access prices to cost recovery, which reduces the likelihood of end users being charged more than once for the same asset and the opportunities for investment cost over-recovery.

⁸⁸ *East Australian Pipeline Limited v ACCC & Anor* [2007] HCA 44.

B.6. What are the options in the National Broadband Network context — are changes needed?

This section assesses which CAN assets are likely to remain in use on fibre networks, and which CAN assets are likely to become redundant. The section then canvasses the range of values for CAN assets using the different approaches outlined above.

B.6.1. Which CAN assets will continue to be used in the NBN?

There will be differences between the network elements used on the copper network and those used in the NBN. For example, if the NBN is rolled out as a fibre to the node (FTTN) network, the upgrade will likely involve building new fibre out as far as a node next to each street-pillar. The NBN will then use the existing copper tails from street-pillar to the customer premises. This is likely to make redundant the copper line from the exchange to the street-corner pillar. Hence, parts of the CAN will continue to be used whilst other network elements will become redundant, as shown in Table 2.

Table 2 Major CAN assets that will be used in the NBN

Asset class	Used today	Used in FTTN	Used in FTTH
Joints			
Copper — main	✓	✗	✗
Copper — distribution	✓	✓	✗
Fibre — main	✓ ^a	✓	✓
Fibre — distribution	✓ ^a	✗	✓
Cable			
Fibre — main	✓ ^a	✓	✓
Fibre — distribution	✓ ^a	✗	✓
Copper — main	✓	✗	✗
Copper — distribution	✓	✓	✗
Conduit, ducts & pipes			
Main	✓	✓	✓
Distribution	✓	✓	✓
Pits & manholes			
Main	✓	✓	✓
Distribution	✓	✓	✓
Pillars	✓	✓	✗
Lead ins	✓	✓	✗

^a In some areas.

A question that needs to be addressed is how the redundant assets will be treated. In a competitive environment, investment in upgrades will often mean that some previous investment becomes redundant.⁸⁹ Prices for downstream services would no longer

⁸⁹ NZ Ministry of Economic Development, 'Asset Valuation Concepts', accessed on 16 September 2008, at http://www.med.govt.nz/templates/MultipageDocumentPage___10450.aspx.

reflect the value of these assets. If the value of the redundant assets were reflected in the asset base, dynamic efficiency would be harmed, as any new investment would only be made if it can recover not only its own costs but also the cost of components it displaces. On the other hand, in a regulatory context, if this resulted in valuations far below those used at privatisation, this could be considered to represent expropriation. The credibility of the regulatory system could be undermined, along with the industry's ability to raise finance for future investment.⁹⁰

B.6.2. Measuring historic and current costs

As discussed, a number of models have been developed since the commencement of the regulatory regime that provide estimates of optimised replacement costs, and there are a number of issues to take into account when using these estimates to value the CAN. If a DORC approach was preferred, these issues would still need to be considered, as the starting point for DORC is optimised replacement costs, but with adjustments for depreciation.

However, just as there are different approaches and judgements required regarding forward looking values of assets, there can also be for historic and current costs. Telstra currently provides the ACCC with accounts prepared on both a current cost and historical cost basis for the retail and wholesale components of their business under the Telecommunications Industry Regulatory Accounting Framework (the RAF).⁹¹

The current cost data represents the replacement cost of Telstra's existing assets based on Telstra's actual network configuration. It represents the present-day cost of acquiring Telstra's existing assets. The following methods could be used to estimate current costs:

- indexation, which involves revaluing an asset by indexing its historical value;
- absolute valuation, which involves obtaining current unit price data for existing assets and multiplying this by the physical number of units currently in service (this is the approach Ofcom uses to estimate current costs),⁹² or
- service potential valuation, which is used where the existing asset is no longer available for purchase, and adjusts the absolute valuation method to reflect

⁹⁰ Frontier Economics, 'Starting From Where? Valuing the Opening Regulatory Asset Base', *Bulletin*, April 2003.

⁹¹ Under section 151BU of the TPA, the ACCC has the power to establish record-keeping rules by written instrument, and require that carriers and carriage service providers comply with these rules. The RAF was introduced under this legislation by the ACCC in 2001. It is a vertical and horizontal accounting separation model that requires revenue and cost information for wholesale and retail services to be reported to the ACCC. The ACCC amended the RAF in 2003, as directed by the Government (on 19 June 2003 the Government released the Australian Competition and Consumer Commission (Accounting Separation – Telstra Corporation Limited) Direction (No.1) 2003), to require that: Telstra prepare current cost accounts, as well as existing historical cost accounts, to provide more transparency to the ACCC about Telstra's costs; and Telstra publish current cost and historical cost key financial statements in respect of 'core' interconnect services.

⁹² In the UK, this is the methodology BT uses to estimate current costs. It estimates an inventory of all existing copper access network assets based on a sample and multiplies that by the relevant current unit prices (BT Procurement's current unit prices). This is then scaled up to provide a gross replacement cost for the whole access network. An abatement is made for those assets which are fully depreciated and accumulated depreciation is applied to those assets that are partly depreciated

differences in service potential between the substitute asset which is used for valuation purposes and the existing asset.

Under the RAF, the current cost of CAN assets is estimated by indexing the written down historic value of the assets. Composite indexes of labour, material and other costs are used to index these assets over their service lives. This approach is determined by Telstra and the Government. In its CCA Reports relating to the accounting separation of Telstra, the ACCC continues to note that the adoption of this approach should not be construed as the ACCC endorsing it as a robust basis for estimating current costs.⁹³ Telstra's asset register does not identify some fixed asset classes (and in particular CAN asset classes) in such a manner as to allow meaningful current cost derivation and analysis. Therefore, the current cost valuation approach for CAN assets has required compromises to be made in relation to the methodology and values adopted.⁹⁴

B.6.3. Values for the CAN

The following section shows the values for the CAN derived using historic costs, depreciated historic costs, current costs and depreciated current costs, and the PIE II model's estimate of optimised replacement costs. It also shows the TEA model's estimate of optimised replacement costs in Band 2. Each table shows values for various CAN components and the total value of the CAN. Table 6 compares these estimates.

Table 3 Historic and current CAN asset values, 2007-08 [RKR CiC]

Description	Historic (\$m)		Current (\$m)	
	Depreciated	Gross	Depreciated	Gross
Ducts and Pipes	3,932.8	6,598.8	11,768.4	22,609.1
Copper Cables	2,683.4	6,422.8	4,450.9	12,393.4
Other Cables	11.4	12.5	11.4	12.5
Pair Gain Systems	1,097.5	3,101.8	1,271.3	4,075.4
Radio Bearer Equipment	237.9	839.4	107.0	1,118.1
Other CAN	1.8	1.8	1.8	1.8
Total^a	7,964.9	16,977.0	17,610.9	40,210.3

Source: ACCC estimates based on Telstra's Fixed Asset Statements as supplied for their RAF accounts. CAN asset categories were summed across all services provided by Telstra's internal and external wholesale businesses.

^a Total may not add due to rounding.

Table 3 shows that ducts and pipes, and copper cables, make up the largest percentage (around 75 per cent) of investment costs of the CAN {RKR CiC}. Given Telstra's approach to determining current costs (indexing historic costs using a composite index of labour, material and other costs), it is to be expected that historic costs are less than or equal to current costs.

⁹³ ACCC, *Current Cost Accounting Report Relating to the Accounting Separation of Telstra for July–December 2007*, April 2008.

⁹⁴ Furthermore, reporting carriers have discretion as to how costs are allocated over time (and services). Data on annual investment costs are therefore the result of allocations made by Telstra. Although this should not impact upon overall asset values, it does affect the implied access prices for CAN services.

However, the gross current replacement cost of ducts and pipes is roughly **four times {RKR CiC}** more than their historic cost, whilst, for example, the gross current replacement cost of copper cables is only roughly **twice {RKR CiC}** that of their historic costs. This is likely to be because each of the asset categories is adjusted using a different composite price index. The composition of the index for an asset category depends on what proportion of the costs of investing in that asset is driven by labour and what proportion is driven by materials. In addition, labour and materials costs are measured using different data sets for different asset categories. That the current costs of ducts and pipes have risen relatively more than the other asset categories suggests that these assets use a higher proportion of inputs whose costs have been rising relatively quickly (according to the price indices adopted).

Table 4 PIE II CAN asset values for 2007-08 [ACCC CiC]

Asset category	Value (\$m)
Ducts and Pipes	15,040.3
Copper Cables	12,348.7
Pair Gain Systems	1,792.4
Radio Bearer Equipment	3,849.1
Total^a	33,030.5

Source: ACCC estimates.

^a Total may not add due to rounding.

Similarly to the historic and current cost estimates, table 4 shows that the **largest proportion of CAN investment costs are ducts and pipes, and copper cables {ACCC CiC}**. As PIE II estimates the costs of a brand new network, the figures should be compared to the gross historic and current cost figures in table 3. According to the model, the optimised replacement costs of ducts and pipes and copper cables are more than their historic costs. This could be because the model assumes:

- there has been little technological improvement or optimisation in these asset categories since they were originally built (and hence little room for costs to be ‘optimised out’); and/or
- the costs of investing in these assets (for example, labour and materials costs) have risen since they were first built.⁹⁵

In theory, the gross current cost measures should be higher than the optimised replacement costs, because current costs are based on the existing technology and capital equipment, and not the capital that would actually be efficiently deployed. However, the optimised replacement costs of, for example, copper cable, generated by PIE II are higher than the current cost. This could be because PIE II assumes that prices for copper cable are higher than implied by the price index applied to historic costs to generate current costs. It could also be that PIE II assumes the same amount of (or not much less) copper cable is used on an optimised network than on the existing network. On the other hand, PIE II’s estimated optimised replacement cost of ducts and pipes is around **\$8 billion {ACCC CiC}** less than their current costs. This could be because PIE

⁹⁵ MJA & Europe Economics, 2006.

II assumes that the costs of building these assets have risen less than implied by the index used to index historic costs to current costs, and/or because PIE II assumes less ducts and pipes are used on an optimised network than on the current network.

Table 5 TEA model CAN asset values for 2007-08, band 2 only [ACCC CiC]

Asset category	Value (\$m)
Main	
Joints	344.5
Copper cable	2,021.9
Fibre cable	26.8
Conduit configuration	2,803.7
Pits and manholes	404.5
Other	380.7
<i>Sub-total</i>	5,982.1
Distribution	
Lead-ins	1,946.6
Joints	567.1
Copper cable	1,163.7
Conduit (includes conduit runs)	9,217.2
Pits	1,695.2
Pillars (includes terminal strips)	168.9
<i>Sub-total</i>	14,758.7
Total^a	20,740.8

Source: ACCC estimates based on TEA model v 1.0 output — Telstra's default settings.

^a Total may not add due to rounding.

It should be highlighted that the figures in table 5 only refer to optimised replacement costs in band 2 exchange service areas. These represent around **two thirds {RKR CiC}** of the total services in operation throughout the country, and cover around **0.2 per cent {RKR CiC}** of the geographic territory (in square kilometres) covered by the CAN. As such, the optimised replacement costs that the TEA model estimates for all four ULLS bands will be a lot higher than the **\$20.7 billion {ACCC CiC}** figure presented above.

Table 6 Comparison of CAN values

Approach	Gross Value (Depreciated Value) (\$m)
Historic Cost	16,977.0 (7,964.9) {RKR CiC}
Current Cost	40,210.3 (17,610.9) {RKR CiC}
Optimised Replacement Cost — PIE II	33,030.5 {ACCC CiC}
Optimised Replacement Cost — TEA^a	20,740.8 {ACCC CiC}

Source: ACCC estimates.

^aBand 2 only, version 1.0.

Again, it should be highlighted that the TEA model only estimates Band 2 optimised replacement costs, as opposed to the other cost estimates, which refer to costs for all four ULLS bands. This makes it difficult to meaningfully compare the figures generated by PIE II and the TEA model. Nonetheless, even when the TEA model is able to estimate costs for all four bands, it is likely it will generate a different cost estimate to PIE II. This is because, as discussed, the output of the models is dependent on a wide range of inputs. As shown in table 1, the models make different assumptions about the degree of optimisation of the network (for example, which technology is deployed on the network and where) and the number and geographic distribution of services in operation. As such it is reasonable to expect that each model will arrive at different values for the CAN.

B.6.4. The effect of changing valuation approach over time

If a valuation methodology (for example, a forward looking approach) is not applied consistently over the cost recovery period (which, as noted, would ideally be the life of the asset), the asset owner could under- or over-recover the costs of investing in the asset. (Unless the valuation approach itself is causing cost over- or under-recovery, in which case changing it could correct this.) When changing valuation methodologies, it is therefore important to consider whether the change will lead to upward or downward revaluation of the asset (and subsequently cost over- or under-recovery, assuming the existing method is not already causing this) and how this will be counteracted (if desired).⁹⁶

For example, a consequence of having valued the existing network at the commencement of the regulatory regime at the optimised replacement cost of a brand new network is that the *past* decline in the value of the existing assets was not taken into account. These assets were attributed a value that assumed they were at the start of their useful lives, rather than part way through them, which means that they would have been upwardly re-valued.

As discussed, this was observed in Ofcom's switching between HCA and CCA for valuing BT's core fixed line network assets. The value of BT's pre-1997 asset base increased with the shift to CCA.⁹⁷ In 2005, given that facilities-based competition had

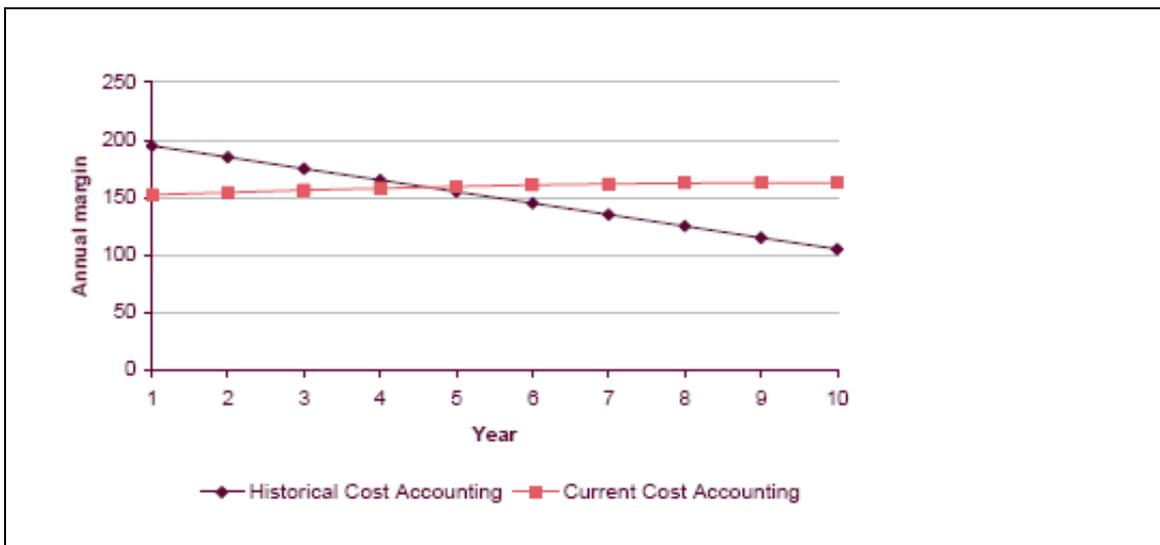
⁹⁶ The extent of the re or devaluation will in part depend upon how long has passed since the asset was invested in, and therefore the difference between its historic costs and its current or optimised replacement cost. As noted, in a 'bundle' of assets such as the CAN, this will be different for each individual asset within the bundle. The overall effect on the bundle is likely to be less the higher the proportion of 'new' assets/lower the proportion of old assets.

⁹⁷ Ofcom, 2005.

not emerged, Ofcom concluded that BT had been earning a return above cost on these assets as a result of the revaluation.⁹⁸

Chart 5 shows the annual compensation over an asset’s life under both HCA and CCA assuming: the asset is subject to straight line depreciation over its useful economic life; a constant increase in replacement cost; and a constant cost of capital. Although the cost recovery paths are different, if the total compensation under each approach was converted to a ‘net present value’ (that is, discounted at the cost of capital), they would be equal.⁹⁹

Chart 5 Gross margins required for a constant cost of capital over the lifetime of a single asset experiencing appreciation in value



Source: Ofcom, *Valuing Copper Access: Final Statement, 2005*.

More cost recovery occurs earlier under the HCA approach, while the recovery of costs from a CCA approach is greater later in the asset’s life. Accordingly, a change from setting cost recovery based on HCA in the early period to CCA in the later period at any point during the life of the asset would result in an over-recovery of costs. (The inverse is also true: if the current replacement cost of the asset decreases over time — if the CCA curve in the above chart were downward sloping — then under-recovery or a loss would result from changing from HCA to CCA.)¹⁰⁰

Therefore, if the approach to valuing the CAN is changed with the NBN upgrade, it will need to be considered whether this will lead to an up- or down-ward revaluation of the CAN, and whether or not it is desirable to make adjustments for this.

B.7. Conclusion

Different approaches can be used to value the CAN, each of which will have different effects on cost-recovery, investment and end-user prices. When considering which approach to use, it is important that it is consistent with the specific objective of the regulatory regime that will apply to the NBN. Of the two broad approaches — ‘value-

⁹⁸ Ibid.

⁹⁹ Ibid.

¹⁰⁰ Ibid.

based' or 'cost-based' — a cost-based approach is preferred if the objective of the regulatory regime is cost-recovery.

There are several cost-based approaches that could be used — historic/actual costs, depreciated historic costs, current replacement costs, depreciated current replacement costs, optimised replacement costs and depreciated optimised replacement costs. Broadly, replacement cost approaches are 'forward looking' whilst historic costs are 'backward looking'.

Any replacement cost approach should take into account current market conditions and input prices (for example, copper prices, wages etc). For example, replacement cost approaches to valuing the CAN are greatly influenced by changes in copper prices in particular, because copper cabling is a high proportion of CAN investment costs. Although over the last ten years these have been rising, more recently, they have begun to fall.

The forward looking perspective is argued to reflect contestable market outcomes in terms of efficient build-or-buy signals, and infrastructure use incentives. However, it also creates uncertainty as to whether the access provider will under- or over-recover the costs of their investment, which may in turn deter future investment and encourage over-use of the asset, or encourage over-investment and under-use of the infrastructure, respectively.

Given that the costs of the largest components of CAN investment costs — ducts and pipes and copper cabling — have generally been rising, and there has been little technological advance in the area of duct and pipe infrastructure, it seems unlikely that an access seeker will build a replacement CAN. The build-or-buy signal may therefore be a less paramount concern in deciding on the asset valuation approach to take.

The backward looking perspective (historic/actual costs) provides more certainty with regard to investment cost recovery, but may not create the build-or-buy signals that a contestable market would.

Comparing the pricing models and the approach to asset valuation in the telecommunications sector and other industries regulated by the ACCC highlights that the approach to asset valuation and the adopted pricing model are inextricably linked. The approach used to value the CAN cannot be considered in isolation of the pricing model that will apply to the NBN. Changing pricing approaches requires an assessment of whether the current asset valuation methodology remains appropriate, in order to ensure that cost recovery is facilitated.

A number of features of the way in which the TSLRIC+ pricing framework is currently applied create uncertainty as to whether investment costs will be recovered. Alternative pricing models, such as the Building Block Model used by the Australian Energy Regulator in the gas and electricity industries, may reduce a number of these uncertainties over time.

If such a set-and-forget approach is considered desirable for the NBN, it is likely that a policy or regulatory decision will need to be made about the level of the opening asset base. This will need to be 'locked in' contractually between Government and the NBN provider and/or through legislative change to the telecommunications access regime to

broaden the scope of regulated pricing to encompass the whole NBN facility. This may also necessitate directing the ACCC to either adopt or follow a contractually determined or prescribed approach to valuing and rolling forward a value for the NBN.

In the NBN context, the chosen level of the opening asset base — the value of existing sunk assets that will be used on the NBN — and decisions made around the treatment of depreciation and future capital expenditure — on new NBN assets, and CAN assets when they need to be replaced — will have fundamental consequences for the incentives for a Proponent to accept the opening asset base and incentives to undertake timely and efficient upgrades to the NBN in future.

Appendix C. Cost of capital

C.1. Executive Summary

- If the Proponent awarded the NBN tender is subject to cost-based regulation, it should be allowed to recover a regulated cost of capital, as it is an economic cost incurred in operating any capital intensive business.
- The cost of capital is the opportunity cost of the debt and equity funds used to finance the investments of a firm. It is the return that the firm forgoes by not investing in the next best alternative investment. Alternatively, it can be thought of as the return the firm must offer an investor to induce it to invest in the firm. Firms that are subject to cost-based access regulation are allowed to recover a regulated cost of capital in regulated access prices (or regulated revenues). If regulated firms were unable to recover these costs, they may be unwilling to invest in regulated assets, and investors may be unwilling to invest in regulated firms.
- The return an investment will earn reflects the risk associated with that investment. As such, the regulated cost of capital should reflect the risks associated with the regulated assets in question, including the risks imposed (or alleviated) by the regulatory regime itself. A regulated cost of capital that exceeds (is less than) the normal return in the market earned by investments of similar risk will encourage too much (too little) investment and an access price greater (lower) than the true economic costs of providing the service.
- In practice, because of the limited number of ways the cost of capital can be estimated, the regulated cost of capital is often determined with reference to the risks and returns associated with similar regulated *and* unregulated assets and firms. Therefore, determining the regulated cost of capital is a very contentious process.
- The regulated cost of capital that a firm is allowed to include as a component of its regulated assets' access prices/revenues will not necessarily equal the overall rate of return the firm earns in the market at any given point in time, particularly if the firm owns both regulated and unregulated assets. Nonetheless, the regulated cost of capital does *affect* the firm's actual overall rate of return in the market, particularly in capital intensive industries such as telecommunications. Determining the regulated cost of capital is therefore also a very important process.
- The ACCC measures the cost of capital using the Weighted Average Cost of Capital (WACC). There are a number of parameters that are inputs to estimating the WACC over which there has been considerable debate in the past in telecommunications and other regulated industries.
- The ACCC's approach to the WACC is to maximise regulatory certainty for industry participants with regard to the cost of capital that will be allowed in regulatory decisions. In light of this goal, the ACCC considers the approach it has taken in the past to estimating the WACC parameters to be reasonably settled. As such, for some parameters — the debt beta, the market risk premium, gamma and

the tax rate — it also considers the determination of their values to be relatively uncontroversial. In assessing NBN Proposals, these parameters should be less contentious than others.

- On the other hand, although the ACCC's approach to estimating a value for WACC parameters is generally uncontentious, the values that the approach derives for some NBN WACC parameters — the equity and asset **betas**, the **risk free rate**, the **debt risk premium** and **gearing ratios** — will depend on the specifics of the NBN Proposal that is accepted and as such may differ from the values currently applied for Telstra and the copper network. These parameters will be more contentious.
- Any difference in the value of these parameters with the NBN upgrade should reflect differences in risk associated with the particular Proposal relative to the risks associated with investment in the copper network; differences in risk associated with the financial structure of the particular Proposal; and the degree to which risks are borne by the Proponent or Government. The differences should also reflect changes in general financial market conditions since previous regulatory decisions and FTTx discussions.
- It is likely that the equity and asset betas will be the most contentious parameters in assessing NBN Proposals. This is because they are affected by both general financial market conditions and the specifics of the Proposal in question, and because they have a large effect on the overall WACC. How the Government's contribution is treated is also likely to be contentious.
- Adjustments to the WACC to account for asymmetric social outcomes, asymmetric risk and real options have been proposed in the past, and it seems likely that they will be proposed in the NBN context. Whilst the ACCC is yet to be convinced by the merits of arguments in favour of *any* these adjustments, the ACCC strongly reaffirms that arguments surrounding asymmetric:
 - risk — i.e. that certain applications of regulation penalise/expropriate above normal returns but do not compensate for below normal returns — are theoretical, and do not represent regulatory practice as applied in telecommunications, or other industries regulated by the ACCC. The ACCC does not consider that there should be a practical risk of truncation — regimes can be designed in such a way as to ensure that it does not arise.
 - social outcomes — i.e. because the social consequences of underestimating the WACC are of much greater importance than the social effects of overestimating it, the WACC should be adjusted upwards — are as yet unsupported by empirical investigation and evidence. Arbitrary WACC adjustments are thus inappropriate.
- It is also important to bear in mind that 'real world' NBN returns will be affected not only by the regulated cost of capital, but by several other real world considerations. In particular, if the value attributed to the existing sunk network (the customer access network) for access pricing purposes is increased (decreased), this could potentially offer Telstra a significant increase (decrease) in the actual return they

earn from existing assets, regardless of whether or not they are awarded the NBN tender.

C.2. Introduction

The cost of capital is the opportunity cost of the debt and equity funds used to finance the operations of a firm.¹⁰¹ The cost of capital for the Proponent awarded the National Broadband Network (NBN) tender is thus the opportunity cost of the debt and equity funds used to finance the NBN investment. It is the rate of return that those investing in the project require to induce them to either lend funds or purchase equity.

As it is a legitimate cost incurred in running a business, if the NBN operator is regulated by cost-based regulation, it should be allowed to recover the cost of capital in its regulated revenues. Importantly though, the cost of capital that is allowed to be recovered is a *regulated* rate of return on a set of regulated assets. This rate of return may or may not be equal to the rate of return the firm *actually* earns across all its businesses (regulated and unregulated) at any point in time. In particular, if the value attributed to the existing sunk network (the customer access network, or CAN) for access pricing purposes is increased (decreased), this potentially offers Telstra a significant increase (decrease) in the actual returns they will earn from existing assets, regardless of whether or not they are awarded the NBN tender.

In capital intensive industries such as telecommunications, the regulated cost of capital is an important component of access prices. Small changes to the cost of capital can have a significant impact on the total revenue requirement, and ultimately end user prices and level of investment. A cost of capital that exceeds the normal commercial return in the market earned by investments of similar risk will give investors a return above that they actually require to induce them to make the NBN investment, and lead to an access price greater than the economic costs of providing NBN services. On the other hand, a cost of capital below the normal commercial return will prevent a regulated firm from gaining a legitimate return on their investment and so may not induce funds to be supplied for the NBN investment.

This is recognised in the Request for Proposals (RFP) where it is stated that one of the Government's objectives for the NBN is that it:

“...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.”¹⁰²

Furthermore Proponents are asked to:

“...explain the basis on which they have derived the cost of capital, including how investment risks have been calculated.”¹⁰³

A firm's cost of capital can be expressed on a number of different bases. Therefore, a number of different figures can be used to represent effectively the same underlying cost of capital. It is therefore important to ensure that consistent definitions and bases are being used prior to comparing different cost of capital figures. For example, rates of return can be stated on a pre-tax or post-tax basis, in real or nominal terms and as a rate of return on equity, debt or a weighted average of both.

¹⁰¹ Opportunity cost is the amount lost by not using a resource in its best alternative use.

¹⁰² RFP, Overview, para 1.3.1(11).

¹⁰³ Ibid., para 1.5.17.

In telecommunications, the ACCC consistently discusses the cost of capital in its regulatory decisions on what is known as a nominal vanilla Weighted Average Cost of Capital (WACC) basis. The ‘nominal vanilla’ WACC is the cost of capital weighted by the total funding proportions of debt and equity; stated in nominal terms; and with the cost of debt stated on a pre-tax basis, and the cost of equity on a post-tax basis. The vanilla WACC is used because it is legislated that the Australian Energy Regulator (AER) use a vanilla WACC, hence, for regulatory certainty, a vanilla WACC is also used in other areas regulated by the ACCC.¹⁰⁴

C.3. WACC parameters

This section shows the formulae that are used for calculating the WACC and discusses each of the parameters that are inputs to the WACC.

C.3.1. WACC formulae

The formula for calculating the vanilla WACC is:

$$WACC = \frac{D}{V} \cdot r_d + \frac{E}{V} \cdot r_e$$

Where:

D/V = the ratio of debt value to the firm’s total value (that is, its debt plus its equity)

E/V = the ratio of equity value to the firm’s total value

r_d = the required return on debt

r_e = the required post company tax (post tax) return on equity

As the formula indicates, the cost of debt and equity financing are considered separately. This is because, from an investor’s perspective, debt financing is generally considered less risky than equity financing as creditors (investors that have lent money to the firm) have claims to payment before shareholders.

r_d is generally calculated as:

$$r_d = r_f + dp$$

Where:

r_f = the rate of return on risk-free assets (the ‘risk free rate’)

dp = the premium required above the risk free rate to encourage investors to hold the particular firm’s debt (the ‘debt risk premium’)

r_e is generally calculated by the ACCC using a domestic capital asset pricing model (CAPM) which states that:¹⁰⁵

¹⁰⁴ AER, *Review of the WACC Parameters for Electricity Transmission and Distribution*, 2008.

¹⁰⁵ The domestic CAPM assumes that the operator of the regulated business is Australian owned, and determines parameters accordingly. The alternative is an international CAPM, which assumes foreign ownership is present. The application of a domestic (as opposed to international) CAPM has been considered appropriate in part due to the foreign ownership restrictions that apply to Telstra. Should a shift to an international CAPM be considered appropriate if the NBN Proponent has a high degree of foreign ownership, this would likely effect the calculation of a number of WACC parameters — the risk

$$r_e = r_f + \beta e(r_m - r_f)$$

Where:

βe = beta, a measure of the volatility of a stock relative to the market as a whole
 $(r_m - r_f)$ = the difference between the required return of the market as a whole (r_m) and the risk free rate (the 'market risk premium')

The following section describes these parameters in more detail.

C.3.2. Debt and equity ratios (gearing)

These measure the proportion of a firm's finance that is raised through debt or equity, and in turn weight the returns to debt and equity to obtain an overall required return on capital. Lowering the debt ratio tends to increase the WACC, as it means more (generally more expensive) equity funding is being used instead of (generally cheaper) debt funding.

Either the firm's actual gearing (determined using direct estimation) or an appropriate benchmark could be used to estimate these parameters.¹⁰⁶ The ACCC's consistent approach in telecommunications (and the AER's in other regulated industries) has been to use a benchmark.¹⁰⁷

In telecommunications, the ACCC has consistently used a benchmark debt ratio of 40 per cent and an equity ratio of 60 per cent for gearing when calculating the WACC for PSTN and ULLS services.¹⁰⁸ This was determined with reference to the Telstra-wide historic book value gearing ratio at the time of Telstra's privatisation; observed gearing estimates of competitors; and other regulatory decisions. In other industries regulated

free rate, the debt risk premium, the market risk premium, the equity beta and gamma. The international CAPM may be less feasible given the difficulty of assessing the correspondingly relevant parameters. The Australian Energy Regulator (AER) continues to apply a domestic CAPM, recognising the presence of international investors in the domestic market.

¹⁰⁶ Direct estimation involves estimating a firm's cost of capital on the basis of that firm's financial data. The firm is therefore compensated exactly for its own cost of capital (in theory). In practice regulated firms often also have non-regulated activities, so the average cost of capital for the firm's total regulated and unregulated businesses is typically what is estimated. Benchmarking uses the average cost of capital for proxy regulated firms. The regulated firm is therefore compensated for the 'average' cost of capital for similar regulated firms (say, in the same industry). Because the benchmarked rate of return is based upon the average investor and an average firm, but the markets in which firms actually raise funds consider the actual position of the investor and the actual position of the target firm, the benchmarked rate of return could be above or below the regulated entity's true cost of capital. Benchmarking therefore gives regulated firms an incentive to reduce their actual cost of funds through time. The ACCC and AER's general approach is to establish the WACC on the basis of benchmark parameters in order to enhance certainty. However, the ACCC has noted that it may exercise judgment in using empirical evidence and direct estimation from the market.

¹⁰⁷ AER, *Statement of Principles for the Regulation of Electricity Transmission Revenues*, 2004.

¹⁰⁸ ACCC, *A Report on the Assessment of Telstra's Undertaking for the Domestic PSTN Originating and Terminating Access Services*, July 2000, p. 74-77; ACCC, *Assessment of Telstra's ULLS monthly charges undertaking – final decision*, August 2006, Appendix C and E; ACCC, *Unconditioned Local Loop Service Access Dispute Between Telstra Corporation Limited (access provider) and PowerTel Ltd (access seeker): Statement of Reasons for Final Determination*, March 2008, p. 86.

by the ACCC/AER, a benchmark debt ratio of 60 per cent is typically considered appropriate.¹⁰⁹

C.3.3. Risk free rate

The risk free rate is the rate of return on an asset with a promised repayment amount and no risk of default. It is used to measure the premium that investors require to hold a firm's debt or equity (assuming these are not risk free).

The ACCC/AER consistently uses the yield on (Commonwealth) government bonds to determine the risk free rate because there is considered to be no risk of default on government bonds. A 10-year term is used in telecommunications, and an average rate over the 10 days leading up to the start of the regulatory period is generally calculated (as opposed to an 'on the day' estimate).¹¹⁰ In other industries the ACCC/AER regulates, it uses a period of between 5 and 40 days to calculate the average.¹¹¹

The term of the government bond chosen should be consistent with the terms assumed in estimating other parameters, such as the debt premium. There has, in the past, been debate as to whether this term should equal the term of the regulatory period, or be the longest term possible to reflect the life of the regulated assets. In its GasNet Decision¹¹², the Australian Competition Tribunal (the Tribunal) established that the term should (as far as possible) match the life of the regulated assets, and this is the approach that has been taken by the ACCC in telecommunications and the AER in other areas since this decision.¹¹³

C.3.4. Return on debt

The cost of debt varies depending on the firm's degree of gearing, its credit rating and the term of the debt. The cost of debt can be measured directly by the interest rate on a firm's debt on issue (its corporate bonds), or benchmarked from the rates on corporate bonds on issue of firms in the same industry with similar credit ratings. The ACCC/AER's preferred approach in all of the industries it regulates is to use a benchmark.¹¹⁴ The difference between the rate on the benchmark bond and the risk-free rate is known as the debt risk premium. This measures the return investors require above the return on risk free assets in order to induce them to hold the efficient benchmark firm's debt.

As noted above, in choosing the term of the firm's debt on issue to use, there should be consistency with the term used to estimate the risk free rate.¹¹⁵ As a general rule, debt with a longer maturity attracts a higher risk premium.

¹⁰⁹ AER 2004.

¹¹⁰ ACCC, *Assessment of Telstra's PSTN and LCS Undertaking Final Decision Public version*, November 2006.

¹¹¹ AER 2004.

¹¹² Australian Competition Tribunal, *Application by GasNet Australia (Operations) Pty Ltd [2003] ACompT 6*.

¹¹³ Australian Competition Tribunal, *Application by GasNet Australia (Operations) Pty Ltd [2003] ACompT 6*.

¹¹⁴ AER 2004; ACCC, *Unconditioned Local Loop Service Access Dispute Between Telstra Corporation Limited (access provider) and PowerTel Ltd (access seeker): Statement of Reasons for Final Determination*, March 2008

¹¹⁵ AER 2004.

The ACCC generally uses a benchmark credit rating of ‘A’ for Telstra, though recently accepted Telstra’s proposed ‘Telstra-wide’ debt risk premium, to “better reflect the recent developments in the financial markets.”¹¹⁶ The cost of debt — whether estimated using a benchmark corporate bond or by direct estimation — may currently be significantly different than in past regulatory decisions due to recent financial market turmoil.

C.3.5. Return on equity

The ACCC/AER calculates the required return on equity using the (domestic) Capital Asset Pricing Model (CAPM).¹¹⁷ The basis of this model is the relationship between risk and return: the starting point for estimating the cost of equity is the risk-free rate; if the investment subjects the investor to risk, the return on equity is raised above the risk free rate. The higher (lower) the level of risk, the higher (lower) the required rate of return on equity.

According to the CAPM, there are two types of risk:

- Systematic risk, which is risk that the equity market as a whole faces, such as that caused by changes in the level of economic activity, inflation, tax changes, and interest rates. No matter how well diversified an investor’s equity portfolio is, systematic risk cannot be eliminated — it is therefore faced by all investors in the equity market.
- Firm specific risk, which is the risk unique to the shares of an individual firm or a small group of companies that form a subset of the equity market. Firm specific risk might cause things like asset stranding, an unexpected decrease in demand for services and operations risk. Investors are assumed to be able to eliminate the level of firm specific risk in their overall equity portfolio by holding a well diversified ‘market’ portfolio.¹¹⁸

The CAPM framework does not provide compensation for bearing firm specific risk, on the assumption that investors can eliminate this risk without cost by holding a well-diversified portfolio of assets.¹¹⁹ Hence, the return on equity should only take into account the amount of systematic risk borne by an investor in holding a particular share.

The return that equity investors require over and above the risk free rate in order to compensate them for investing in a risky share is a function of beta and the market risk premium. The market risk premium represents the return that investors expect the equity market as a whole to deliver in excess of the risk free rate. Beta ‘weights’ the market risk premium to reflect the higher or lower level of systematic risk associated

¹¹⁶ ACCC, *Unconditioned Local Loop Service Access Dispute Between Telstra Corporation Limited (access provider) and PowerTel Ltd (access seeker): Statement of Reasons for Final Determination*, March 2008; ACCC, *ULLS Pricing Principles and Indicative Prices*, July 2008, p. 17.

¹¹⁷ Although the CAPM framework was not specifically designed for the purposes of estimating a regulated return on equity, the ACCC/AER considers it to be the most appropriate framework currently available.

¹¹⁸ A well diversified portfolio of shares is one that includes a variety of shares such that the effect of any one stock on the overall performance of the portfolio is small.

¹¹⁹ AER 2008.

with the particular share relative to the average systematic risk in the equity market. These two parameters are now discussed.

Market risk premium

The market risk premium is the difference between the risk free rate and the rate investors earn by investing in a fully diversified portfolio of shares that are *not* risk free (that is, a portfolio that contains systematic risk, because specific risk has been eliminated by diversification).

Because the market risk premium is an expected, or ‘forward looking’, premium, it is not directly observable. Historical estimates such as the historical difference between the return of the stock market and the risk free rate are commonly used to indicate the forward looking market risk premium.¹²⁰

In all areas regulated by the ACCC/AER, a value of 6 per cent is used for the market risk premium.¹²¹ This is based on consultancy advice that this value is an appropriate balance of the available evidence; historical premiums typically suggest a higher market risk premium than 6 per cent, whilst estimates of the market risk premium over more recent periods and forward looking estimates typically suggest a lower market risk premium than 6 per cent.¹²² This value has been upheld through numerous processes where various submissions have been made to the ACCC/AER arguing for either an increased or decreased market risk premium.¹²³

Equity beta

The equity beta is a measure of the expected volatility of a particular stock relative to the volatility of the market as a whole. More formally, beta is a measure of the systematic risk of a firm (the risk that cannot be eliminated by holding a fully diversified portfolio of investments). An equity beta of one indicates that the firm’s equity has the same systematic risk as the equity market average. An equity beta less than one indicates that the stock has low systematic risk relative to the equity market average, whilst a beta greater than one indicates the stock has high systematic risk relative to the equity market average. As such, a lower (higher) beta means that a lower (higher) expected return is required to encourage investors to invest in the particular firm’s equity, relative to that required to encourage them to invest in the average share in the equity market.

Importantly, in the context of the regulated return on equity, the betas should represent the risks associated with the firm’s *regulated* assets and lines of business for which the WACC is being calculated, and not the firm as a whole, which may include both regulated and unregulated assets.

¹²⁰ AER 2004.

¹²¹ AER 2004; ACCC, *A Report on the Assessment of Telstra’s Undertaking for the Domestic PSTN Originating and Terminating Access Services, July 2000*, p. 74-77; ACCC, *Assessment of Telstra’s ULLS monthly charges undertaking – final decision*, August 2006, Appendix C and E; ACCC, *Unconditioned Local Loop Service Access Dispute Between Telstra Corporation Limited (access provider) and PowerTel Ltd (access seeker): Statement of Reasons for Final Determination*, March 2008.

¹²² AER 2004.

¹²³ AER 2004.

In measuring the risk associated with being an equity holder of a regulated firm, the equity beta takes into consideration both the risk associated with the firm's regulated assets (for example, the customer access network (CAN) or the NBN) and the effect on risk of the firm's financial structure (that is, in the context of the NBN, the proportions of funding for the NBN investment that come from debt and equity). Borrowed funds affect the risk of equity investment and the desired equity returns by:

- increasing (gearing up) the potential returns available to investors, but also increasing risks by a similar multiple; and
- reducing one aspect of risk, namely the amount of funds at risk in the event of total business failure, because the lender assumes the risk associated with the loss of borrowed funds.¹²⁴

If the regulated assets are financed completely by equity, the equity beta only needs to take into account risks associated with the cash flows of the assets, because there are no borrowed funds to increase the risk to equity holders. In this case, the equity beta is equal to the 'asset beta'. The asset beta only reflects the risks associated with the regulated assets cash flows. It provides a reflection of risk which can be compared across asset classes independent of the financial structure (that is, proportion of debt and equity financing) of, in this case, the NBN investment.

An equity beta can be generated from an asset beta (a process called re-levering), or alternatively, an asset beta can be generated from an equity beta (a process called de-levering).¹²⁵ Importantly, the process of estimating either of the betas is very sensitive to the period used, the frequency of observation, the statistical technique applied, and a variety of other factors.

In estimating the asset beta, the ACCC's approach in telecommunications has been to estimate an asset beta for a business supplying services over the PSTN and the ULLS (that is, a business that has not diversified into business lines that use other networks/assets, such as mobile or cable TV).¹²⁶ The same asset beta is applied to PSTN and ULLS services because it has been considered that the cash flows that have traditionally recovered the costs of the ULLS are those resulting from the sale of PSTN products. The introduction of broadband as a service that is supplied over the ULLS did not change this view, because broadband is not necessary to recover the costs of the ULLS, and if anything, makes it more likely that ULLS costs will be recovered, as it provides additional revenue. This would tend to lower the systematic risk associated with Telstra's asset base compared to when broadband was not supplied.¹²⁷

¹²⁴ The formula the ACCC/AER uses to take this into account can be found in the appendix to this paper.

¹²⁵ The formula the ACCC uses for this process can be found in the appendix to this paper.

¹²⁶ ACCC, *Unconditioned Local Loop Service Access Dispute Between Telstra Corporation Limited (access provider) and PowerTel Ltd (access seeker): Statement of Reasons for Final Determination*, March 2008; ACCC, *ULLS Pricing Principles and Indicative Prices*, July 2008.

¹²⁷ ACCC, *Access dispute between Chime Communications Pty Ltd (Access Seeker) and Telstra Corporation Limited (Access Provider) Unconditioned Local Loop Service (ULLS): Interim Determination under Section 152CPA of the Trade Practices Act 1974 — Reasons For Interim Determination*, 2006.

Using direct estimation and benchmarking, the ACCC has estimated an asset beta of around 0.5, which translates to an equity beta of around 0.83 at a 40/60 D/E ratio.

In the electricity transmission sector, the AER has used an equity beta of 1¹²⁸ The revenue cap decisions in this sector have generally stated that this figure of 1 is approximately equal to re-levering an asset beta of 0.4. (However, the re-levering process is not actually undertaken from observed market data to obtain the equity beta of 1.¹²⁹) These differences across industries reflect the perception that there is less risk associated with the cash flows generated by electricity transmission assets than telecommunications assets (hence the asset beta in telecommunications is higher); but the financial structure assumed of firms in the energy sector — that is, the higher level of debt funding relative to that assumed in telecommunications — imposes more risk on these firms' equity holders (hence, the equity beta for an electricity transmission firm is higher).

In taking into account the effect of financial structure on the risk to equity holders, the parameters 'debt beta', 'gamma' and the tax rate are used. These parameters are now discussed.

Debt beta

The debt beta measures that part of a business' systematic risk which is transferred from equity holders to providers of debt. For a given asset beta, increasing the debt beta reduces the equity beta.

In telecommunications, the ACCC uses a debt beta of zero while the ACCC/AER decisions in other areas have varied.¹³⁰ However, this has been a relatively uncontentious parameter in the past, and the ACCC does not generally consider its effect on the overall WACC to be large.

Tax rate

As noted, in regulatory decisions in telecommunications the ACCC consistently discusses the WACC in terms of a nominal vanilla WACC. The vanilla WACC does not include the impact of company tax — the ACCC therefore explicitly models company tax liabilities in cash flows (after adjustments for the utilisation of imputation credits — discussed below — are made). The tax rate therefore only enters the vanilla WACC as one of the parameters used in the re-levering and de-levering process to estimate equity and asset betas. As such, the ACCC has expressed the view that the tax rate used does not have a large impact on the vanilla WACC.¹³¹ (It does, however, impact the modelling of tax liabilities in cash flows, but this is done in a separate process to calculating the WACC.)

¹²⁸ AER 2004.

¹²⁹ AER, *Statement of principles for the regulation of electricity transmission revenues-background paper*, 2004.

¹³⁰ Ibid. p.107.

¹³¹ ACCC, *ULLS Pricing Principles and Indicative Prices*, 2008.

In the vanilla WACC, the return on debt is usually expressed in a pre-tax form, and the return on equity in a post-tax form. To express the cost of debt in after tax terms, the pre-tax cost of debt would need to be downwardly adjusted taking into account the tax rate. Alternatively, to express the return on equity in a pre-tax form, the post-tax cost of equity would need to be upwardly adjusted by taking into account the tax rate (as well as gamma).

In telecommunications, the ACCC historically preferred the application of an effective tax rate of 20 per cent (as opposed to the statutory tax rate of 30 per cent), as it was considered consistent with the average effective tax rate of companies in Australia and should be a reasonable estimate of an efficient effective tax rate.¹³² However, since 2006, for pragmatic reasons the statutory tax rate of 30 per cent has been allowed when calculating the Vanilla WACC.¹³³

Imputation factor (gamma)

Under Australia's imputation tax system, Australian resident taxpayers can claim a tax credit against the income tax they pay on dividends received from Australian companies. This credit reflects the tax that has already been paid by those companies. These tax credits can be used to offset tax payable on other income, and therefore reflect a benefit to investors.

With a vanilla WACC, all tax effects including the benefit of imputation are captured in cash flows rather than the WACC and therefore imputation is only relevant in the equations for re-levering and de-levering beta estimates.¹³⁴

The imputation factor, or gamma, represents the proportion of these credits which can, on average, be used, and their value to investors. Gamma has a value of between 0 and 1. A gamma of 1 means that shareholders receive income tax credits equivalent to the value of tax paid at the company level. A gamma of zero means that shareholders receive no value from the income tax credits.

There has been a long running debate as to the value which should be ascribed to gamma.¹³⁵ In all of its regulatory decisions in all of the industries it regulates, the ACCC/AER has used a gamma value of 0.5.¹³⁶

C.3.6. Debt and equity issuance costs

Issuance costs include the underwriting costs, management fees, accounting fees and legal fees incurred in raising funds. In telecommunications, the ACCC has preferred to

¹³² ACCC, *Assessment of Telstra's PSTN and LCS Undertaking Final Decision Public version*, 29 November 2006.

¹³³ ACCC, *Assessment of Telstra's PSTN and LCS Undertaking Final Decision Public version*, 29 November 2006; ACCC, *Unconditioned Local Loop Service Access Dispute Between Telstra Corporation Limited (access provider) and PowerTel Ltd (access seeker): Statement of Reasons for Final Determination*, March 2008.

¹³⁴ Imputation is also relevant in the modelling of tax payments in cash flows/allowable revenue, but this is done in a separate process to calculating the WACC. The value of gamma takes on more importance in a pre-tax WACC. The higher the gamma, the lower will be the required pre-tax return to equity (because a higher gamma implies a higher benefit gained from income tax credits) and hence, the lower the estimated pre-tax WACC required to compensate equity holders for making the investment.

¹³⁵ In the telecommunications context, this has largely centred around whether the marginal investor is an Australian or an overseas investor. Telstra has argued that it is an overseas investor, hence, gamma should be 0. The ACCC's position has been that, given the restrictions that apply to Telstra on foreign ownership, and that a domestic (rather than international) CAPM is applied, it is appropriate to assume the marginal investor is Australian, hence, a non-zero value is appropriate.

¹³⁶ AER 2004; ACCC, *Unconditioned Local Loop Service Access Dispute Between Telstra Corporation Limited (access provider) and PowerTel Ltd (access seeker): Statement of Reasons for Final Determination*, March 2008; ACCC, *ULLS Pricing Principles and Indicative Prices*, July 2008; ACCC, *Assessment of Foxtel's Special Access Undertaking in relation to the Digital Set Top Unit Service Final Decision*, March 2007.

treat these costs as operational expenditure, to be recovered through a specific allowance in cash flows when they arise.

However, debt issuance costs have been included in the WACC where they cannot be placed in cash flows.¹³⁷ The ACCC has preferred a value for debt issuance costs of 0.083, based on benchmarks.

The ACCC has not allowed the inclusion of equity issuance costs in the WACC, and has noted that, in the past, Telstra has never actually raised equity capital, and should therefore not be compensated for equity raising costs.¹³⁸ In other industries regulated by the ACCC/AER, such as electricity transmission, equity issuance costs are not included in the WACC, but rather in operational or capital expenditure cash flows.¹³⁹

The ACCC/AER does not consider the overall WACC to be sensitive to the treatment of these costs.

C.4. WACC adjustments

The following adjustments to the WACC have been put forward by firms regulated by the ACCC in the past. The ACCC has not supported the proposed adjustments in any regulatory decision to date, and similarly, the Tribunal has also had reservations with regard to some of them.

C.4.1. Asymmetric social outcomes

Asymmetric social outcomes refers to the argument that, because the social consequences of underestimating the WACC are of much greater importance than the social effects of overestimating it, the WACC should be adjusted upwards, or, if a range of WACCs is estimated, the upper end should be applied.¹⁴⁰ This argument has been put forward by Telstra in several regulatory proceedings.¹⁴¹ The ACCC has not considered a) the existence of asymmetric social outcomes to be certain and b) taking account of them in the WACC to be appropriate, even if they do exist.¹⁴²

The Australian Competition Tribunal has accepted that, in theory, there is potential for asymmetrical consequences should the WACC be set too low or too high.¹⁴³ However, it has noted that empirical investigation and evidence is required to determine which leads to the greatest social damage, and the degree of this damage, before an

¹³⁷ Telstra's PIE II model does not allow debt issuance costs to be included in cash flows. Hence, regulatory processes that have used this model have allowed debt issuance costs to be included by adding debt issuance costs to the cost of debt.

¹³⁸ Whilst the inclusion of a 0.15 uplift for equity issuance costs was allowed in Telstra's 2005 ULLS Undertaking, their inclusion has been subject to re-assessment since this time.

¹³⁹ AER 2008.

¹⁴⁰ Australian Competition Tribunal, *Re Telstra Corporation Ltd (No 3) [2007] ACompT 3*, 17 May 2007, para 433.

¹⁴¹ Telstra, ULLS Undertaking WACC, 4 April 2008; Telstra, *Telstra's Submission in Support of its PSTN and LCS Undertakings*, 22 March 2006; ACCC, *Assessment of Telstra's ULLS monthly charge Undertaking*, Public version, Final Decision, August 2006.

¹⁴² Australian Competition Tribunal, *Re Telstra Corporation Ltd (No 3) [2007] ACompT 3*, 17 May 2007, para 448.

¹⁴³ *Ibid.*, para 457.

adjustment to the relevant WACC parameter (rather than an arbitrary adjustment to the overall WACC) would be appropriate.¹⁴⁴

C.4.2. Asymmetric risk

Asymmetric risk relates to the argument that the CAPM does not take into account regulatory truncation risk, so the WACC (or range of WACCs) this framework estimates *underestimates* the true cost of capital. The WACC should therefore be upwardly adjusted. Truncation arguments centre around applications of regulation where above normal returns are penalised and/or expropriated ex post, whereas below normal returns are not compensated for.

These arguments are theoretical, and do not represent regulatory practice as applied in telecommunications, or other regulated industries by the ACCC. Accordingly, the ACCC does not consider that there is a practical risk of truncation, as regulatory regimes can be designed in such a way as to ensure that it does not arise.

C.4.3. Real options

Regulated access providers have recently begun to argue that a ‘real options approach’ should be used in determining the access prices for regulated investments.¹⁴⁵ Advocates of this approach argue that:

- Neoclassical investment theory, or the net present value (NPV) rule, sets the regulated return on capital below the true cost of capital, as it fails to deal with the interaction between sunk costs and uncertainty.¹⁴⁶
- To compensate the access provider adequately, real option theory should instead be used. Real option theory contends that the ability of the investor to defer an irreversible and uncertain investment is something of significant value, as it allows an investor to receive new information as time passes, which assists in resolving some of the uncertainty surrounding the investment.
- Given that the investor holds this valuable option, when the investment does actually occur, and the firm ‘exercises’ its option to invest, it foregoes the opportunity to defer the investment and wait for further information to arrive. As this is an additional opportunity cost associated with undertaking an investment, it should be taken into account by ‘uplifting’ the WACC.

Whilst Telstra has not yet claimed a real option surcharge on any of its new investments, it has indicated that it believes such a mark up is likely to be appropriate in the future. For example, in Telstra’s 2006 FTTx discussions with the ACCC, an options value was included in its WACC model, but its value was set equal to zero. {ACCC CiC} More recently, in its 2008 ULLS Undertaking, it noted that because the

¹⁴⁴ Ibid., para 473

¹⁴⁵ AAPT Ltd, *Submission to the Senate Environment, Communications, Information Technology and the Arts Legislation Committee Inquiry into the Telstra (Transition to Full Private ownership) Bill 2005 and related bills*, September 2005.

¹⁴⁶ Traditional neoclassical investment theory states that, the firm will undertake an investment if the present value of future expected net revenue streams — usually discounted by some risk-adjusted discount rate — is greater than or equal to the direct cost of investment, or alternatively, the net present value of the project is greater than or equal to zero.

CAPM does not take into account real options, the resulting WACC estimates will underestimate the true cost of capital. Of note, the ACCC has never incorporated a real options surcharge in the WACC for the purposes of determining regulated access prices in any area it regulates.

C.5. Recently proposed WACC parameters

The following table shows the standard WACC parameter values that the ACCC/AER uses.

Table 1 Standard ACCC/AER WACC parameters

Parameter	ACCC - telecommunications	AER - energy¹⁴⁷
Risk free rate	10 year Commonwealth Government bonds, averaged over 10 days leading up to start of regulatory period.	10 year Commonwealth Government bonds, averaged over 5-40 days (transmission) and 10-20 days (distribution) leading up to start of regulatory period.
Debt ratio	40%	60%
Debt risk premium	Benchmarked corporate bond ('A' rated for Telstra), 10 year term to match term of risk free rate.	Benchmarked corporate bond (for 'BBB+' rated firm), 10 year term to match term of risk free rate (for both transmission and distribution).
Market risk premium	6%	6%
Equity beta	0.83	1 (transmission) 0.70 – 1.10 (distribution)
Asset beta	0.5	0.4 (transmission) 0.3 – 0.55 (distribution)
Debt beta	0	0
Gamma	0.5	0.5
Tax rate	30% (statutory)	Effective tax rate
Debt issuance costs	0.08%	Not included in the WACC — included in cash flows.
Equity issuance costs	Not included.	Not included in the WACC — included in cash flows.

The following table shows the WACC parameter values and approach to estimating the parameters that have been raised in previous fibre discussions. It also includes the most recent parameter values, and approach to estimating them, proposed by Telstra for its fixed line assets.

¹⁴⁷ The AER is currently consulting on these parameters for electricity transmission and distribution in its 2008 review of electricity transmission and distribution WACC parameters.

Table 2 Recently proposed WACC parameters {ACCC CiC}

Parameter	Telstra 2008 ULLS Undertaking	Telstra 2006 FTTN discussions: new assets (existing assets)	FANOC FTTN Undertaking 2007
Risk free rate	6.33% Point estimate (31 December 2007).	5.74%	Approach consistent with that used in the energy sector.
Debt & equity ratios	30% debt; 70% equity 'Target' market gearing ratio.	20% debt; 80% equity	60% debt; 40% equity Based on that used for similar assets in the energy sector.
Debt risk premium	1.95% (1.8%—2.10%) Point (low & high) estimates (31 December 2007). Market driven, Telstra-wide.	1.25% (1.15%)	1.02%
Market risk premium	7% (5.5%—8%) Point (low & high) estimates. Estimated as/using sum of U.S. MRP + country risk premium; historical studies; taking into consideration 'uplift' for distortion in C'wealth Govt bond market.	7%	6% Based on that used for similar assets in the energy sector.
Equity beta	1.028 (0.887—1.170) Point (low & high) estimates.	1.05 (0.87)	maximum 1.0 Set equal to the lower of the <i>actual</i> equity beta or 1.0. Actual equity beta determined in a 'capital auction', whereby the equity beta was to be initially set low and gradually raised until the market met FANOC's required level of funding.
Asset beta	0.725 (0.625—0.825) Point (low & high) estimates.	1.4 (0.7)	N/A
Debt beta	0	0	0

Gamma	0 (Gamma irrelevant — marginal investor is an overseas investor who cannot claim tax credits.)	0.5	0.5 (Based on that used for similar assets in the energy sector.)
Tax rate	30% (statutory)	30% (statutory)	Effective. Based on that used for similar assets in the energy sector.
Debt issuance costs	0.15% (0.07%—0.22%) Point (low & high) estimates.	0.2%	N/A
Equity issuance costs	0.4% (0.27%—0.47%) Point (low & high) estimates. Based on estimate of IPO and seasoned equity offering costs.	0.15%	N/A
WACC	12.28% (10.49%—13.91%) Nominal vanilla WACC. Point (low & high) estimates.	15.93% (11.02%) Nominal vanilla WACC	Actual \approx 7.0% Max. \approx 9.0% Nominal <i>post-tax</i> WACC. ‘Actual’ uses ‘actual’ equity beta; max. is consistent with the standard assumptions used by regulators for natural monopoly assets in the energy sector. WACC applied was to be lower of these two.
Asymmetric social outcomes	‘Uplift’ WACC point estimate by one standard deviation to reduce risk of underestimation.	N/A	N/A
Asymmetric risk and real options	If selecting WACC from a range, the upper end should be used to account for these.	Option value included, 0%	N/A

Public statements by Telstra around the time of their 2006 fibre discussions with the ACCC note that a vanilla WACC for existing assets of 10.32 per cent had been agreed upon as a *starting point* for further discussions. This is consistent with the parameter values above, but uses a market risk premium of 6 per cent rather than 7 per cent {ACCC CiC}.

Of the parameters in the tables which have been most contentious in the past, the equity and asset betas, the risk free rate and the debt risk premium have the largest effect on the overall vanilla WACC.

C.6. WACC for the National Broadband Network

The approaches the ACCC considers appropriate in determining the values of the various input parameters to the WACC are largely settled, and for regulatory certainty, it would seem preferable that these approaches do not change with the NBN upgrade. In addition, given the Tribunal's decisions regarding asymmetric social outcomes, the ACCC is unlikely to change its position in these areas, subject to evidence being presented that should convince it otherwise.

As the approach to determining a value for most parameters is generally settled, there are some parameters whose value will likely be unaffected by the NBN upgrade. These include gamma, the tax rate, the market risk premium and the debt beta. These parameters are unaffected by either the general financial market conditions that prevail at the time capital is raised, or by which Proponent is awarded the tender. If their values remain in line with regulatory decisions more generally, regulatory certainty will be promoted.

On the other hand, the values attributed to some parameters are likely to be different to those used in past regulatory decisions. The following section discusses these parameters — firstly those which are influenced by the Proponent awarded the tender and their Proposal, and secondly, those affected by the prevailing financial market conditions at the time funds are being raised.

C.6.1. Parameters that will likely differ according to the Proposal

An important consideration when assessing Proposals will be the treatment of the Government's contribution of funds. The Government has specified that it requires a rate of return on this contribution, but has not specified what this rate is, nor whether the contribution will be debt or equity. There are therefore a number of permutations possible:

- if Proposals treat the contribution as equity (debt) and offer the Government the same return on equity (debt) as normal equity (debt) investors, the Government's contribution should be treated no differently from normal equity (debt) funding;
- if Proposals offer the Government a rate of return that differs from that offered to either debt or equity, this may need to be factored into the WACC as a separate 'cost of funds' component;
- if the latter is the case, the effect on the risks borne by normal equity and debt holders will need to be considered.

Indeed, regardless of the return offered to the Government, how Proposals share risk between the Government and other investors is an important consideration — increasing (decreasing) the amount of risk the Government bears should lower (raise) the regulated WACC, all else equal. At the extreme, if the Government bears all the risk of the project, say by guaranteeing all investors' funds, the regulated return to the investment should be no more than the risk free rate. As another example, should Proposals put forward that the Government's funds are provided as a subsidy (despite that the RFP specifies that the Government requires a return), this would have the effect of decreasing risk to all other investors, and should be taken into account in the WACC accordingly. Ultimately, the lower the return required by the Government and the more risk it takes on, the lower will be the return other investors require, and potentially, the lower prices will be for consumers.

As noted, the ACCC has in the past adopted a benchmarking approach to assess the value for various 'firm specific' parameters (debt and equity ratios, the debt risk premium, equity and asset betas, and debt and equity issuance costs). Even if benchmarking is still considered the most appropriate approach to estimating these parameters, some firm-specific parameters may change from the current values relevant to fixed line regulation with the NBN upgrade. Importantly though, the parameters must continue to reflect those of a business that earns revenues only from services provided over a copper network or a fibre network — that is, the effect of Proponents' other lines of business that do not use these assets (for example, mobiles) should be excluded from the WACC.

The appropriate benchmark used for estimating the asset beta may change if it is considered that investment in NBN assets involves a different level of risk to investment in the PSTN and the ULLS. The risk associated with the NBN assets is likely to be affected by:

- capital cost recovery — capital costs themselves are likely to be predictable, but the pricing framework and regulatory regime that is applied may affect cost recovery;
- technology risk — not likely to be increased solely due to fibre itself, but possibly due to providing *access* to fibre; and
- uncertain demand — not for services similar to those provided over copper, but potentially for high speed services. How this affects risk depends on the proportion of investment costs that are to be recovered from high speed services.

This will also need to be taken into account in choosing an appropriate benchmark for the equity beta for the NBN, as will any differences in the financial structure (proportion of debt and equity funding) of the Proponent relative to the benchmark financial structure assumed for the equity beta today. If the Proponent has an 'A' credit rating and the same benchmarked financial structure as is currently assumed remains appropriate, the benchmark used for the equity beta will only need to be adjusted for differences in the risks associated with the NBN assets relative to copper network assets.

With regard to debt and equity issuance costs, it is likely to remain preferable that these continue to be included in cash flows. If they are included in the WACC, the appropriate benchmarks for estimating them will not change with the NBN upgrade.

If benchmarking is no longer seen as the appropriate approach, and these firm-specific parameters are directly estimated or observed, their values will depend on which Proponent is awarded the tender and the specifics of their Proposal. For example:

- debt and equity ratios will vary depending on how the Proposal is financially structured, including how Government funding is treated (that is, whether it be debt or equity, and the returns required on it);
- the debt risk premium will change in line with the returns currently being earned on the firm's debt on issue (if they have any on issue); and
- debt and equity issuance costs will reflect those actually incurred in raising funds for the NBN investment.

However, because direct estimation of the values of the equity and asset betas would require observations of the relative volatility of the Proponent's shares on issue, these parameters could only be directly estimated for Proponents who currently have shares on issue.

Of note, FANOC's 2007 FTTN Special Access Undertaking proposed that, given the nature of the FANOC investment — the development of a new network — the WACC would use the *actual* cost of debt and the *actual* cost of equity capital arising from an initial capital auction. The value of the equity beta was to be set at the lower of either 1.0 or a value derived through a capital raising auction.

C.6.2. Parameters that change over time reflecting market conditions

Some WACC parameters, in particular, the level of the risk free rate and the debt risk premium, will differ from those used in past decisions because they are influenced by changes in general financial market conditions over time.

Table 3 shows the vanilla WACC that have featured in recent regulatory processes, and updates them for contemporaneous versions of the risk free rate and debt risk premium in light of current market conditions.

Table 3: Recent WACC values and contemporaneous updates (at January 2008)

	'06 ULLS Undertaking	'06 FTTN discussions	'07 Foxtel Undertaking
Then	8.86%	10.32% ^a	14.00%
Updated	≈10.5% ^c	≈11.2% ^{a,c}	≈14.5% ^b

^a For legacy network assets, not FTTN assets ^b Debt risk premium not updated ^c Risk free rate of 6.35% and debt risk premium of 2.7%.

It is unclear for how long these conditions will continue, but for so long as they do, they will affect the cost of capital for all NBN Proposals.

C.7. Conclusion

In regulated, capital intensive industries such as telecommunications, the allowed cost of capital has a large effect on access prices and investment. A cost of capital that exceeds (is less than) the normal commercial return in the market earned by investments of similar risk will encourage too much (too little) investment and an access price greater (lower) than the true economic costs of providing the service.

The ACCC measures the cost of capital using the WACC. There are a number of parameters that are inputs to estimating an overall WACC, which this paper has discussed. As table 4 shows, for most of these parameters, the ACCC considers the approach to estimating them to be reasonably settled.

Table 4 WACC parameters: settled or contentious approach and/or value

Parameter	Approach settled	Value dependent on financial market conditions	Value dependent on Proposal
Equity beta	✘	✓	✓
Asset beta	✘	✓	✓
Debt risk premium	✓	✓	✓
Risk free rate	✓	✓	✘
Debt & equity ratios	✓	✘	✓
Market risk premium	✓	✘	✘
Debt beta	✓	✘	✘
Gamma	✓	✘	✘
Tax rate	✓	✘	✘
Debt issuance costs	✓	✘	✘
Equity issuance costs	✓	✘	✘
Asymmetric social outcomes	✓	N/A	N/A
Asymmetric risk	✓	N/A	N/A
Real options	✓	N/A	N/A

Furthermore, whilst Telstra has proposed in the past to increase the WACC to account for asymmetric social outcomes, in light of the Tribunal's decisions in this regard, the ACCC does not consider such adjustments appropriate, subject to evidence being

presented that would convince it otherwise. The ACCC has also not considered regulatory truncation risk and ‘real options’ adjustments to be appropriate in any regulatory decision to date, and its position in these areas is also unlikely to change.

For those parameters that aren’t affected by financial market conditions or firm/asset related risks, if the approach to estimating them, and therefore their value, remains in line with the approach taken in other regulated areas, regulatory certainty will be promoted. These parameters include gamma, the debt beta, the market risk premium and the tax rate. As such, in assessing NBN Proposals, these parameters should be less contentious than others.

Whilst the ACCC considers the *approach* to estimating parameters to be settled, the *value* of some parameters for the NBN WACC are likely to differ from those currently used.

These differences should reflect any difference in risk associated with the particular NBN Proposal relative to the risks associated with investment in the copper network, and any differences in risk associated with the financial structure of the particular Proposal. As such, values for the equity and asset betas, the debt risk premium, and the debt and equity ratios are likely to differ from those currently used by the ACCC in telecommunications.

The differences should also reflect changes in general financial market conditions since previous regulatory decisions and FTTx discussions. These conditions will affect the value of the debt risk premium, as well as the risk free rate, but will not affect the approach to estimating their value.

The equity and asset betas are likely to be the most contentious parameters when assessing NBN Proposals. This is because the approach to estimating them is less settled than for other parameters, their value is dependent on the specific details of the Proposal in question and the period over which they are estimated, and because they have a large affect on the overall WACC. How the Government’s contribution is treated is also likely to be contentious.

Annexure — Re/de-levering formula

The following formula is used by the ACCC to take into account the effect of financial structure on the returns to equity holders, and for the re- and de-levering process:

$$\beta_e = \beta_a + (\beta_a - \beta_d) \left\{ 1 - \left[\frac{r_d}{1 + r_d} \right] (1 - \gamma) T_e \right\} \cdot D / E$$

Where:

β_a = the asset beta

β_d = the debt beta

γ = the imputation factor (gamma)

T_e = the effective tax rate

D/E = the debt to equity ratio¹⁴⁸

There are several different formulas that can be used for this purpose. The ACCC generally uses the one listed, but has stated that it will use its judgement in establishing the asset beta and how the equity beta is derived from it.¹⁴⁹

¹⁴⁸ In theory the debt/equity mix (D/E) assumed in the formula for deriving of the equity beta must be consistent with the debt/equity mix assumed in calculating the WACC.

¹⁴⁹ ACCC, *Draft Statement of Principles for the Regulation of Transmission Revenues*, 1999.

Appendix D. Pricing Flexibility

D.1. Executive Summary

- Prices for products and services are variable. ‘Pricing flexibility’ refers to ability of a firm to choose both the level and structure of prices which are to be charged for its products and services.
- In competitive markets, the pricing flexibility of firms is constrained by competition towards the costs of providing services. In regulated infrastructure markets, regulation fulfils the role otherwise performed by the competitive process in constraining flexibility to ensure prices reflect underlying costs.
- Any pricing regulatory regime must inherently make decisions regarding both the levels and the structure of prices (including the degree of geographic and customer specific differentiation), even if the decision is to let either or both of these be set by the operators themselves. The regulatory regime applying to the NBN upgrade will need to make similar decisions.
- Pricing flexibility of some extent is likely to be a highly desirable property of the regulation of the NBN upgrade. However, achieving pricing flexibility may require some degree of change to the regulatory regime currently applying to telecommunications. It will be substantially a policy decision for the Government as to what constraints, if any, it wishes to place on pricing flexibility for the NBN operator.
- This appendix considers some possible approaches to pricing flexibility, and their possible corollary consequences.
- An important advantage of pricing flexibility is said to be that it better enables the firm to ‘discover’ and adjust to uncertain demand; to match prices to consumer willingness to pay; to adjust to changing circumstances (including changes in technology and the competitive environment); and to operate in a more ‘business-like’ manner than if there is no pricing flexibility. This can have substantial efficiency benefits, in particular in the presence of well defined price caps (but can lead to inefficient excessive pricing in the absence of such well defined caps).
- Pricing flexibility can decrease incentives for vertical price discrimination, particularly in the absence of downstream economies of scale and scope. Vertical price discrimination – such as where a network operator discriminates (price, service quality, etc) in favour of the operator’s own downstream retail arm – is generally seen as undesirable from a competition policy and efficiency perspective.
- The disadvantages of pricing flexibility include that the resulting prices may not be fully compatible with universal service obligations and other similar requirements or with distributional imperatives from a policy or political perspective. For example, prices may differ across regions and customers, depending on the costs of providing services to those customers, or those customers’ willingness to pay different prices. Pricing flexibility also potentially creates greater opportunities for a vertically integrated operator to engage in ‘price squeeze’ and similar conduct.

- Two potential regulatory approaches that allow for pricing flexibility are price cap regulation (PCR), incorporating average price caps rather than individual caps on specific services; and the building block model (BBM) of regulation, used to fix total maximum allowable revenue, rather than to set individual allowable prices.
- In other regulated industries, pricing flexibility is achieved through variants of the BBM or PCR – both of these approaches can achieve pricing flexibility, broadly constrained by costs of service provision, and compensation for the level of risk involved by way of an appropriate risk-adjusted cost of capital.

D.2. Introduction

D.2.1. Price structures

Telecommunications service providers almost always provide wide sets of services (that is, they are ‘multiproduct firms’). These sets of services are necessarily accompanied by similarly wide sets of associated prices.

The choice of a set of prices involves both a choice of the level of prices and the structure of the prices (that is, both the absolute prices and the relative prices). Therefore, when the service provider is deciding on its prices (or the regulator is setting those prices), a decision must be made not only on the absolute level of the prices (that is, the prices in dollar terms), but also on the structure of the prices relative to one another. For example, when a firm (or regulator) is setting prices for two different but related products A and B, one of the important decisions is whether A should have a similar price to B, or whether there is reason for A to carry a substantially higher price than B, and what that relative price difference should be.

A regulator charged with regulating a firm’s/industry’s prices (or a government establishing a regulatory framework) also faces an additional choice. Should the regulator set prices of all (relevant) individual services, thereby setting the pricing structure as well as the price levels? Or should the regulator set only some type of average of prices (thereby effectively setting the price levels) but permit the firm to set the individual prices around the regulated average price (thereby permitting the firm to set the pricing structure)? The second choice involves granting the firm a degree of pricing flexibility that it would not have under the first choice.

The structure of access prices will have an important impact on the development of infrastructure and competition in the industry. As much as the level of access prices, an inadequate structure of access prices can send the wrong signals for the operator’s choices of investment in infrastructure and for entrants’ entry / exit decisions. As a general statement it can be said that the:

“setting of access charges regulates the rate of return on the incumbent’s investment in infrastructure. There is in general a trade-off between promoting competition to increase social welfare once the infrastructure is in place and encouraging the incumbent to invest and maintain the infrastructure. That is, regulators must encourage entry without expropriating incumbents.”¹⁵⁰

The desirable amount of pricing flexibility is likely to depend critically on the level of vertical integration in the industry. A vertically integrated industry typically contains an operator that provides both upstream ‘bottleneck’ infrastructure services (and typically owns such infrastructure), and downstream services in competition with rivals. A central difficulty with a vertically integrated industry is that a vertically integrated operator may have the incentive to discriminate against downstream rivals that rely on the upstream bottleneck infrastructure to provide their downstream services. By contrast, such a problem will generally not occur where the industry is vertically separated, that is, where the industry is vertically separated so that the infrastructure provider is not also a downstream service provider. Where an industry

¹⁵⁰ J-J Laffont and J Tirole, *Competition in Telecommunications*, Cambridge MA: MIT Press, page 7.

is vertically integrated, a core policy challenge is to design the regulatory and other frameworks so as to mitigate against such incentives to discriminate.

D.2.2. Pricing flexibility in the NBN context

The Request for Proposals (RFP) contains several requirements that may influence policy choices in relation to pricing flexibility and other relevant features. Further, there are certain tensions among the different objectives, and any final policy position is highly likely to require some degree of trade-off between these different requirements in order to reach a balanced resolution.

The most relevant requirements in relation to pricing flexibility are:

1. that prices should reflect underlying costs and enable uniform retail prices nationally (see objectives 6 and 11 in the RFP) – this would generally speak against flexibility for prices; and
2. that flexibility and good incentive structures should be encouraged (implied by objectives 8, 10 and 11 in the RFP) – this would generally favour greater pricing flexibility.

In its regulatory submissions, Telstra has argued for more pricing flexibility. In particular, Telstra seeks a lesser emphasis on the setting of ex-ante price points for individual access service,¹⁵¹ and movement towards an approach of greater flexibility of individual service pricing within broader overall constraints. Telstra argues that a NBN operator will require a reasonable degree of pricing flexibility at retail and wholesale levels because demand is unpredictable and many products will be new to the market, and that scope will be needed to experiment to discover demand and price levels. However, Telstra also argues that pricing flexibility must be provided in a manner that does not deprive a NBN operator of pricing certainty, and hence must accommodate scope for fixed price ceilings and other pricing arrangements that are locked in for the life of the relevant assets. Telstra notes that there may “be tensions between certainty on the one hand for access seekers and flexibility to price innovate for a NBN operator on the other hand.”¹⁵² Telstra argues in one submission that a solution to this may be the approach of anchor product regulation.¹⁵³ Under this approach, only the retail or access price of key entry level ‘anchor’ products (for example, a voice and low speed internet service) would be regulated — the NBN operator would be given unrestrained flexibility in the pricing of other services (though it is argued that the prices of unregulated services would be indirectly constrained by the pricing of the anchor products).¹⁵⁴

¹⁵¹ However it should be noted that the ACCC does not have wide ranging price setting powers with respect to telecommunications services. The ACCC can only set prices for declared services on a bilateral basis following the lodgement of an access dispute. Therefore, a degree of flexibility already exists for third party access, as operators have full price setting powers in respect of all undeclared services.

¹⁵² Telstra, *Public Submission on the Roll-out and Operation of a National Broadband Network for Australia*, 2008, p. 25.

¹⁵³ Telstra, *Public Submission on the Roll-out and Operation of a National Broadband Network for Australia*, 2008, p. 25.

¹⁵⁴ Ofcom, *Future Broadband: Policy Approach to Next Generation Access*, 2007.

Terria proposes that a pricing methodology (model) should be established to determine the relevant access price, with the ACCC having the right to review key inputs in the model against an objective criterion appropriate to the telecommunications industry (such as reasonableness) on a regular basis. Terria also recommends that the ACCC should have the right to determine those key inputs if it is not satisfied with an operator's proposal. It argues that this would give the access provider additional certainty regarding the return it may make, and give certainty to access seekers regarding the price they have to pay for access. Optus also supports the ACCC having the responsibility to approve access terms and prices.

Most industry submitters, along with many welfare and consumer groups, government agencies and individuals emphasise the importance of the ACCC determining access prices, and the importance of cost based principles.

Drawing on the criteria of the RFP and other economic considerations, a desirable regulatory regime for a NBN upgrade is likely to contain a small number of core features.

Firstly, the resulting prices are likely to be broadly reflective of costs, with reference both to marginal costs and average costs. This will generally assist in attaining acceptable levels of static economic efficiency, and in mitigating against substantial windfall gains or losses for operators.

Secondly, there should be good incentive structures to encourage operators to engage in continued improvements in efficient costs levels and continued advances in productivity, and to engage over time in efficient investment in infrastructure and technological improvements. This will generally assist in enhancing static and dynamic economic efficiency in the industry.

Thirdly, there should be adequate opportunity for operators to dynamically engage in 'discovery' of uncertain and changing demand and consumers' preferences, and to respond effectively to external changes in demand, consumers' preferences, technology, and similar. This will typically be achieved by some sort of flexibility and responsiveness in pricing and other settings.

This appendix examines the issue of pricing flexibility in the provision of services on the NBN.

Section D.3 outlines some of the potential advantages of pricing flexibility.

Section D.4 provides an overview of some regulatory models which can assist in achieving pricing flexibility.

Section D.5 outlines some of the practical limitations of some of the regulatory models which allow pricing flexibility.

Section D.6 examines whether there should be a requirement for side controls when allowing a firm to set prices in a flexible manner. Consideration is given to what these controls may be and how would they change as the degree of vertical integration increases.

Section D.7 looks at how the degree of pricing flexibility that is desirable varies according to whether the Proponent is vertically integrated or separated.

Section D.8 examines the issue of price discrimination and the implications that price discrimination at the wholesale level has on prices at the retail level.

D.3. The potential advantages of pricing flexibility

D.3.1. Pricing flexibility may increase economic welfare through increased efficiency

It is said that by allowing pricing flexibility across individual products, the resulting price structure will be more economically efficient. The commonly argued reason for this is that more flexible pricing will be more Ramsey-orientated (see Box 1 below) and therefore more consistent with economic efficiency.¹⁵⁵ The principle behind this argument is that this type of pricing most closely aligns with consumer preferences and demand conditions for different products and consumer groups, so that it distorts consumption decisions less than other forms of pricing. The result is the economic welfare across all consumers will in principle be maximised.

One argument against such Ramsey-orientated pricing is that this will typically result in price-discrimination between (groups of) consumers. This is argued by some to be inequitable (see section D.7 below for further development of the arguments for and against price-discrimination). A further consideration is that the use of Ramsey pricing principles by regulators can require information that is not available.

Box 1: Ramsey pricing

‘Ramsey pricing’ refers to the set of prices that maximise some given or pre-determined measure of the total economic welfare of the society. The resulting prices will generally be a function of the underlying costs of production, the demand-side substitution and supply-side bypass possibilities, and the elasticities of demand for the product (the responsiveness of demand to price changes). This can also be considered in relation to different user groups or users. In general, comparatively higher price-cost mark-ups apply to products with less ‘elastic’ (responsive) demand than to products with more elastic demand, as consumption decisions will be distorted less in relation to less elastic products, so that the impact (comparatively) on social welfare is therefore minimised.

D.3.2. Use of new information about changing circumstances

Another argument for pricing flexibility is that it will typically allow the operator to make better use of new information about changing circumstances. A very substantial amount of information is potentially relevant to a NBN operator or regulator in making decisions regarding pricing (and other operating decisions), including information on consumer preferences or demand, different technologies, competitive pressure, and so forth. Further, this information is likely to evolve substantially over time given the likely technological changes in broadband provision, as well as the

¹⁵⁵ See I Vogelsang and J Finsinger (1979), “A regulatory adjustment process for optimal pricing by multi-product monopoly firms”, *Bell Journal of Economics*, 10, 151-171.; M Armstrong and J Vickers (1991), “Welfare effects of price discrimination by a regulated monopolist”, *RAND Journal of Economics*, 22, 571-580..

ongoing process of development of applications for which broadband can be used. Pricing flexibility would arguably allow the operator to adjust its individual prices to reflect such large amounts of evolving information, including “elasticities of demand, complementarities and substitutabilities between segments, and competitive pressures”, even if the operator cannot affect its overall average price if this is constrained by regulation.¹⁵⁶ In this sense, pricing flexibility can permit the incumbent operator to become more business orientated.

A low degree of pricing flexibility may not provide sufficient incentives for the operator to respond to increased information about and changes in demand (which it can ‘discover’ through responding to market signals), in particular in environments marked by some competition and technological change (in addition to enduring bottleneck and natural monopoly characteristics). That is, there are limited incentives for the operator to increase capacity or make services available to more users, because again it does not get compensated for doing so. This could mean that potential dynamic efficiency and productivity gains are lost.

D.3.3. Imperfect and asymmetric information

A third argument in favour of pricing flexibility is that the regulated operator will typically have more fully-developed information about their own business (for example, their cost structures) and about the regulated industry (for example, demand conditions and consumer preferences) than the government or the regulator. In practice, a regulator seldom has complete information about consumer demand in the industry or about the technological capabilities and cost structures of regulated producers.

It is argued that, under these conditions of imperfect and asymmetric information, a degree of pricing flexibility provides greater incentives for the regulated operator to make best use of the information it has available, and provides greater incentives for it to seek further and better information. The consequence is argued to be greater total economic welfare for consumers and other market participants.

A critical question is: how can the regulator best induce the regulated firm to employ its superior information to further the broader interests of societies, as well as furthering the firm’s own interests? That is, how can the interests of the regulated firm be broadly aligned with the interests of the broader society?

In answering this question, there is a trade-off between providing strong incentives for the regulated firm to align prices with demand and reduce costs (which call for a high-degree of pricing flexibility) and preventing the firm extracting too much rent (which calls for a lower degree of pricing flexibility). Increasing the incentive power of the regime increases the incentives to the firm to behave efficiently but is also likely to increase the profits retained by the firm (and vice versa).

A general principle in relation to the informational requirements that are placed on the regulator — and by implication the degree of flexibility given to the regulated firm — might be:

¹⁵⁶ J-J Laffont and J Tirole, *Competition in Telecommunications*, Cambridge MA: MIT Press, p. 4.

“The access pricing rule [more generally, the regulatory framework] must impose reasonable informational requirements on the regulator in terms of computing the access charges and monitoring compliance. This simplicity helps to reduce the regulatory costs and limit the influence of politics in the determination of access charges.”¹⁵⁷

D.4. Relevant forms of regulation

It is a widely recognised result of economics that unconstrained monopolies (and firms with substantial market power subject to minimal levels of constraint) in general charge higher prices and produce lower amounts of output than the social optimum, which is typically seen to be the output and price that will prevail in a competitive market for the good or service in question. Where a market is capable of being competitive, the optimal policy response, to ensure that the market becomes or remains competitive, is typically achieved by the application of competition policy (‘anti-trust’) measures. However, in some markets competition is inherently difficult to achieve, in particular in industries with strong natural monopoly features such as network economies and/or enduring bottleneck characteristics (typically including fixed-line telecommunications and utilities industries). In essence, a natural monopoly arises in an industry (or in an element of an industry) if technology and consumer demand are such that it is substantially more economical for one firm to serve the relevant market than for several firms to serve it. In such industries, the optimal policy response is often to regulate the natural monopoly firms, including the prices that the firms charge, and other service characteristics such as quality.¹⁵⁸

Once it has been decided that an industry should be regulated (or certain elements of the industry, such as infrastructure bottlenecks, for example by means of an access regime as is currently contained in Parts IIIA and XIC of the *Trade Practices Act 1974*), further policy decisions must be taken. Typically, price regulation is a key component of economic regulation of such industries.

But what form should the regulation take?

D.4.1. Rate of return regulation

Some approaches to regulation require each regulated price to be individually approved. Early forms of price regulation (especially in U.S. utilities, including telecommunications) were often based on notions of rate of return regulation (RORR). Under RORR, the regulator specifies an allowable rate of return on the firm’s total costs, including operating and capital (depreciation) costs. Prices under rate of return regulation (RORR) are thus set predominantly with reference to a measure of the cost of production, so that the operator may typically charge the relevant (variable) cost of production, plus an allowable rate of return on capital. Where a change to the regulated price is sought by the service provider, the change may typically only occur upon application to, and approval by, the regulator.

¹⁵⁷ J-J Laffont and J Tirole, *Competition in Telecommunications*, Cambridge MA: MIT Press, page 7.

¹⁵⁸ Attempting to replicate competitive market outcomes (as closely as is reasonable in the circumstances) is the most common (stated) objective of economic regulation. Regulation has, however, also been enacted for a variety of other reasons. These have included distributional rationales (as between the consumers and the producers, or different groups of consumers, or both), and regulation at the behest of firms seeking protection from too much competition. (for example, Part X of the TPA, tariff protection of industries, and similar)

In practice, RORR is generally implemented when the regulator specifies the allowed prices that a regulated firm may charge that the regulator estimates will give the regulated firm the allowed rate of return. In summary, under RORR:

- The regulator sets prices (typically with reference to predicted demand) – the firm has little discretion in altering these prices once they are set.
- Prices are adjusted to keep the rate of return constant – the regulator ensures that the realised rate of return does not deviate substantially from the target rate, and that the firm has opportunity to earn the target rate of return on an ongoing basis.
- Costs directly affect prices – prices are adjusted to reflect significant changes in costs.

Other commonly applied forms of regulation with similar features are:

- Marginal / incremental cost-based approaches – such as TSLRIC, TSLRIC+ and TELRIC. (The appendix, ‘Valuing the Sunk Network’, explains these regulatory approaches further.)
- Building block model approaches (see section D.4.2 below).

Problems identified with rate of return regimes

It has been argued by some that RORR can give rise to a variety of adverse consequences, in particular that such approaches do not provide sufficient incentives for efficiency gains by the operators.

One argument is that such approaches to regulation may not provide adequate incentives for the operator to minimise costs or improve productivity, and can encourage the operator to over-invest in capital where the allowable rate of return is higher than the underlying cost of capital (the so-called ‘gold plating problem’). The argument is that, in the absence of any regulatory mechanism to encourage efficiency gains, the lack of incentive to minimise costs arises because prices are typically set to cover the firm’s actual costs, irrespective of the level of those costs. Under a pure ‘actual-cost’ approach, if the firm invests (capital and/or effort) in cost-minimisation, then the cost savings will subsequently be passed on to consumers in the form of lower prices. It is argued that this effectively removes the incentives for the firm to make such cost-minimisation effort, as it will not benefit from the investment. In a similar manner, the firm does not have strong incentives to avoid cost increases, as it will be compensated for the cost increases by way of higher regulated prices.

Another argument is that the approach may not provide sufficient incentives for the operator to respond to increased information about and changes in demand (which it can ‘discover’ through responding to market signals), in particular in environments marked by some competition and technological change (in addition to enduring bottleneck and natural monopoly characteristics). That is, there are limited incentives for the operator to increase capacity or make services available to more users, because again it does not get compensated for doing so.

Further, it has been argued that such approaches are costly and cumbersome to implement (in terms of administration, information requirements, etc.), as they typically require the regulator to obtain substantial amounts of information and typically involve the regulator setting individual prices for a range of services.

These argued flaws in rate of return regulation have been proposed as arguments in favour of incorporating incentive-orientated mechanisms in regulatory regimes.

D.4.2. Incentive based regulation

Building block model ('BBM') of regulation

One form of regulation that is potentially consistent with more incentive based regulation is the building block model (BBM) approach.¹⁵⁹ Further, while BBM is conceptually best seen as a cost-based approach, it can potentially be applied in a manner that incorporates pricing flexibility elements.

The BBM approach is (among others) the basis for the ACCC / AER's regulation of the electricity and gas sectors. The ACCC / AER typically uses the BBM approach to establish (in accordance with the relevant legislation, code or rules) reference tariffs for reference services. These tariffs then form the basis of negotiations between an operator and users, within a framework access arrangement that has been approved by the ACCC / AER.

Incentive elements can be incorporated into the BBM by permitting operators that 'beat the benchmark' within review periods to retain the associated benefits. Review periods can be set over longer periods (e.g. 3 or 5 years rather than annual) to permit operators sufficient time to outperform the relevant forecasts. Operators can be given strong incentives to achieve such out-performance by being permitted to retain all or some of the associated benefits. For example, the operators may be allowed to retain some or all of the increased earnings resulting from them increasing revenues beyond forecast growth by growing their markets, or decreasing costs by operating the assets more efficiently than forecast.

In its basic form, the BBM accounts for each cost category faced by the service provider:

- Return of capital: periodic depreciation on capital costs.
- Non-capital expenditures including operations, maintenance and administrative costs.
- Return on capital: return on equity and return on debt, calculated with reference to the allowable regulatory asset base. (The appendix, 'Cost of Capital', provides further information on determining the allowable weighted average cost of capital.)
- Other expenditures or allowances including adjustments for taxation and incentive schemes.

¹⁵⁹ Among others, see: ACCC, *Submission to the Productivity Commission: Review of the Gas Access Regime*, 15 September 2003.

Typically, these periodic costs are then aggregated to determine the periodic revenue required by the operator to cover its reasonable costs, including reasonable returns on capital. More specifically, the **maximum allowable revenue** for a period is the sum of:

- the allowable **regulatory asset base** at the beginning of the relevant period, times the allowable **weighted average cost of capital**; PLUS
- the allowable **depreciation** during the relevant period; PLUS
- the allowable non-capital expenditures during the relevant period; PLUS
- other expenditures or allowances for the relevant period.

In the simplest form of the BBM, the maximum allowable revenue is then divided by forecast demand for the relevant period to calculate a reference tariff or price for the service in question. This application of the BBM requires that demand forecasts be made for the time periods to be covered in each regulatory review period.

However, the BBM can be applied without taking the extra step of calculating specific reference tariffs by way of demand forecasts (as per the above). The BBM can allow pricing flexibility by allowing the operator a total amount of maximum allowable revenue, and permitting the operator to charge the prices that it sees fit within the total maximum allowable revenue cap.

The BBM is often based on ‘efficient costs’ rather than actual costs. Efficient costs can be determined on a variety of different bases, including benchmarking processes applied to actual costs. The purpose of using efficient costs is the view that, going forward, the benchmark for the operator’s compensation should not include any current or legacy operational inefficiencies. However, the BBM can also be based on actual costs (i.e. irrespective of whether or not they are efficient costs) both in principle and in practice.

Price cap regulation (‘PCR’)

Price-cap regulation (PCR) is an early form of incentive-based regulation that potentially permits substantial flexibility to the operator in price setting, typically both across the retail and the wholesale levels. PCR was designed as an alternative form of regulation that would eliminate the cost disincentives associated with rate of return regulation. The discussion in this section focuses on PCR at the wholesale level — if PCR is effective at this level, retail prices are also likely to be such that efficient outcomes are promoted.

Price caps became common in regulating incumbents in a number of network industries, including in U.S. and Australian telecommunications.¹⁶⁰

A typical price cap regulatory system has four basic characteristics:

¹⁶⁰ J-J Laffont and J Tirole, *Competition in Telecommunications*, Cambridge MA: MIT Press, Chapter 1.

1. The regulator establishes an acceptable set of prices – these are the initial price cap, or starting point.
2. In a multi-product industry, the regulator does not establish a specific maximum price for each product, but establishes an overall ceiling for aggregate prices for a basket of services.
3. The regulator may allow the price cap to be adjusted over time by a pre-determined adjustment factor.
4. Regulators typically provide for a periodic review of the system at set intervals.

A core aspect of price cap regulation is that any cost savings achieved by the firm are retained (at least in part) by the firm, thereby reinstating the incentive of the firm to achieve cost savings and efficiencies. Note that this is also a feature of BBM if applied as described above – firms retain (fully or partially) cost savings achieved within a regulatory period.

Other important features of such price cap regulation are as follows:

1. Regular prices resets – the rate at which the firm can increase prices over time is fixed for pre-determined periods, typically several years, and is not adjusted to reflect realised costs and profits during this regulatory period.
2. No link to costs – current prices are not explicitly linked to current costs (see below).
3. Regulatory discretion – the regulator has considerable discretion over future policy (i.e. beyond the current regulatory period).

A common way of implementing PCR for a multiproduct firm is by way of an average tariff basket and similar forms of PCR (here collectively referred to as ‘Average PCR’). Average PCR has been applied in respect of telecommunications in a number of U.S. states and other jurisdictions. Average PCR shares the above listed features of PCR, with one additional feature:

- Control of average ‘basket’ price only – only the firm’s average price is controlled, and the firm is free to control the pattern of relative prices within the basket of regulated services.

Therefore, an average price cap is an overall constraint on some measure of the average of the firm’s prices (or alternatively a subset of those prices), rather than a separate price constraint placed on each of the firm’s products. This is generally implemented by calculating a price index on a basket of goods. The cap is typically adjusted each year to account for inflation and expected technological improvements.

Within the confines of the cap on its average price level, the firm typically is otherwise free to adjust the price levels of individual services. The average price cap can be subject to some constraints on the speed of price rebalancing.

An average price cap thereby gives the operator significant price flexibility in setting prices of individual products and services. This is compared with a regime of separate price caps on individual products / services, where the operator does not have comparable flexibility in pricing among its different products / services.

A further form of PCR is global price cap regulation ('Global PCR'). Under Global PCR, the average price cap would apply to all prices charged by the regulated operator. If applied to a NBN upgrade, a Global price cap could be applied to both wholesale and retail prices.

Global PCR of this form has been proposed in extensive and respected economic literature¹⁶¹, but has not yet been implemented fully in practice anywhere (unlike other forms of Average PCR, which have been implemented for telecommunications and other industries in a number of jurisdictions). One possible reason for non-implementation of Global PCR up to now is that it is a relatively recently proposed variant of the broader concept of Average PCR. Implementation would therefore involve additional considerations.

An NBN operator would likely be a multiproduct firm, so that if PCR was chosen as the regulatory framework, then this could be implemented by way of Global PCR.

PCR and some BBMs allow pricing flexibility

As stated above, an important feature of price cap systems and some BBM systems of regulation is that they permit the firm greater flexibility in setting its prices. In particular, pricing flexibility would typically allow the operator to respond to changes in consumers' preferences and demand, or shifts in production technology, by adjusting the relative prices of its different products. For reasons outlined in section D.3, this may result in substantial increases in economic welfare

This pricing flexibility would typically be exercised within the context of certain constraints imposed by the regulatory regime that is in place. Where the regulatory regime is PCR, the operator would be able to adjust its relative prices within the constraint of the overall / average price cap. In the case of BBM regulation, the operator could adjust its relative prices subject to the overall maximum allowable revenue constraint.

The incentive and efficiency properties of incentive-based regulation

A feature of incentive-based regulation (such as PCR, or an appropriately implemented BBM) is that the link between prices and costs is substantially broken (at least over time – prices and price caps may nonetheless be set initially in reference to underlying costs, and be adjusted over time with reference to expected / desired productivity improvements or other cost-reflective criteria). Under a common form of price cap regulation, the prices the firm charges are permitted to increase (on average) at a specified rate for a specified time. The specified average rate of price increase is often linked to the overall rate of price inflation, and typically does not reflect the

¹⁶¹ See e.g. J-J Laffont and J Tirole, *Competition in Telecommunications*, Cambridge MA: MIT Press; J-J Laffont and J Tirole (1996), "Creating competition through interconnection: theory and practice", *Journal of Regulatory Economics*, 10, 227-256; and D Sappington (2002), "Price regulation", in M Cave, S Majumdar and I Vogelsang (2002), *Handbook of Telecommunications Economics: Volume 1*, Amsterdam: Elsevier Science BV.

firm's realised production costs or profits. Under PCR, the firm's past cost performance is in principle not intended to be reflected in the (periodic) revision of the price cap – the price cap is partly intended to weaken the link between prices and costs, with a principal purpose being to suppress the link from cost inefficiencies to price increases, with the aim in turn of providing the firm with powerful incentives for cost reduction. The incentive properties of price cap regulation arise because prices are not directly linked to costs for relatively long periods of time. The consequence is that regulated firms can have strong incentives to achieve efficiencies by reducing their operating costs. In contrast, rate of return regulation adjusts the firm's prices as the underlying costs change, to assure the firm a reasonable opportunity to recoup underlying costs incurred and earn an allowable cost of capital (and/or rate of return).

PCR is a prominent example of a 'high-powered incentive form' of regulation, that is, a form of regulation that provides operators with substantial incentives to reduce costs and increase efficiencies. A 'high-powered' incentive regime is one in which the firm bears a high fraction of its cost at the margin, and similarly retains a high fraction of marginal benefits.¹⁶² By contrast, a 'low-powered' incentive regime is one in which the firm bears only a low fraction of its cost at the margin. In particular, under a cost-plus regime, the firm's costs are fully reimbursed, so that the firm is not made accountable for its cost savings or overruns.

However, it is noted that under RORR the firm is assured a reasonable opportunity to earn the authorised return on its investments over a medium or longer term, so that the firm has limited concern that its sunk investments will be expropriated by future regulatory policy.

The U.S. Federal Communications Commission (FCC) generally prefers price-cap regulation to rate-of return regulation, as in its view "it is prudent to implement regulatory systems that are better able than rate of return to operate effectively in an environment marked by competition and technological change".¹⁶³

Adjustments over time with PCR

Price caps are typically adjusted over time to allow for inflation and productivity and/or technological changes. Such dynamic adjustment is commonly known as 'CPI-X' (or 'RPI-X' in the UK). This formulation denotes that price caps are adjusted upwards for inflation (typically measured by the CPI, or the RPI in the UK), and adjusted downwards for expected efficiency savings ('X'). Other adjustment formulations include 'CPI-X+K', which has been used in the UK water industry, where K is an adjustment factor based on capital investment requirements.

The purpose of adjusting for inflation is neutralise the impact of economy-wide price changes on the real prices obtained by the operators.

Adjustments for expected efficiency changes are intended to provide incentives for efficiency savings, as any savings above the predicted rate X can be retained by the operator (and its shareholders) in the form of increased returns, at least within a given

¹⁶² For example, if the firm's costs rise by \$1, its net return is reduced by an amount close to \$1, or, equivalently, its gross return hardly moves despite the increase with the \$1 increase in costs.

¹⁶³ Federal Communications Commission, In The Matter of Policy and Rules Concerning Rate for Dominant Carriers, *Order on Reconsideration*, CC Docket No. 87-313, FCC 89-91, p.19.

review period. At subsequent reviews, the efficiency gains can then accrue (either fully or partially) to service users in terms of permanently downward adjustments in prices. The efficiency gain factor 'X' is often measured not only on the firm's past performance, but also on the performance of other comparable firms such as other operators in relevant markets. In this way, the X factor is intended to be a proxy for a competitive market, in the sense that firms that achieve greater-than-average or greater-than-expected efficiency gains can retain (some or all of) the benefit of those achievements, at least within review periods.

Adjustments over time with BBM

Maximum allowable revenues are adjusted over time by:

- rolling forward the previous period's regulatory asset base to the beginning of the relevant period – by adding allowable current capital expenditure to the previous period's regulatory asset base, and subtracting allowable current depreciation; and
- estimating allowable depreciation and non-capital expenditures for the relevant period.

In this way, the maximum allowable revenue in each period under the BBM fundamentally remains a product of estimates of the relevant period's regulatory asset base (which is itself determined from the previous period's regulatory asset base, and current allowable capital expenditure and depreciation), and the estimates of current allowable weighted average cost of capital, depreciation and non-capital expenditures.

These revised estimates can then be combined with revised demand forecasts to yield price estimates for reference tariffs. Alternatively, if the operator is to have pricing flexibility, the operator could have the total amount of maximum allowable revenue determined by the regulator, with freedom as to what prices to charge which will yield this revenue.

D.5. Practical limitations of price flexibility

There are, however, a number of limitations of regulatory regimes (such as PCR or appropriate applications of BBM) that incorporate degrees of pricing flexibility and that weaken the relationship between prices and underlying costs. These are now discussed.

D.5.1. Potential for significant gains or losses by regulated firms

Information asymmetries open doors to large windfall gains or losses by firms – where the regulator has imperfect information regarding the operator's costs (as is reasonably to be expected), there is an unavoidable trade-off between providing incentives and creating variability in the operator's profits.

The regulator may aim to make the firm fully accountable for its efficiency performance, by allowing the firm to receive \$1 in increased profits for every \$1 in cost efficiencies generated. However, cost savings or increased costs may also occur for external reasons (i.e. for reasons not connected with the firm's controllable efficiency performance). Such external 'efficiency shocks' may create windfall gains or losses for a firm under regulatory regimes (including PCR) that weaken the link between underlying costs and prices.

D.5.2. Potential issues with regulatory commitment

The problem of external costs and productivity shocks (as discussed in the previous point) raises issues of the credibility of regulatory commitment. Where firms make windfall profits over extended periods, the regulator may face pressure to reduce price caps outside of the scheduled price review process. Similarly, where a firm makes unexpected large losses, the regulator may face similar pressures to raise price caps, e.g. to keep operators alive.

Under incentive-based regimes that depart from a primary production costs basis, the regulator arguably has substantial discretion over the profitability of the firm under PCR. This raises two potential (and opposite) concerns linked to issues of regulatory commitment: (a) regulatory capture, where the regulator is too soft on the firm and voluntarily inflates the firm's rent, and (b) regulatory taking, where the regulator is too harsh on the firm and does not adequately compensate the firm for its investments and its efficiency gains.

These potential problems heighten the need for clear external objectives and guidelines regarding how the regulator is to exercise its discretion.

D.6. The requirement for side controls

D.6.1. Quality of service controls

High incentives to reduce costs can give rise to quality concerns. Under incentive-based regulation (e.g. PCR), the firm directly bears a higher proportion of its expenditures. The firm has an incentive to reduce its expenditure however it can do so, which can include expenditure on items and services that are valued by the consumers. This incentive to 'skimp on quality' may mean that PCR needs to be accompanied by increased attention to quality issues.

The effect of PCR on service quality is seen to be a potentially significant problem. A decline in quality can be seen as being in essence a disguised increase in price.

Regulators of telecommunications in both the U.K. and the U.S. have introduced quality of service side controls subsequent to introducing PCR, after it was found that the regulated firm had skimmed unduly on service quality expenditure and that this quality had decreased in response to the introduction of service regulation.

D.6.2. Universal service obligations

Universal service obligations (USOs) generally impose some sort of requirement on the operator to provide certain services (for example, certain 'base-line' services viewed as being essential) to all members of society. Further, USOs often require that these services be provided to different user groups on equivalent or similar terms. The obligation is usually to provide these services to all, irrespective of whether or not it is economic to provide these services (and on the relevant terms) to all demographic and other subgroups of society.

Two commonly argued rationales for USOs are (1) distributional arguments that it is 'just' that all members of society receive the same basic services irrespective of location and cost of delivery of those services, and (2) regional planning arguments

that provision of basic services assists the broader economic and social development of locations that are geographically distant from established urban centres.

A prominent example of a USO in telecommunications is the requirement to provide basic telecommunications services to distant rural areas on equal terms as they are provided in dense urban locales, irrespective that it is often substantially more expensive to provide such services to geographically distant locations (and that it may thereby not be economic to serve such locations on equivalent terms).

D.6.3. Limits on speed of rebalancing individual prices

In addition to the cap on average price levels (under PCR) or revenues (under BBM), freedom of price flexibility can be constrained by some constraints on the speed at which individual prices can be rebalanced.

An operator that can price flexibly subject to some cap may find it desirable to rebalance prices rapidly – this is particularly likely when price flexibility is first introduced (as the operator seeks to match different demand profiles of different user groups, and seeks to eliminate cross-subsidization) and after subsequent substantial demand or costs shocks.

Rapid rebalancing can lead to rapid price increases for some consumer groups. From an economic efficiency perspective, this is likely to be seen as desirable. However, it may be judged from a policy perspective that this is undesirable. There is likely to be a policy trade-off in this regard between total economic welfare (‘efficiency’) considerations and distributional (‘equity’) considerations. In the context of the NBN upgrade, a commensurate policy judgment and decision would need to be made.

One possible safeguard in a broader context of pricing flexibility may be to permit firms to price flexibly, but subject to some form of safeguard. Such a safeguard might be a form of approval process for very rapid price rebalancing above some form of pre-defined threshold. The object of such a process might be to capture the economic welfare benefits of pricing flexibility, while protecting market participants against unexpected rapid price adjustments over the shorter term. However, a potentially substantial issue would be that a new regulatory mechanism would need to be established, administered and enforced. In particular, a set of criteria would need to be established that would specify both the prices that should be controlled, and the rebalancing thresholds (e.g. time rates of change of prices, or prices relative to one another, or other criteria) that should not be exceeded. Specific proposed mechanisms should be examined carefully for their full impact, including the potential efficiency benefits and costs, and for potential unintended adverse consequences.

D.7. Pricing flexibility and vertical integration

One of the key concerns in regulating companies in natural monopoly industries is that a vertically integrated firm in control of bottlenecks may have the incentive to attempt to exclude its upstream or downstream rivals, either through direct exclusion, or through engaging in ‘price squeeze’ behaviour that attempts to disadvantage or exclude downstream competitors.

This is likely to be a more significant problem where there is vertical integration of the bottleneck operator with competitive upstream or downstream markets. Vertical

integration in such a case can give rise to the incentives for the operator of the bottleneck to discriminate in favour of its own downstream operations and against its downstream rivals.¹⁶⁴ Further, with vertical integration under asymmetric information (which will generally be the case as between regulator and the regulated firm), the vertically integrated operator may have incentives to exaggerate its costs in order to convince the regulator to set a higher access price, again to the disadvantage of its downstream rivals.¹⁶⁵ By contrast, where the industry's structure is vertically separated, incentives to discriminate against downstream rivals are substantially less likely to exist (although perverse incentives with respect to reporting of costs may equally exist in regulated but vertically separated industries).

Under a strictly cost-based approach to regulation, a vertically integrated operator of a bottleneck infrastructure may have incentives to discriminate against downstream rivals for the purposes of partial or full exclusion of those rivals from downstream markets. Such discrimination can be price-based (such as charging a higher price of downstream rivals than of the operator's own downstream business, one form of which is known as 'price-squeeze') or non-price-based (such as providing lower quality services to downstream rivals, or even forms of 'sabotage'). Potential for such anti-competitive exclusionary behaviour in turn typically requires close regulatory monitoring. Similar incentives for such discrimination may also arise under PCR where it is applied only at the wholesale level.

Incentives to discriminate are argued to be decreased by Global PCR, even where the structure is vertically integrated. It has been argued that Global PCR significantly reduces (or even eliminates) the incentives of the bottleneck operator to attempt to exclude downstream rivals. According to these arguments, under a global price cap, the operator manages its product lines 'symmetrically', as it has no in-built incentive to favour one product type over another. A global price cap provides the operator with the flexibility to choose which product types (including wholesale vs. retail) are profitable. Formal economic analysis suggests that behaviour that seeks to exclude rivals tends also to reduce the operator's own profit. This profit reduction is particularly clear where rivals have no market power and the exclusionary practice consists of raising the rival's costs – in formal economic modelling, the exclusionary practice is equivalent to the operator raising its own cost of providing the retail service through its competitive rivals.¹⁶⁶

However, as stated above, Global PCR has not been implemented in practice anywhere, so its practical ability to constrain instances of vertical price discrimination is as yet unproven.

D.8. Price discrimination

'Price discrimination' refers to a seller charging different prices of different buyers for reasons other than underlying costs (e.g. a simple example is charging different prices

¹⁶⁴ See e.g. M Armstrong & D Sappington (2007), "Recent Developments in the Theory of Regulation", in M Armstrong and R Porter (eds), *Handbook of Industrial Organisation III*, Amsterdam: Elsevier, 1557-1700

¹⁶⁵ See e.g. J Vickers (1995), "Competition and regulation in vertically related markets", *Review of Economic Studies*, 62, 1-17

¹⁶⁶ J-J Laffont and J Tirole, *Competition in Telecommunications*, Cambridge MA: MIT Press, pages 173-178.

of different user groups for an identical product in an identical time and place). Price discrimination will generally be profitable for the seller where different consumers (or identifiable groups of consumers) have different demand profiles, in particular different elasticities of demand (that is, different responsiveness in demand to the price of a product). Price flexibility (say, under an average price cap) will generally lead an operator to price discriminate, as it will generally be profitable for the operator to do so. In consequence, an operator under pricing flexibility will generally charge higher prices for those products (or to those consumers) for which demand is less elastic (that is, less responsive to changes in price) than would be the case if price discrimination was not allowed or not otherwise possible.

The economic literature points to substantial potential efficiency and economic welfare benefits from price discrimination. The core of these arguments is that substantial efficiency and welfare losses can arise from pricing that distort consumption decisions (e.g. cause consumption that is substantially lower than the 'efficient' levels). Price discrimination can assist to reduce these inefficiencies and welfare losses, because under efficient price discrimination the 'less elastic' products will attract a relatively higher price. In consequence, the consumption distortion will generally be less, relative to what it would have been under non-discriminatory pricing, with the result under many circumstances that broader economic welfare will be higher.

The difficulty with price discrimination arises from distribution and 'equity' arguments and considerations similar to those outlined in respect of USOs and elsewhere above. It can often be the case that demand is less elastic for 'essential' products such as basic-level telephony. Under price discrimination, such products would typically attract comparatively higher prices, with the impact falling disproportionately on lower-income groups. In this sense, there may be something of a trade-off between economic efficiency / total welfare, and distributional considerations. Decisions in relation to such trade-offs generally require the invocation of political and policy considerations. A policy-maker may decide that distributional considerations merit the equalisation of certain prices, and merit the concomitant loss in economic welfare relative to where prices are permitted to adjust freely in response to demand.

Such control of relative prices for distributional purposes generally involves indirect (cross-) subsidisation of some users by other users. A better alternative in many circumstances may be direct subsidisation, meaning that prices are permitted to adjust and vary freely, and that certain users are instead compensated by direct cash payments or favourable tax treatment. The reason this may be preferable is that under direct subsidisation there is not likely to be the same distortion of consumption decisions (and resultant loss in total economic welfare) as there is with indirect subsidisation through manipulation of price levels. As a result, under direct (rather than indirect) subsidisation there will generally be a net gain in economic welfare, even taking into account the cost of the direct subsidies.

D.8.1. Implications of price discrimination at the wholesale level on retail prices

Price discrimination can in principle occur at the wholesale level as well as at the retail level.

Price discrimination at the retail level would typically take place between different users or user groups. Price discrimination at the wholesale level would be likely to feed through to concomitant price differences at the retail level. It is recalled that price discrimination essentially involves charging different prices of different users for reasons other than costs (and would include charging different prices for an identical product). At the wholesale level, this would mean different access seekers are charged different prices for the same wholesale product that they use as an input in cost structures, even though they are using (in this example) equivalent wholesale products. This form of ‘price squeeze’ behaviour can potentially have substantial implications for the ability of the ‘higher-priced’ purchaser to compete in downstream markets, with possible implications for the level of competition in those downstream markets. Where operators are also able to price discriminate at the retail level in addition to being able to discriminate at the wholesale level, this may amplify the risks of ‘price squeeze’ behaviour and the consequent potential implications for competition in downstream retail markets.

It is also useful to recall that price discrimination may be very difficult to reconcile with equivalence requirements, whether they be imposed at the wholesale or at the retail level.

D.9. Conclusion

This appendix has considered some possible approaches to pricing flexibility, and their possible corollary consequences.

An important advantage of pricing flexibility is said to be that a firm that can price flexibly is better able to ‘discover’ and adjust to uncertain demand, is better able to adjust to changing circumstances (including changes in technology and the competitive environment), and is generally better able to operate in a more ‘business-like’ manner than if there is no pricing flexibility.

The disadvantages of pricing flexibility include that the resulting prices may not be fully compatible with universal service obligations and other similar requirements, or with distributional imperatives from a policy or political perspective. Pricing flexibility also potentially creates greater opportunities for the incumbent to engage in ‘price squeeze’ and similar conduct.

Two potential regulatory approaches that allow for pricing flexibility are:

1. price cap regulation (PCR), incorporating average price caps rather than individual caps on specific services; and
2. building block model (BBM) regulation, used to fix total maximum allowable revenue, rather than to set individual allowable prices.

PCR is said to provide the opportunity over time to ‘break the link’ between allowable prices and underlying costs (and the regulatory requirement to evaluate detailed allowable costs). This is argued to assist in providing incentives for operators to increase efficiencies and productivity, and to be more market responsive. A disadvantage is that this may result in substantial windfall gains or losses to the operator, which may raise political issues. A further potential issue is whether the regulator would, in the event of significant losses by the operator, be required to assist

the operator by way of unscheduled reviews, with potential adverse consequences for the regulator's reputation for commitment.

A BBM approach would keep the total allowable revenue more closely aligned with underlying allowable costs. One advantage is that this is likely to assist in avoiding windfall gains or losses to the operator. A consequence is that BBM would likely require much closer ongoing and active regulatory engagement with the operator's allowable asset base (and with the operator's capital expenditure, operating and maintenance plans) than PCR would require. This may however be consistent with the higher degree of scrutiny required if the NBN concentrates the bottleneck nature of the existing fixed infrastructure.

Pricing flexibility may well need to be accompanied by targeted side controls. This is particularly the case where the operator of the NBN is vertically integrated, such as with businesses in competitive upstream content markets and/or competitive downstream retail and other services markets. Appropriate side controls in the presence of vertical integration would likely include equivalence provisions to ensure that the NBN grants equivalent access to upstream or downstream competitors. Some degree of quality of service regulation may also be necessary.

Appendix E. Funding uneconomic services

E.1. Executive Summary

- ‘Uneconomic services’ are those for which the revenues earned do not cover the costs. In the Australian telecommunications context, uneconomic services arise due to the combination of three factors:
 - There is a presumption that consumers in high cost regions (traditionally rural and remote areas) would not be willing to pay a price for telecommunications services that would reflect the long term costs (that is, including capital costs) of providing services to them. This in turn implies that, whilst generally operators may be willing to incur losses in the short term, no operator would be willing to build the infrastructure to supply services in these areas, because capital costs will not be recovered.
 - However, it is considered desirable from a social policy perspective that these customers are able to access telecommunications services — hence, Telstra is required by law to provide services to customers in rural and remote areas.
 - Further, given the absence of a willingness to pay, social policy typically also requires that these customers be able to access the services on an *equitable* basis, which is interpreted to be at similar price and non-price terms to those in metropolitan areas, despite technical and differing cost considerations.
- To the extent that such prices do not cover the costs of providing services to regional and remote areas, the operator will incur a loss, ordinarily giving rise to a need for a mechanism to fund the shortfall.
- The NBN’s objectives for 98 per cent coverage of **equal capacity**, combined with the requirement for **uniform retail pricing** of key entry level voice and broadband services, implies that the NBN operator could incur a loss in serving some customers, particularly in high cost regions. As such, how the gap between the revenues earned from and costs of providing services to these customers will be funded needs to be considered.
- It should be kept in mind that the costs of providing services to traditionally high cost areas may actually reduce with the NBN upgrade, hence there may be fewer uneconomic services to fund relative to the legacy network. This will depend critically on the technologies Proponents choose to deploy in traditionally high cost areas.
- Furthermore, whilst determining the shortfall between revenues and costs on the legacy network has been problematic for the (sunk) legacy network, the process should be more transparent following the NBN upgrade. Via the NBN RFP process, Proponents had to explicitly state the technologies that will be deployed in different regions, and their costs. That is, they were effectively required to state what the costs of funding services in different regions will be. In some respects, the NBN tender process mimics contestability for universal service provision.

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- There are three broad mechanisms that have been used to fund uneconomic services in the past — internal cross subsidies, ‘access deficit’ charges, and Universal Service Funds (USFs). Internal cross subsidies occur when revenues from services for which the price is above costs are used to fund services for which the price is below costs. Access deficit charges are a variation on internal cross-subsidies — with access deficit charges, all providers of subsidising services contribute payments to subsidise uneconomic access services (so, for example, all service providers in metropolitan areas). USFs are pools of funds that are used to directly compensate/subsidise the service provider for providing uneconomic services.
- Internal cross subsidies were in place for many years prior to the introduction of competition. However, past experience (both in Australia and overseas) has clearly shown that internal cross-subsidies are unsustainable in a competitive market:
 - Retail cross subsidies are unsustainable if there is competition in the retail markets for the services which provide the subsidy (e.g. metropolitan markets).
 - Wholesale cross-subsidies — that is, averaged access prices — are unsustainable if there is infrastructure-based competition in regions which provide the subsidy (e.g. metropolitan markets).
- However, if access seekers in metropolitan areas have no other option but to purchase access services from the NBN operator — that is, if there is no possibility that the NBN will be bypassed — averaged access charges may be sustainable.
- The sustainability of uniform/averaged access charges will also depend on the cost of providing services in traditionally high cost regions, which in turn will depend on the technologies proposed to serve these regions. If the costs do not differ a great deal across regions, uniform/averaged access prices would be efficient and sustainable, because they would more or less be cost-reflective. Indeed, if this is the case, it is possible that there will be no uneconomic services within the NBN footprint.
- Still, internal mechanisms such as cross-subsidies lack transparency and accountability. With a vertically integrated NBN operator, they also create anti-competitive conduct concerns (e.g. the ability to price squeeze). Anti-competitive conduct concerns would be reduced in the case of a wholesale only Proposal. The ACCC notes that Australia is a signatory to the *World Trade Organisation (WTO) Agreement on Basic Telecommunications*, which requires that only transparent and accountable funding mechanisms are implemented.
- If access prices are de-averaged to reflect cost differentials across regions *it is still possible to achieve uniform retail pricing objectives*. Direct subsidies can be offered to operators in high cost areas to recover shortfalls. Hence, there would be no disincentive to offer retail services in high cost areas at a price different to that offered in low cost areas. Subsidies could be sourced from a USF.

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- A USF provides an alternative means of funding uneconomic services to internal cross-subsidies.
 - Subsidies are provided from the fund to the operator or operators that provide services to uneconomic regions to compensate them for their losses in doing so.
 - The mechanism can be structured such that either one operator, for example, the NBN operator, is the only service provider in uneconomic regions (for example, by providing subsidies at the wholesale level, to the wholesale supplier i.e. the NBN operator) or multiple operators provide services in uneconomic regions (for example, by providing subsidies at the retail level i.e. to resellers of the NBN operator's wholesale products).
 - There are likely to be unavoidable distortions in the market for whichever technology receives a subsidy. For example, assume 3G is deployed and subsidised in high cost areas. The common costs (for example, coverage) associated with that operator's 3G network across all regions will be reduced relative to those that an unsubsidised operator would have to recover, which may preclude further roll-outs of competitive infrastructure into these high cost regions. Further, that operator's revenues would be subsidised to the extent that coverage can be used as a marketing tool, which would provide a competitive advantage across all regions.
 - Funds for the USF should be collected in an efficient and transparent manner. There are three broad options — general taxation revenues, contributions from service providers through an industry based levy or from consumers. Which of these is most efficient and transparent, will depend on the specifics of their implementation.
- Consideration should be given to uneconomic services outside the NBN footprint.
 - If an operator other than the NBN operator services the last 2 per cent of premises, internal mechanisms are unlikely to be sustainable for funding the last 2 per cent of premises. In this case, a USF, or direct government subsidy, would be required.
 - If the NBN operator is required to service the last 2 per cent of premises, but a different funding mechanism is used for these premises than that used for uneconomic services within the NBN footprint, distortions in competition and investment across regions may arise. There would not appear to be a clear rationale for using different funding mechanisms for the two different uneconomic regions if they are both supplied by the same operator.
 - Currently, no requirements for quality and price have been laid out for the last 2 per cent of premises. The desirability of differentials in price and quality across 'the last two per cent' and the NBN footprint therefore also needs to be considered.

E.2. Introduction

In general, a service provider will not, of its own accord, provide services to customers who do not generate enough revenues to cover the costs of providing services to them. It would be ‘uneconomic’ to provide services to such customers, hence, they are known as ‘uneconomic services’. Importantly, what is uneconomic for a new entrant may not be uneconomic for an incumbent with sunk assets. From a social policy perspective, it is widely considered undesirable for some members of a society to not have access to basic services. What constitutes a basic service will, of course, change over time.

The revenues a service provider can earn may be constrained by consumers’ willingness to pay, competition, or regulation. For example, in contestable markets, a service provider’s ability to earn revenues is constrained to its costs by the threat of competition. On the other hand, an unregulated monopoly infrastructure provider’s ability to earn revenue is less constrained. The prices it is able to charge end users, and therefore the revenues it earns, are dictated by the willingness of consumers to pay for the service. Its investment decisions therefore reflect the difference between the revenues it expects to earn from a group of consumers or a specific region and the costs of earning this revenue. Investment is likely to be greatest (least) with regard to consumers or regions for which this gap between revenues and costs — profits — is largest (smallest).

In the Australian telecommunications context, the revenues that the incumbent operator has been able to earn have been constrained, by both:

- access regulation — this aims to emulate a similar constraint on revenues that contestability would create. The revenues the incumbent has been able to earn from the services it provides at the wholesale/access level are constrained towards the level of the costs of providing the services.
- retail price controls — these are applied to the prices charged to end users for certain services, and are not directly related to the costs of providing the services to those end users. Hence, the difference between revenues and costs (profits) for retail services varies in line with differences in the costs of providing services to different groups of consumers and regions. The controls also indirectly constrain the prices that competitors can charge their customers.

Cost-based access regulation does not, of itself, constrain Telstra’s revenues to below costs, and therefore does not cause the ‘uneconomic service’ issue. Rather it is the presumption that some groups of end users will not be able to pay prices that cover the costs of providing services to them, plus social policy objectives which require uniform retail prices and retail price controls that make some services uneconomic.

The issue of uneconomic services typically arises in the context of end users’ access to telecommunications in remote areas. Geographically uniform retail prices are in place to ensure that end users in these areas have access to basic telecommunications services on the same basis as end users in metropolitan areas, despite the higher costs of providing these services.

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From a social policy perspective, it is considered equitable for all members of a society to receive the same basic services irrespective of where they live and the cost of delivery of those services. From a regional planning perspective, the provision of basic services to all members of a society assists the broader economic and social development of locations that are geographically distant from established urban centres.

The Request for Proposals (RFP) to roll out the National Broadband Network (NBN) makes it clear that achieving these social policy objectives remains a high priority for the NBN. For example, the Government has indicated that one objective of the NBN is to “enable uniform retail prices on a national basis” (Section 1.3.1(6)). However, Schedule 2 to the RFP only requires retail price information for *key entry level and basic services*, including both a basic voice and broadband service (see Schedule 2, section 1.5.3). Of note, fulfilment of this objective would appear to extend the operation of existing retail price controls (which currently only apply to voice and narrowband services) into services not previously controlled, specifically broadband services. The current retail price control and universal service regimes are discussed in more detail in section E.3.

Depending on the prices put forward by Proponents for these services, the revenues that can be earned from them may not cover the costs of providing services in regional and remote areas. It is unlikely that the NBN operator (or any other service provider) would, of its own accord, provide services to uneconomic consumers or regions. This is because its interests will lie in maximising value for shareholders, rather than society as a whole.

Hence, the RFP also requires that the NBN operator deliver minimum service quality (12 Mbps) and coverage objectives (98 per cent of premises). The objective of fair and equitable access to NBN services across regions gives rise to the potential for *mandatory* provision of uneconomic services. As such, the RFP recognises that there will be services provided under the NBN which will be uneconomic to provide:

Proponents should identify the parts of the network that are commercially viable in their own right and those parts that would not otherwise be commercially viable without financial support. (see 1.5.22).

As this suggests, in order for the dual objectives of uniform retail pricing and 98 per cent coverage to be simultaneously met, a mechanism will need to be created to ensure the ongoing viability of service provision to uneconomic consumers. The RFP calls upon Proponents to set out the mechanisms which they propose to ensure this. Specifically, the RFP states that:

- (a) If a Proponent is proposing cross-subsidy arrangements within access prices to support uneconomic services or achieve other outcomes, the Proponent should identify these services and outcomes, the amounts of the losses and the cross-subsidies separately, the rationale for them, and methodology for their calculation.
- (b) If a Proponent proposes another type of mechanism to support otherwise uneconomic services or achieve other outcomes, it should identify the services and outcomes concerned and set out details about the nature of its proposed mechanism and other relevant details. (Schedule 2 section 1.4.4)

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Internationally, there is no standard approach to funding universal service. The main mechanisms appear to be:

- to not subsidise universal service at all — this is based on the rationale that the universal service provider obtains substantial benefits from being the universal service provider. For example, in the UK, BT funds its universal service obligation, because these “obligations have not previously been considered to represent an unfair burden on them”,¹⁶⁷
- internal cross subsidies — between or within services provided by incumbent operators;
- ADCs — paid by telecommunications operators to subsidise the access deficit of incumbents — in this sense, they represent an external cross-subsidy, because the shortfall in funding for uneconomic services is funded from all providers’ ‘high margin’ customers, not just the incumbent’s;
- Universal Service Funds (USFs) — independently administered funds that collect revenue from various sources and provide targeted subsidies to implement universality programs.¹⁶⁸

These mechanisms are not always applied mutually exclusively, and there are a range of variations on each of them.

Each performs differently in terms of efficiency. The degree of economic efficiency will depend, amongst other things, on which services and/or end users receive and provide the subsidies, and on the size of the subsidy. In general, non-targeted and non-quantified cross-subsidies between services tend to be the least efficient mechanism. On the other hand, the most efficient mechanisms are those that provide targeted subsidies to promote specific universal service objectives, such as can take place with a USF approach. In terms of the collection of revenues to fund the USF, mechanisms that collect revenues from government sources or a wide range of telecommunications services (as opposed to just high margin services) tend to be the most efficient.¹⁶⁹

Each mechanism also performs differently in terms of transparency and accountability. This has implications for measuring the actual cost of funding universal service, and for the potential for abuse of market power by the universal service provider. Further, accountability and transparency must be features of any funding mechanism in order that Australia complies with international trade rules. The *WTO Regulation Reference Paper*, which forms part of the *WTO Agreement on Basic Telecommunications*, deals with universality and subsidy issues, and contains universal service provisions relevant to Member States. How Australia can comply with these obligations in the NBN context is discussed in more detail in section E.6.

¹⁶⁷ Ofcom, *Review of Universal Service Obligations: A Review*, 2008.

¹⁶⁸ H. Intven, J. Oliver and E. Sepulveda, *Telecommunications Regulation Handbook*, World Bank, 2000.

¹⁶⁹ Intven, Oliver and Sepulveda, 2000.

This appendix addresses the issues involved in funding uneconomic services on the NBN. Section E.3 examines the current arrangements for funding uneconomic services, including retail price controls and the funding mechanisms. Section E.4 identifies the lessons that can be learnt from how uneconomic services have been funded in the past in Australia and overseas, and from economic literature. The section examines the options for funding universal service, issues involved in costing universal service, and the interaction between different policies for achieving universal service objectives. Section E.5 discusses some key issues for funding the NBN's price and coverage objectives, including costing issues and efficiency considerations. Section E.6 examines some implementation issues, and section E.7 issues arising for universal service from the non-ubiquity of the NBN. Section E.8 concludes the appendix.

E.3. Current arrangements

The aim of universal service policy in Australia in the past has been to ensure that all Australians have reasonable access, on an equitable basis, to standard telephone services and payphones (the universal service obligation, or USO). The current regime comprises:

- arrangements for selecting universal service providers (including contestability arrangements — discussed below);
- provisions for the regulation of universal service charges;
- arrangements for the collection and distribution of the universal service levy (also discussed below);
- continued access to untimed local calls; and
- price control arrangements.

Telstra is currently the sole universal service provider of standard telephone services and data services. The standard telephone component of the USO is currently defined as the obligation “to ensure that standard telephone services are reasonably accessible to all people in Australia on an equitable basis, wherever they reside or carry on business”.¹⁷⁰ Many of the key dimensions of the current USO, such as functionality of the standard telephone service, reasonable access and pricing parity, are left to be defined by Telstra in its USO Standard Marketing Plan or USO Policy Statement. These documents define these concepts to some extent, but the documents act more as guidelines than prescriptive obligations.

Telstra is compensated for the net cost of fulfilling the USO through a subsidy. The size of this subsidy is determined by the Minister following advice from the Australian Communications and Media Authority (ACMA). The methodology for establishing USO subsidies is not prescribed in the relevant legislation, but the size of the subsidy is meant to reflect the cost of providing non-commercial services, minus

¹⁷⁰ Section 4, *Telecommunications (Consumer Protection and Service Standards) Act 1999*.

any revenue that the universal service provider receives. In 2007-08, the subsidy for universal service was around \$145 million.¹⁷¹

All carriers in Australia contribute to the USF (the fund from which USO subsidies are drawn) via a universal service levy which is based on their share of ‘eligible revenue’.¹⁷² Carriers are required to lodge their eligible revenue returns to ACMA for each year they hold a telecommunications carrier licence. ACMA then assesses the returns and advises carriers of their eligible revenues for each financial year.

Retail price control arrangements were introduced in 1989 with the aim of preventing Telecom from leveraging its market power in rural markets where it was the monopoly provider for most services.¹⁷³ They are currently set by the Minister and require Telstra to put downward pressure on its telephone call prices and, indirectly, those of its competitors.¹⁷⁴ Importantly, the current regulation which applies until 30 June 2009:

- maintains a 22 cents cap on untimed local calls; and
- promotes pricing parity between metropolitan and regional areas for local calls¹⁷⁵ and line rentals. There is a 12 month delay in parity requirements for local calls, but not for line rentals. Parity for line rentals only applies if line rental is not bundled with any other service (such as internet services), and if a third party is selected for long distance calling.¹⁷⁶

Telstra is required to report to the ACCC on its compliance with the price control arrangements. Although the price parity arrangements only apply to a subset of services, and are not particularly stringent, generally, it can be observed that Telstra and its competitors offer all of their retail products at the same price regardless of region (in those regions where the products are available).

E.4. What lessons have been learnt?

The following section discusses the main lessons that can be learnt from Australian and international experience, and from the economic literature.

E.4.1. Internal cross-subsidies

Internal cross-subsidies occur when revenues from services for which the price is above costs are used to fund services for which the price is below costs. For example,

¹⁷¹ ACMA, ‘Funding of the USO and DDSO’, at http://www.acma.gov.au/WEB/STANDARD/pc=PC_2483, accessed on 20 October 2008.

¹⁷² Eligible revenue is the telecommunications earnings of a carrier and its related parties.

¹⁷³ DCITA, *Telecommunications Universal Service Obligation (USO) Review Issues Paper*, 2007, Attachment D.

¹⁷⁴ The current arrangements are contained in *Telstra Carrier Charge—Price Control Arrangements, Notification and Disallowance Determination No.1 of 2005*.

¹⁷⁵ Specifically, the revenue-weighted average untimed local call price for residential, charity and business customers in non-metropolitan Australia in a given financial year is not to exceed the revenue-weighted average untimed local call price for residential and charity customers in metropolitan Australia in the previous financial year by more than 0.4 per cent.

¹⁷⁶ Section 19A *Telstra Carrier Charges – Price Control Arrangements, Notification and Disallowance Determination No.1 2005*.

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historically, revenues from international and long distance calls were used to fund line rental and local call charges (inter-service cross-subsidisation); and revenues from metropolitan customers were used to fund regional customers (intra-service subsidisation).

When the idea of community service obligations (CSOs) began to enter Australian telecommunications regulation (in 1975), the delivery of telecommunications services to uneconomic areas was funded via internal cross subsidies at the retail level generated by the government-owned statutory monopoly, Telecom.¹⁷⁷ In 1988, the cost of CSOs was estimated to be between \$240 — \$295 million.

During the 1970s and 1980s, governments and regulators began to reassess arguments about the claimed natural monopoly characteristics of parts of the network and the scope to introduce competition. With the introduction of competition into telecommunications markets in 1991 and the implementation of the telecommunications access regime in 1997, cross-subsidisation became increasingly complex. Competition began to force retail prices down, especially within metropolitan areas, which reduced the amount of funds that could be used from end users in these areas to fund uneconomic regions. This trend was also observed internationally, and the subsequent unsustainability of internal cross-subsidies, along with the other problems with cross-subsidies outlined in Table 1, have initiated an international trend away from reliance on this mechanism.¹⁷⁸

With the failure of cross-subsidies emerging in 1991, it was arranged for both Optus and Telstra to share the financial load of CSO/USO costs between them, based on their respective share of the telephone market, and then from 1997, for all carriers to contribute. (The merits of these arrangements are discussed in later sections.)

Averaging of access prices

The introduction of access regulation and competition in 1997 also meant that the opportunity arose to cross-subsidise at the wholesale level. Initially, this took the form of an external cross subsidy (the ADC — discussed below). More recently, wholesale level cross-subsidies have taken the form of access prices which are averaged across regions (which, as opposed to the ADC, are internal to the incumbent). If costs vary significantly across regions, averaged wholesale/access prices mean that access seekers purchasing access services in low cost regions (generally metropolitan areas) subsidise the below cost access price of services provided in high cost (usually rural and regional) areas.

¹⁷⁷ DCITA 2007.

¹⁷⁸ P. Xavier, *What Rules For Universal Service In An IP-Enabled NGN Environment? Background Paper*, prepared for ITU Workshop on ‘What rules for IP-enabled NGNs?’, 2006.

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Economic theory,¹⁷⁹ Australian¹⁸⁰ and international experience¹⁸¹ and the Australian Competition Tribunal (the Tribunal)¹⁸² support the notion that averaged access prices are unsustainable when there is the potential for infrastructure-based competition in metropolitan areas. For averaged access prices to be sustainable, the potential for duplication must either be banned (for example, there must be ‘overbuild protection’) or not technically or commercially feasible in metropolitan areas. This includes inefficient bypass, that is, bypass that would not be commercially feasible but for distorted (above cost) averaged wholesale prices.

This is because, if the cost that an access seeker would face in building its own network in metropolitan areas was less than the costs the universal service provider decides to recover in metropolitan areas, access seekers may be encouraged to build their own infrastructure. This ‘inefficient duplication’ would drive retail prices down to cost in metropolitan areas, which, if uniform retail prices are maintained, would require that retail prices also fell in regional areas. The universal service provider would no longer be able to subsidise service provision in regional areas using revenues from metropolitan areas. On the other hand, if bypass cannot occur in metropolitan areas, the network operator will have a persistent monopoly in both the short and long term in all regions, so access seekers will be unable to build their own infrastructure and undermine the above cost access price in metropolitan areas.¹⁸³

Averaged access charges can be thought of as the universal service provider’s network bearing all of the tax burden required to fund uneconomic services. The OECD argues that only a broadly-based tax, levied on the incumbent and all of its rivals — whether they utilise the incumbent’s network or their own competing network — can be sustainable in the threat of network bypass.¹⁸⁴ In order to sustain uniform retail pricing *and* retail competition in metropolitan areas, it is preferable to tax retail services, through a USF or similar arrangement. Economic efficiency is achieved by setting access prices at efficient costs and using the tax to fund shortfalls. It is distorting to not to share the tax burden amongst other networks if there are other networks with which to share it.

Although *averaged* access prices are not sustainable if there is the potential for infrastructure based competition, *uniform* access prices *are* still possible. As noted, the shortfall in high cost areas would simply be compensated for externally. If the entire shortfall is met via this external mechanism, there is no need for averaged access prices, but access prices will be uniform.

¹⁷⁹ Armstrong, M, ‘Access Pricing, Bypass and Universal Service’, *American Economic Review*, Papers and Proceedings 91(2), 2001, pp.297-301; Armstrong, M. and Sappington, D. E. M., ‘Regulation, Competition and Liberalisation’, *Journal of Economic Literature*, June 2006, pp 325-366; Cave, M. E., Majumdar, S. K. and Vogelsang, I., *Handbook of Telecommunications Economics. Volume 1: Structure, Regulation and Competition*, 2002, Chapters 8 and 10.

¹⁸⁰ The issue of averaged or de-averaged access prices has been debated at length by the ACCC, particularly in the context of the unconditioned local loop service (ULLS). For a detailed outline of the arguments for and against averaging in this context, see ACCC, *Assessment of Telstra’s ULLS monthly charge undertaking Final Decision Public version*, 2006.

¹⁸¹ OECD, *Access Pricing in Telecommunications*, 2004, pp. 134-135.

¹⁸² *Telstra Corporation Ltd (No 3)* [2007] ACompT 3, [229]-[230].

¹⁸³ Armstrong 2006; Armstrong and Sappington 2006.

¹⁸⁴ OECD 2004, pp. 134-135.

Clearly, an assessment of the potential for bypass, or perhaps more importantly, the likely willingness of consumers and access seekers to switch to purchasing services from networks other than the NBN, is important when considering whether averaged access prices would be sustainable. If consumers and access seekers would readily switch to alternative networks, above-cost access prices in metropolitan areas would not be sustainable, because the NBN operator would wish to prevent infrastructure-based entry occurring in these areas.

Also important is an assessment of the extent to which costs across regions actually differ. The ACCC has accepted uniform access prices for the specific costs of the Line Sharing Service (LSS) because the relevant cost pool is not geographically specific (that is, it is a centralised computer system).¹⁸⁵ It has previously specified geographically averaged connection and disconnection charges — although these costs do vary across different regions, the cost variations are not large.¹⁸⁶ However, the ACCC has stated that if a line cost component were to be included (which it currently is not), it should be de-averaged, because these costs do vary significantly across regions. As a consequence of the retail-minus-retail-cost approach, access prices for the Wholesale Line Rental and Local Call Services (which allow access seekers to provide a retail voice service) are averaged across regions in line with Telstra's pricing of its equivalent retail services.

E.4.2. Access Deficit Charges (ADC)

ADCs are a variation on traditional cross-subsidy mechanisms. While traditional cross subsidy mechanisms are internal to the incumbent, with ADCs, all providers of subsidising services (which were traditionally local calls) contribute payments to subsidise uneconomic access services — hence, markups on *retail* products were used to subsidise *access* products. The cost of the subsidy is therefore spread across all competitors. An ADC imposed on regulated access services is one potential solution to the problem of a diminishing cross subsidy base. An ADC, like any form of cross subsidy, involves driving a wedge between the cost of providing the service and the price being charged to access seekers. This distorts efficient use of and investment in the service that is the subject of the charge. An ADC can also act as a barrier to competition in a similar way to an industry levy (discussed below).

This approach was considered reasonable by the ACCC for a number of years. For example, in the Undertaking Reports of 1999 and 2000 the ACCC regarded it reasonable to allow Telstra to add an ADC to the conveyance cost for PSTN origination and termination (PSTN OT).¹⁸⁷ However, the ACCC noted that it favoured removing the access deficit by loosening retail price controls.¹⁸⁸ This would

¹⁸⁵ The costs typically claimed by Telstra as specific costs are IT system development and operational costs; connection group costs; wholesale product management costs; and indirect costs.

¹⁸⁶ ACCC, *Access dispute between Request Broadband and Telstra—LSS—publication of final determination and associated statement of reasons*, 2007, available at <http://www.accc.gov.au/content/index.phtml?itemId=793060>; ACCC, *Assessment of Telstra's LSS undertaking relating to connection and disconnection charges—final decision*, 2006; ACCC, *Review of the Line Sharing Service Declaration Final Decision*, 2007.

¹⁸⁷ ACCC, *Assessment of Telstra's Undertaking for Domestic PSTN Originating and Terminating Access Final decision*, 1999; ACCC, *A report on the assessment of Telstra's undertaking for the Domestic PSTN Originating and Terminating Access Services*, 2000.

¹⁸⁸ ACCC, *Review of Retail Price Control Arrangements: An ACCC Report*, 2001.

allow the prices for line rental to increase, and hence allow for greater recovery of line costs over time. This would lead to corresponding reductions in the size of the access deficit, and eventually allow it to be removed. Commencing in 2002-03, Telstra was given greater freedom in their retail price controls over a period of five years. This has allowed Telstra to re-balance its tariffs and increase line rentals, with the aim of eliminating the access deficit.

Similarly to in the Australian telecommunications context, ADCs have been rejected or are under review in many jurisdictions.¹⁸⁹

E.4.3. Universal Service Funds

As internal cross subsidies and ADCs are increasingly being phased out, they are being replaced with more efficient, targeted mechanisms to promote universality. As early as 2001 the OECD Working Party on Telecommunications and Information Services Policies noted that:

Interconnection charges should not include an access deficit contribution or universal service contribution. If there is any economic loss due to the provision of universal service (including the provision of subscriber lines), this should be compensated separately through, for example, a competitively neutral funding mechanism.¹⁹⁰

International experience suggests that universality funds have many benefits.¹⁹¹ USFs are pools of funds that are used to directly compensate the service provider for providing uneconomic services. That is, funds equal to the difference between the costs of providing the service and the revenues earned from the service are given to the provider that services the uneconomic service in order to directly compensate them.

Compared to internal cross-subsidies and ADCs, a USF can be more transparent and it can be designed to be competitively neutral (for example, by requiring a broad range of operators to contribute to the fund).¹⁹²

Contributions to the fund can be made by the telecommunications industry (as is the case with the current USF in Australia), consumers of telecommunications services or the Government from general taxation revenues.¹⁹³ Internationally, the most common approach appears to be one in which a levy is placed on telecommunications operators. The chief advantage of the current system in Australia — whereby all carriers contribute in proportion to their share of total carrier revenue — is that it offers a broad and sustainable revenue base due to the wide definition of eligible industry revenue.

¹⁸⁹ Xavier 2006.

¹⁹⁰ OECD Working Party on Telecommunication and Information Services Policies, *Interconnection and Local Competition*, OECD, 2001.

¹⁹¹ Intven, Oliver and Sepulveda 2000.

¹⁹² Xavier 2006.

¹⁹³ It should be noted that, if providers pass on the costs to them of contributing to the Universal Service Fund, and because general taxation revenue is earned from consumers (residential and business), the costs of Universal Service are ultimately always funded by consumers. What differs is how broadly the costs are spread across different consumer groups. Further, if the fund is contributed to by general taxation revenues, it would basically be a similar mechanism to direct subsidy programs such as the Australian Broadband Guarantee.

On the other hand, requiring non-universal service provider carriers to fund the universal service provider’s rural and regional activities could have negative effects on competition. In an environment where competitive carriers are finding it hard to make inroads against the incumbent, the current USO regime actually requires competitive carriers to cross-subsidise the universal service provider’s activities, thus potentially strengthening the universal service provider’s position. The contribution could thus act as a disincentive for competitive carriers to provide their own regional and rural services. This could in turn impede the deployment of alternative technologies, such as wireless, in these markets even when such delivery systems are more efficient. A further knock on effect of this is that it could reduce the incentive for the USO provider to build the most efficient network in these areas.¹⁹⁴

Table 1 provides a summary of the advantages and disadvantages of the three mechanisms discussed above.

Table 1 Options for increasing universality — advantages and disadvantages¹⁹⁵

Option	Advantages	Disadvantages
Internal cross subsidies	Traditional approach in many countries, often in combination with mandatory service obligations	Inefficient; depresses demand for services that provide the subsidies and forecloses entry in the subsidised markets, because competitors cannot match the low prices Unsustainable in a competitive environment, because new entrants typically target profitable market segments (ie the areas that provide, rather than receive, the subsidies) If untargeted, all existing users receive the subsidy, whether they can afford to pay or not Anticompetitive effects (using the cross-subsidy to enable lower prices on non-universal services) difficult to detect and prevent
ADCs	Spreads funding burden across all operators (including competitors)	Many of the same problems as with traditional cross-subsidy, including inefficiencies Difficult to calculate access costs; difficult to implement and administer in a transparent and efficient manner Encourage bypass of the PSTN, and therefore inefficient duplication of network facilities, depriving the incumbent of revenues they would otherwise earn Difficult to calculate benefits of USO provider; can lead to excessive access charges to competitors
Universality Funds	Most effective means of providing targeted subsidies to expand or support uneconomic services Potentially most efficient	Some administrative complexity and transaction expenses in establishing fund; some potential for bad governance; difficult to forecast associated costs and revenues

¹⁹⁴ Xavier 2006.

¹⁹⁵ Intven, Oliver and Sepulveda 2000.

	<p>Most transparent</p> <p>Works best in expansion of service to new areas, if combined with competitive bids for private operators</p>	
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E.4.4. Costing universal service provision on the legacy network

Subsidies received by a universal service provider are aimed at compensating it for any shortfalls in revenue. If the estimate of the subsidy required is inaccurate, competitive neutrality can be affected. If funded by industry levy, a high estimate may advantage the universal service provider if it exceeds its ‘true’ costs, because its higher contribution is more than offset by contributions it receives from other providers. These contributions, in effect, subsidise costs the universal service provider does not bear.¹⁹⁶ A too low estimate means the levy will not cover the costs of providing universal service, hence, the universal service provider would be at a competitive disadvantage. An incorrect levy can also possibly affect efficiency, in that, to the extent it is passed on to consumers, a too high levy can distort their consumption decisions, and a too low levy could affect investment decisions.¹⁹⁷

Under the current universal service regime, the level of the subsidy required to support uneconomic services has been difficult to determine and has been open to debate. For example, in 1997-98, the first year in which the Net Universal Service Cost model was applied, Telstra claimed a net cost of \$1.8 billion; the Australian Communications Authority assessed it at over \$548 million; but the Minister introduced legislation that prevailed to cap it at \$253.32 million.¹⁹⁸ Detailed measurement of the net cost has not occurred since 2000. Since then, the subsidy amount has been determined by adjusting each year’s amount based on trends in underlying factors.

Partly, debate over costs has arisen because they relate to a largely sunk network, and are based on estimates of the costs of building and operating a hypothetical network. As noted by Optus in its submission to the NBN Panel on regulatory issues:

Telstra typically claims that it faces “losses” in rural and remote areas since it is unable to recover its “costs” through line rental charges. But in making this claim Telstra is trying to “double-dip”. The bulk of the “costs” Telstra claims in respect of existing connections are not real costs that Telstra actually faces, since they relate to the original investment made in building the copper access network. The vast majority of connections to Telstra’s copper network were made many decades ago by the Government. Given that the economic life budgeted for copper lines is typically around 15 years, the capital costs cited by Telstra have already been recovered in the past through Telstra’s very substantial revenues.¹⁹⁹

¹⁹⁶ Productivity Commission, *Inquiry Report on Telecommunications Competition Regulation*, 2001.

¹⁹⁷ Ibid.

¹⁹⁸ Minister for Communications, Information Technology and the Arts, ‘Alston Confirms 1997-98 Universal Service Cost’, media release, DCITA, 22 October 1999, <http://www.richardalston.dcita.gov.au/Article/0,,0_4-2_4008-4_14446,00.html>, viewed on 24 November 2008.

¹⁹⁹ Optus, *Regulating the National Broadband Network*, 2008.

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The Department for Communications, Information, Technology and the Arts (DCITA) review of the USO in 2004 suggested that any new attempts to measure the costs of universal service in detail would be difficult, controversial, costly, and take a minimum of two years.²⁰⁰ The review determined that the problems and costs associated with developing a new model might outweigh the potential benefits. The review stated that “any subsidy based on modelling results would risk being contested by one or more of the affected carriers, given the range of factors and the nature of the methodological issues involved”.²⁰¹

Issues also arise due to a lack of transparency. Because the current USO regime provides only loose guidance as to key dimensions of the USO, there is no definitive answer to the question of how many services are provided under the universal service arrangements, or where they are located. If a USO is defined without a high degree of specificity, there will always be scope for debate over whether the universal service subsidy is adequate.²⁰²

In its 2007 submission to the DCITA review of the USO, the ACCC outlined its preference to introduce contestability for the provision of universal service.²⁰³ Contestability gives the market the opportunity to determine the size of the subsidy — such a ‘market based’ approach can:

- minimise the subsidy by encouraging the provision of universal service over more efficient networks;
- help to overcome the information asymmetry problems that arise when a regulatory body seeks to independently estimate these costs;
- help place a value on the intangible benefits that a carrier receives when it is the universal service provider; and
- avoid the high cost of developing cost models.

It also removes the ability for carriers to subsequently contend that subsidies are insufficient. This process is sometimes referred to as competition *for* the market (as opposed to competition *in* the market).²⁰⁴

Of note in this regard, the Government announced the introduction of contestability in the delivery of universal service in 2000, commencing with two regional pilots. While the contestability arrangements commenced in 2001, to date no provider has been approved by ACMA as a competing universal service provider. The Productivity Commission note that this may be because, under the current regime, there is a lack of

²⁰⁰ DCITA, *Review of the operation of the USO and CSG*, 2004.

²⁰¹ Ibid.

²⁰² ACCC, ‘Submission to the DCITA Review of the Operation of the Universal Service Obligation’, 2007.

²⁰³ Ibid.

²⁰⁴ The two differ, in that competition *for* the market will lead to there being only one universal service provider in an area, because competition occurs for exclusive provision in certain areas. On the other hand, competition *in* the market would involve competition between carriers within universal service areas. This would occur under, for example, a per service subsidy scheme.

incentive to reveal the true costs of service provision to regulators, and therefore a lack of incentive for competition in the provision of universal service. It also notes that a process designed to encourage potential suppliers to indicate their true costs, and which would reward the lowest cost suppliers for doing so, would enhance the prospect for competition.²⁰⁵

Whilst contestability has had little practical success in Australia to date, as discussed in section E.5.1, it may prove more fruitful in the NBN context. The competitive tender process being undertaken for the NBN of itself incorporates elements of contestability for universal service provision. Hence, there is the potential for a number of the costing issues discussed in this section to fall away.

The ACCC has also noted that it is difficult to determine the true cost of providing universal service whilst there is a USO that is not clearly defined. A partial solution was argued to be to increase the degree of specificity in the USO (for example, how many uneconomic services there are in Australia and where they are located) to place clearer boundaries around the cost debate. In addition it was noted that the trend analysis used to estimate the net cost of fulfilling the USO did not provide reliable estimates for the cost of the USO; and that any estimate going forward would need to take into account alternative subsidy programs like the Australian Broadband Guarantee (ABG) and the Communications Fund.²⁰⁶

E.4.5. Interaction between different funding mechanisms

There are currently a number of schemes in place to fund universal service type policies. For example, in addition to the mechanisms discussed above for funding the USO, the Government has more recently supported the provision of broadband services to under-served areas through programs such as the ABG. Via this program, Australians living in the most remote or difficult to reach areas are entitled to a broadband subsidy of \$2750 per household.²⁰⁷

The cost and effectiveness of the schemes is affected by the interaction with other policies that are operating simultaneously. While the focus of determining the level of subsidies is generally on costs under the current regime, changes in revenues associated with universal service, such as those gained from the ABG, must also be considered. Co-ordination between policies can reduce the overall costs of universal service, both in terms of dollars spent and distortions to investment and consumption.

E.5. Key issues to consider for funding uneconomic services on the NBN

There are differences between the nature of legacy networks and next generation networks (which the NBN will be) which may change the way we currently think about and achieve universal service. For example:

²⁰⁵ Productivity Commission 2001.

²⁰⁶ The two differ, in that competition *for* the market will lead to there being only one universal service provider in an area, because competition occurs for exclusive provision in certain areas. On the other hand, competition *in* the market would involve competition between carriers within universal service areas. This would occur under, for example, a per service subsidy scheme.

²⁰⁷ RTIRC, *Regional Telecommunications Review: Framework for the Future*, 2008.

- Whilst currently, telecommunications services are provided using a multi-network system, next generation networks are expected to result in one single network capable of supporting all traffic types. Further, a clear separation is permitted between network facilities and services. This raises questions as to whether access to services, or access to the NBN infrastructure itself is the relevant ‘universal service’ objective. How the objective is defined may have implications for competitive and technological neutrality.
- It is likely that customers will be pre-provisioned (that is, the equipment required to provide different services will be installed for each customer, regardless of whether they purchase the service or not) and services provided at the application layer. The operational costs of connecting consumers to different services will therefore not differ a great deal (if at all) for different services as it can be done remotely. So, whilst the NBN is required to provide entry level voice and broadband to 98 per cent of the population at uniform prices, the same infrastructure will be able to provide more advanced services at little (if any) additional operational cost. The capital costs of providing higher speed services may still be greater for premium services, due to the greater backhaul requirements.
- Quality concerns for voice services in next generation networks (which will be known as VoIP) may be heightened, including reliable access to emergency calls, interruptions to normal service, reliance on the power supply to maintain the service, jitter on the line, access difficulties, virus attack, security, etc.²⁰⁸

In light of these changes, and the lessons learned about funding uneconomic services in section E.4, the following section considers some of the key issues for funding uneconomic services on the NBN, as well as the 2 per cent of premises that will not be covered by the NBN.

E.5.1. Costing the subsidy required to fund uneconomic NBN services

With the NBN upgrade, the costs of providing services, and the subsequent levels of funding required to serve uneconomic services, may change relative to the legacy network. NGNs have the potential to reduce the, sometimes prohibitively high, costs of supplying communications services to traditionally high cost areas.²⁰⁹ This in turn has the potential to reduce the number of uneconomic services, and therefore reduce the costs of mandatory provision to uneconomic services, or potentially even eliminate the issue within the 98 per cent NBN footprint altogether. For example, the Analysys Wireless Costing Model suggests that WiMAX would be a lower cost

²⁰⁸ VoIP is a general term for a family of transmission technologies for delivery of voice communications over the internet or other packet-switched networks. Xavier 2006.

²⁰⁹ The capital costs of providing services in traditionally high cost areas will in large part depend on the technologies that are deployed in these areas. Wireless technologies in particular have the potential to reduce capital costs, while still meeting the quality and coverage objectives as set out in the RFP. Capital costs in these areas will also depend on the extent to which they are already supplied by backhaul that can support broadband services. With regard to operational and maintenance costs, operational expenditure for new customer connections is likely to reduce with the move to the NBN; there is likely to be less need for visits to customer sites because problems can be repaired remotely; and damage to fibre cable (say due to rain) is likely to occur substantially less than with copper cables.

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alternative to FTTN in Bands 3 and 4.²¹⁰ Analysys also found that 3G and later-generation mobile technologies may similarly be cheaper than wire line solutions in some areas, but lack the range and capacity of WiMAX.²¹¹ However, Telstra have disputed these findings, stating that 3G is a more cost-effective alternative to WiMAX. Its Chief Technology Officer, Hugh Bradlow, has publicly stated with respect to WiMAX:

“I object to my tax dollars being spent on an inefficient solution that has no future.”²¹²

The 2008 Regional Telecommunications Independent Review Committee (RTIRC) report suggests that the lowered costs of the NBN relative to the copper network will extend competitive markets into regional Australia.²¹³ In contrast Telstra, in their regulatory submission to the NBN Expert Panel, argue that:

“...the costs of loss making or unprofitable services will grow with the NBN. Currently, the big losses on service provision occur in relation to remote users. In non remote rural areas, much of the asset base is written down or off and the cost differential, though real, is manageable. However, there will be many more ‘uneconomic’ services as the expensive infrastructure is rolled out in rural areas.”²¹⁴

As noted, determining the costs of funding uneconomic services under the current USO system has similarly been open to such divergent views. However, unlike for the legacy network and the current USO model, the capital costs of the NBN roll-out will be directly observable, rather than being based on hypothetical cost estimates. This increases the Government’s ability to determine which are the true uneconomic services and the cost of funding them. There should therefore be less subjectivity in the future relating to the costs of universal service provision. As noted, the RFP requires that:

- (a) If a Proponent is proposing cross-subsidy arrangements within access prices to support uneconomic services or achieve other outcomes, the Proponent should identify these services and outcomes, the amounts of the losses and the cross-subsidies separately, the rationale for them, and methodology for their calculation. (Schedule 2 section 1.4.4)

Given that Proponents are required to identify and quantify the amount of any cross-subsidies (and the services they apply to) the issue of Universal Service Funding shortfalls should arise to a far lesser extent (if at all, particularly in the short term) following the NBN upgrade.

Via the NBN RFP process, in contrast to the current system, Proponents are effectively able to determine the cost of funding uneconomic services. There are several access technologies that could be used to achieve the 12Mbps and 98 per cent objectives, each with varying capabilities and costs. Proponents are able to choose the

²¹⁰ Analysys, *Comparative Costing of Wireless Access Technologies in Australia: Final Report for the ACCC*, 2006.

²¹¹ Ibid.

²¹² Nowwearetalking editor, ‘Telstra CTO High Bradlow highlights WiMAX limitations’, at <http://www.nowwearetalking.com.au/news/telstra-cto-hugh-bradlow-highlights-wimax-limitations>, accessed on 14/11/2008.

²¹³ RTIRC 2008.

²¹⁴ Telstra, *Public submission on the roll-out and operation of a National Broadband Network for Australia*, 2008.

technologies they will deploy in traditionally high cost areas, and the level of uniform retail prices. In this respect, the RFP process itself is a competitive tender process for universal service provision — Proponents will put forward their proposed mechanisms and costs of funding these, and the Government is able to favour the most efficient and effective Proposal. The process is very similar to that noted by the ACCC in its 2007 submission to the DCITA review of the USO:

The government would set a minimum standard of service and request bids from carriers. If fully effective, the process would see carriers submit bids that involve a subsidy that reflects the cost of providing the service (including a normal rate of return). The owner of the most efficient network should win the tender process by virtue of its lower costs. The winner of the tender would then be provided with the requested level of subsidy, if any, in order to provide services. Under this model, there would only be one universal service provider in each universal service area.²¹⁵

Indeed, the OECD notes that competitive tendering is more practical and administratively simpler where new (as opposed to existing) universal service is to be provided.

E.5.2. Defining the services to which pricing and coverage objectives apply

With NGNs, the delivery of a number of, previously separate, communications services is possible using only one transmission platform. As opposed to on the legacy network, where the infrastructure required to provide a broadband connection is separate from that required to provide a voice service, and not pre-provisioned, with the NBN upgrade, the same platform that provides voice will also be pre-provisioned to provide a broadband connection. If an end-user is connected to a voice service, they are also likely to be assured access to broadband (and vice versa). Further, as noted, it will not cost the NBN operator more to connect broadband *and* voice over the NBN than it would cost to connect just voice, as connection takes place via remote access. However, the backhaul costs for each service are likely to differ, because voice requires relatively less of this than other services. Hence, including NBN pricing and coverage standards for broadband as well as voice should not increase operational costs to the NBN operator relative to if these objectives had only applied to voice, but as noted, may increase backhaul costs

The question could be raised as to whether the focus of universal service should move towards ensuring access to the infrastructure element that provides next generation network services (for example, access to the NBN), rather than the services themselves. ‘Universal service’ objectives would address only access to communications infrastructure, on the grounds that competitive provision of *services* (for example, a telephone service provided using VoIP) will ensure their availability and affordability.

There is considerable debate as to whether this is the way forward. Ofcom notes that there may be a case for separating the two elements, but that it may be premature to conclude that the provision of services will de facto ensure the availability and affordability of services to the standards required.²¹⁶ In its submission to the NBN Panel on regulatory issues, CEG argue that the concept of ‘ubiquity’ should include

²¹⁵ ACCC, ‘Submission to USO Review’, 2007.

²¹⁶ Xavier 2006.

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the common services delivered over the NBN (such as free-to air TV, internet and email access). The Queensland Government also suggests that voice, data and television should be included in definitions of universal service, and the South Australian Government that universal service should be “recast as a Next Generation Network able to deliver voice and broadband capability.”²¹⁷ The recently released RTIRC report also finds that universal service should be extended to mobile and broadband; but that the current USO framework is not suitable for this, hence, a new USO framework is needed.²¹⁸

In contrast, despite the RFP’s objectives, the Communications Alliance does not support the extension of universal service beyond voice, because covering broadband “is likely to be costly and distort competition”, and there is not a clear public policy rationale to ensure universal supply of broadband services.²¹⁹ Hutchison note that ‘key entry level voice and broadband services’ (to which uniform retail prices are to apply) should be defined minimally to ensure that the distortionary effects of uniform national prices are minimised.

Ideally, the mechanism that is chosen to fund uneconomic services would not be one that supports one technology platform over another, or one provider over another.²²⁰ It is important to consider the nature of services that can be offered by infrastructure-based competitors. For example 3G mobile networks are currently capable of providing voice and data services; HFC networks can provide equivalent services to those provided over fibre. Whilst defining the NBN’s universal service objectives in terms of access to the NBN infrastructure would ensure that all users, regardless of where they live, are able to access the services offered by the NBN, it might impede the ability of alternative infrastructure to compete with the NBN (assuming these networks duplicate the NBN, rather than form part of it), because only the NBN operator will be entitled to receive any subsidy for funding uneconomic services.

On the other hand, defining the NBN’s coverage objectives in terms of services (such as access to voice and access to broadband) could be competitively and technology neutral — any operator who provides these services at the constrained retail price would be entitled to a subsidy, so no competitor or technology would be favoured over another. Ultimately, the difference between the two is that access to infrastructure (the NBN) would mean the NBN operator would be the only universal service provider; whilst access to services could allow multiple operators to be universal service providers.

However, subsidising different technologies in one area may affect the performance of that technology across all areas. For example, if 3G technology is deployed in traditionally high cost areas, and subsidised, this may effect competition, investment and use in the mobile market in metropolitan areas. The common costs — of which coverage is one — across all regions associated with the universal service operator’s 3G mobile network that must be directly recovered from consumers will be reduced

²¹⁷ Queensland Government, *Submission to the Australian Government on Regulatory Reforms to be implemented with the National Broadband Network*, 2008; South Australian Government, *Submission on Regulatory Issues Associated with the National Broadband Network*, 2008.

²¹⁸ RTIRC 2008.

²¹⁹ Communications Alliance Ltd, *National Broadband Network Regulatory Submission*, 2008.

²²⁰ Xavier 2006.

relative to those that an unsubsidised mobile operator would have to recover. Hence, this may distort all mobile markets. Further, the subsidised 3G operator's revenues would also be subsidised to the extent that coverage can be used as a marketing tool. It is unclear how large these effects will be, and which markets could be affected, but it is nonetheless likely to be an important consideration when assessing Proposals.

Another implication of the move to NGNs is that how capital costs, which will largely be common to all NBN services, are allocated across services will affect the service's price, and correspondingly, whether it is affordable. If the NBN operator chooses not to allocate a large amount of costs to key entry level services, but rather, allocates the bulk to non-key entry level services, uniform retail prices for key entry level services could be achieved without the need for a funding mechanism. However, presumably, this would make non-key entry level services, to which uniform pricing constraints do not apply, even less accessible in high cost areas, which may or may not be desirable to Government. It would also likely affect the take-up of these services in all areas. This highlights that how Proposals define services, and their prices, are important considerations when assessing the mechanisms put forward to fund uneconomic key entry level services.

E.6. Efficiency considerations

The benefits of social policy objectives, such as the NBN's price and coverage requirements, are widely believed to outweigh the costs of achieving these objectives. As noted, in general societies value that all members of that society receive the same basic communications services irrespective of where they live, who they are, or the cost of delivery of those services. Further, the provision of basic communications services assists the broader economic and social development of locations that are geographically distant from established urban centres.

Nonetheless, it is still important to recognise that there are costs involved in achieving uniform retail pricing and coverage objectives. For example, such objectives may:

- restrict or distort competition and availability/choice of technology in rural/remote areas — such objectives may have adversely affected the rollout of next generation networks, if the services provided over such networks would have been relatively more attractive to consumers were the true costs of the alternative (the legacy copper wire) reflected in retail prices;
- benefit those who do not need subsidies (because many universal service programs are generally not means tested, and some in receipt of the benefits of these objectives may be able to afford to pay for them);
- discourage potential market entrants facing the prospect of competition against a subsidized provider (offering services at prices below cost), and deter entry due to the additional costs that universal service policies impose on market participants, especially if they are made to contribute to a USF that is used to transfer funds to the designated USO provider;
- be wasteful, if they apply a blunt 'one size fits all' approach whereas consumer preferences can differ markedly; and

- impose a considerable cost on consumers (who may bear the final incidence of universal service levies and costs imposed on operators).²²¹

In light of this, it is desirable that the approach taken to supporting universal service is the most efficient, and creates the least distortion to consumption and investment, possible. This section highlights the efficiency considerations that will need to be taken into account when assessing the mechanisms for supporting universal service put forward in Proposals.

E.6.1. Relative efficiency of alternative fund raising mechanisms

Cross subsidies

In light of the considerations in section E.4, internal cross-subsidies or a regulated cross subsidy such as an ADC may not be favourable as a basis for funding uneconomic services on the NBN.

Service-based retail market competition on the NBN will likely mean that cross-subsidies between retail customers are unsustainable. However this will depend on the NBN operator not having market power in the provision of any of its retail products — if it has the ability to charge a price above cost for any of the retail products it provides, it may be able to charge a price below cost for other retail products. (The anti-competitive implications of this are discussed in section E.6.3.) Competition in the provision of all services would seem consistent with the RFP's objectives, and means that retail level cross-subsidisation will not be sustainable.

The sustainability of cross-subsidies at the wholesale level will depend on whether there is competition in the provision of wholesale services, say because service-based competitors are able to build their own networks to compete, and/or because there are alternative platforms from which service-based competitors can purchase wholesale services. If there is competition at this level, averaged access prices will not be sustainable.

As discussed in section E.4, these issues have been extensively examined in the Australian context in the past. One of the key considerations in assessing the effectiveness and desirability of averaged wholesale prices is the potential for bypass. As noted, averaged wholesale/access prices across regions should only be adopted if bypass, efficient or inefficient, in *metropolitan* areas is either banned or is not technically or commercially feasible. The existence of alternative infrastructure, such as Optus' HFC network in the capital cities, TransAct's FTTN network in the ACT, and 3G wireless networks highlights that bypass of the *legacy* network in metropolitan areas can occur. A key consideration is whether bypass of the NBN in metropolitan areas is likely to occur.

The RFP expresses a preference that existing infrastructure capable of providing minimum speeds of 12 Mbps should not be duplicated by the NBN. Specifically the RFP notes that:

²²¹ Productivity Commission 2001.

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the Commonwealth expects that there will not be economically inefficient duplication of existing FTTN or FTTP infrastructure. Proponents are also encouraged to consider interconnecting with existing FTTN or FTTP roll-outs. (RFP clause 1.5.20).

and;

The extent to which existing infrastructure is to be utilised in the NBN and the extent to which existing infrastructure is already capable of delivering a minimum dedicated downlink speed of 12 Mbps over each connection. (Schedule 2, 1.1.13(a)(i)).

These requirements imply that, assuming bypass is possible, averaged access prices would not be desirable, as averaged access prices could encourage inefficient duplication in metropolitan areas.

On the other hand, the preference for ‘hooking up’ the NBN to existing infrastructure could mean that a network that was once competing with the legacy network (for example, HFC in metropolitan areas and 3G in regional areas) will no longer be a competing network, but rather will be part of the NBN. This might mean the NBN has a sustainable monopoly, that bypass is not possible and therefore that averaged access prices may be sustainable. Indeed, to the extent that lower cost technologies such as wireless are used on the NBN in regional areas, the cost of providing services in these traditionally high cost areas may fall, leading to less disparity between costs in regional and metropolitan areas. This would further support uniform access prices. Evidence of reductions in the differences between costs across regions would need to be supplied to support averaged access prices.

If the NBN *does* duplicate existing networks and compete with them, averaged access prices would be unsustainable if competition from alternative networks drives down the access price the NBN operator could charge in metropolitan areas. Mechanisms to prevent this from happening (e.g. overbuild protection) may encourage additional, inefficient, bypass in these areas. In regional areas, if, for example, the NBN uses a higher cost technology (such as fibre, as opposed to wireless technologies) that is supported by cross-subsidies at the wholesale level, a lower cost technology may be unable to compete, despite it being the more efficient alternative. In contrast, a de-averaged access price may encourage the adoption of more efficient technologies in regional areas, and would not lead to inefficient duplication in metropolitan areas.

Submissions to the NBN Expert Panel on regulatory issues appear to support averaged access prices, or at least seem not to recognise that other funding mechanisms are available to fund the RFP’s pricing and coverage objectives. For example, the South Australian Government argues that all aspects of NBN pricing should be uniform, including wholesale services.²²² TransACT argue that:

Nationally, the USO deficits will net to zero if the access price (wholesale access revenue per line, treating STS and broadband lines equally) is set to ensure this. This will mean that some areas (ie the metro areas) will effectively be taxed to provide a cross-subsidy to high cost areas. The amount of the cross-subsidy can be reduced if the \$4.7bn committed by the Commonwealth is treated as a grant. Another virtue of this approach is the simplicity of the

²²²

South Australian Government 2008.

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funding being collected at source (in access price surcharges) rather than from an invoice based on retailer revenues.²²³

Optus state that, whilst individual customer connection costs will differ, the price charged for connection will likely be set to recover the average costs of providing coverage to 98 per cent of the population. Hence, no further funding will be required within the coverage area, as the pricing agreed under the new regulatory regime will be sufficient to cover the costs of construction and connection of new customers in rural as well as metro areas.²²⁴

Telstra recognises the potential for inefficient duplication with averaged wholesale prices. It submits that if averaging at the wholesale level is to be implemented (its first preference being for the Government's NBN pricing and coverage objectives to be directly funded by the Government) averaging must not be implemented inflexibly, as the revenues from which cross-subsidies would be funded are open to erosion by 'cherry-picking' (that is, access seekers building their own competitive infrastructure in low cost areas, in turn reducing the NBN operator's revenue base).²²⁵ Telstra note that, it will be important to take into account the fact that NBN will face competition from other next generation networks, such as HFC, 3G and fixed wireless. They will be able to cherry pick the most profitable customers, whether in metro or non-metro areas, undermining internal cross-subsidies within the NBN service. Telstra then goes on to argue that there would need to be a mechanism to ensure that the NBN owner is not trapped into averaged prices in responding in competitive areas, and that deals with the eroded cross subsidy that was otherwise available to fund the loss making areas. This, of itself, highlights that averaged wholesale prices will not be a sustainable mechanism for funding the NBN's pricing and coverage objectives; and that they are likely to lead to inefficient duplication of infrastructure.

Nextgen also recognises these effects, submitting that with averaged prices:

...subsidies flowing from city users to regional and rural areas will lift the prices of services to city users; providing an incentive for city-based service providers to deploy alternate access networks and undermine the NBN business case...²²⁶

Are uniform retail prices sustainable with de-averaged access prices?

Some of the submissions to the NBN Panel on regulatory issues suggest that stakeholders do not believe uniform retail prices are sustainable unless access prices are also uniform. This is, however, not the case. It might be likely that de-averaged, cost reflective access prices would lead to access prices in regional areas that are above retail prices (which, with competition in metropolitan areas, would reflect the costs of providing the services in metropolitan areas). If this is the case, it would be unattractive for access seekers to purchase access and compete in regional areas, because they would make losses from doing so. By the same token, it would be unattractive for the NBN operator to provide services in these regions, because they would also make losses from doing so — assuming no access seekers purchase access

²²³ TransACT, *The National Broadband Network: a Blueprint for the 5th utility*, 2008.

²²⁴ Optus 2008.

²²⁵ Telstra, *Submission on NBN*, 2008.

²²⁶ NextGen Networks, *National Broadband Network Submission to the Australian Government on Regulatory Issues*, 2008.

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to the NBN, its only revenues would come from retail customers, to whom it would have to charge prices that reflect the costs of providing services in metropolitan areas. The NBN operator would therefore be at risk of not recovering its costs in these areas.

However, as noted, there are several mechanisms that can be used to fund uneconomic services. In the case above, compensation could be provided to *any* operator — access seeker or NBN operator — for losses incurred in servicing uneconomic services. This could be achieved via a per-service subsidy scheme, with funds coming from a USF (discussed below). This type of arrangement would permit multiple carriers to be registered as universal service providers in the one area. The carriers would then compete for customers and receive universal service subsidy payments based on the number of customers they serve. Under this approach, consumers get to choose which carrier provides the best service, rather than the Government choosing the provider that then serves all users in the area.

Under these arrangements, the NBN operator would recover their costs (because they receive the cost-reflective access price from access seekers, and are compensated from the USF for supplying directly to retail customers for whom the retail price is below the cost); access seekers would also be compensated for their losses by the subsidy, so efficient competition in high cost areas would not be deterred. Further, they would only be encouraged to bypass the NBN in metro areas if they could provide services using their own network at a lower cost than the NBN operator, so only efficient investment should take place.

It is also important to bear in mind that the RFP does not require the NBN operator to provide services to the last 2 per cent of premises. These last 2 per cent of premises are likely to be the highest cost areas. If the cost differential across regions *within* the 98 per cent NBN footprint is not large — that is, if the technologies deployed in different areas are such that the costs of providing services in different areas within the 98 per cent footprint are broadly the same — an ‘averaged’ access price could be more or less cost reflective. Put another way, the degree of averaging across areas within the 98 per cent footprint would not be large, because the costs across the different areas would be much the same.

Universal Service Funds — where should the funds come from?

As noted, revenues for USFs can come from industry, consumers or general taxation revenues. Each of these options is now discussed.

General taxation revenue

The cost of achieving the NBN’s coverage and pricing objectives could be funded directly by the Government. For example, the Government’s (up to) \$4.7 billion commitment to the NBN, if provided as a subsidy, could be used to fund the rollout of infrastructure to support uneconomic services. This would imply that the Government’s monetary return on its contribution may approach zero. Rather, consistent with the idea that universal service is a government social policy tool, the contribution would earn a social return.

Funding the NBN pricing and coverage objectives using general revenues appears to be favoured by some industry stakeholders. For example, the Communications

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Alliance submit that their members support government funding,²²⁷ and Telstra's view is that, as universal service objectives are directed at meeting the Government's social policy goals, they should be directly and entirely funded by the Government.²²⁸

In the recent past other subsidised telecommunications services have been funded from consolidated revenue, such as parts of the rural CDMA rollout and the ABG. There does not seem to be a clear justification under the present USO system for treating universal services (the voice service) differently to these other services, particularly where services are increasingly converging.

There are advantages and disadvantages to raising funds through general taxation mechanisms. The advantages include that:

- it is competitively neutral;
- the marginal administrative costs of raising funding through existing taxation mechanisms would be negligible; and
- there are no issues relating to sustainability or predictability of the funding mechanism.

Disadvantages include that:

- It could potentially be less efficient than a tax on telecommunications products. It is difficult to determine which is the least distorting mechanism. The magnitude of economic loss caused by taxation in Australia is unclear but it is likely to be non-trivial, perhaps as much as 20c per dollar raised.²²⁹ On the other hand, the distortions caused by a tax on telecommunications products will depend on the mix of products the levy is applied to — if applied to 'inelastic' telecommunications products (explained below), the economic loss could be less than the loss from a general taxation mechanism. If demand for most telecommunications products is more inelastic than the average product in the economy, it is possible that a levy on *any* (or all) telecommunications products would lead to less distortions than general revenue taxation.
- It could be less transparent than if funds were to be raised via a levy on telecommunications providers. A levy on telecommunications providers would give them 'buy in', which would in turn be likely to encourage debate surrounding the level of the subsidy required (and indeed if it is required at all). On the other hand, if funds are sourced from general revenues, the level of the subsidy may be more open to manipulation by the NBN operator.

²²⁷ Communications Alliance Ltd 2008.

²²⁸ Telstra, *Submission on NBN*, 2008.

²²⁹ Campbell and Bond, 'The Cost of Public Funds in Australia', *The Economic Record*, vol, 73, issue 220, 1997.

Industry levy

As noted, the USF in Australia is currently contributed to by industry participants. As with funds sourced from general revenues, this approach has a number of advantages and disadvantages.

Sharing the cost of universal service amongst carriers on the basis of revenue could be quite efficient, particularly if the organisations that contribute the majority of the funds have scope to pass the costs on to consumers in an efficient way.²³⁰ The ability of carriers to pass the cost of the levy on to consumers depends on the extent to which consumers change their purchasing behaviour in response to a change in the price of each firm's product. Firms in competitive markets (for example, mobile) may be less able to pass on the levy because the resulting price increase would mean consumers switch their purchases to a competing product (for example, fixed voice). Nonetheless, the ability of each firm *within* a market (e.g. mobile) to pass on the costs should be the same, so the mechanism is competitively neutral.

The reduction in profit margins available to all firms in the communications industry could create barriers to entry and investment, and thus impede competition. Administrative costs could also create barriers to entry. For example, under the current regime, administrative costs must be incurred regardless of the size of the carrier. However, implementation of an eligible revenue threshold below which carriers are not required to submit an eligible revenue return could go some way to addressing this issue.

If there is uncertainty as to the level of the levy, business planning may be difficult, which may deter long term investment.

Further, if providers contribute on the basis of revenue shares, and access revenues are included in these revenues, the NBN operator may be at a disadvantage relative to access seekers in providing services, because they would be required to contribute a larger amount of funds per service than access seekers.²³¹ Ensuring only retail revenues are included would alleviate this issue.

As noted above, an industry levy may encourage industry 'buy in' and more transparency than funding the USF from general revenues. Further, if the industry levy is administered in a way which is transparent to end users of communications services — for example, via an itemised amount on end users' service bill reflecting the portion of the charge that is being used by the carrier to fund their universal service obligation — public debate as to whether universal service type policies are desired by the public would be facilitated.

Levy on consumers of telecommunications services

A fee could be levied directly on consumers of telecommunications services. This could be either a flat fee or a usage based fee. It could be levied on all connections, or only on certain products. Similarly to as noted above for the industry levy, a tax on end users has the potential to make the contribution to the USF more transparent than

²³⁰ Productivity Commission 2001.

²³¹ Ibid.

if the fund were contributed to from general revenues, and makes it easier for the public to assess the costs of universal service.²³²

A ‘connections-based’ system could involve any connection to the NBN, whether it is used for data or voice (or any other application), being taxed.²³³ This approach has the potential to raise predictable amounts of revenue through relatively small imposts on each end user.²³⁴ Generally, small, broad-based taxes are unlikely to distort economic decisions significantly, and the approach would be a competitively and technology neutral source of funds, since all providers would be included (including, for example, wireless, cable and VoIP providers).

However, in practice, this type of system raises a number of issues.²³⁵ In order for all users/connections to be captured, some form of ‘telephone number’ equivalent (that is, some way of identifying each end user) would need to be assigned to each end user, and the charge be levied on that identifier. It may not be possible to assign such a unique ‘identifier’. For example, IP addresses are dynamic and so could not be used. An alternative could be to use providers’ customer records. However, this could mean some end users are taxed twice if they purchase services from two different suppliers. Further, if the telephone numbering system was used, end users that only took a broadband service would not be taxed; and end users that had a telephone number for both a plain old telephone service (assuming this still operates for some transitional period) and a VoIP service would be taxed twice.

If a tax were applied only on the use of certain products, the distortionary effect would depend on how readily consumers switch their purchases in response to price changes (the ‘elasticity of demand’ for those products). The economic losses from imposing a levy will be higher if a tax is imposed on products which consumers will readily stop purchasing in response to a price rise (i.e. that have a high elasticity of demand). Hence, the overall distortion from imposing a levy on consumers will depend on which types of products attract the bulk of the charge. Table 1 shows elasticities of demand that have been estimated for a selection of telecommunications products. Based on these figures, a levy that predominantly impacted the price of local calls would be more efficient than one that imposed the levy on international and long distance calls. A one per cent increase in the price of local calls would lead to a reduction of only 0.2 per cent in the quantity of local calls demanded whilst a one per cent increase in the price of international calls would lead to a 0.9 per cent reduction in the quantity demanded of this service.

Table 1 Point and interval estimates of Price Elasticities of Demand for Selected Telephone Services.²³⁶

Type of demand	Price elasticity		
	Connection	Subscription	Long distance

²³² Xavier 2006.

²³³ Ibid.

²³⁴ Ibid.

²³⁵ Ibid.

²³⁶ Intven, Oliver and Sepuilverda 2000, p. B-12.

Access	-0.03 (+/- 0.03)	-0.10 (+/- 0.09)	
Local Calls		-0.20 (+/- 0.05)	
Domestic LD calls			
Shorter distance			-0.375 (+/- 0.125)
Medium distance			-0.65 (+/- 0.15)
Longer distance			-0.75 (+/- 0.20)
International calls			-0.90 (+/- 0.30)

Notes: In each cell, the first figure indicates the ‘one best’ (ie point) estimate of the elasticity. The second figure preceded by (+/-) indicates the possible range for the elasticity. For example, for medium distance domestic LD calling the price elasticity is estimated at about -0.65 with a possible range of -0.50 to -0.80.

A concern with a flat fee (applied either to identifiers or certain products) is that it is a ‘regressive tax’, since low users and the poor would pay as much as high users and the rich. This concern might be addressed by exempting or providing a rebate for the poor.²³⁷ Further, if an industry levy is passed on to end users on a fixed fee basis (as opposed to one related to use) an industry levy would not perform any better in this regard than a flat tax on end users. A usage based charge (either on all identifiers or on certain products) would reduce these concerns.

E.7. Co-existence with other subsidy programs

How the NBN’s pricing and coverage objectives are funded will interact with the Government’s other ‘universal service’ related policies. Subsidy programs such as the ABG and the Communications Fund are intended to underwrite the provision of adequate services to regions which may significantly overlap universal service areas for the NBN. These subsidy programs have important implications for assessing revenues relevant to any determination of the subsidy required to fund the NBN’s pricing and coverage objectives, including that:

- if they are to continue to apply, and will apply to services provided over the NBN, they will reduce the costs of subsidising the NBN’s pricing and coverage objectives; and
- if they are not to apply to services provided over the NBN, they could limit the ability of the NBN operator to earn revenues to help meet its costs if it would have to compete with the subsidised provision of broadband on other platforms.

Any future determinations of the level of subsidy required to achieve the NBN’s pricing and coverage objectives will clearly need to address these issues. As broadband is included in the key entry level services the NBN operator is to provide, it may be more efficient to achieve the Government’s pricing and coverage objectives using a single universal service tool, rather than multiple, potentially conflicting, policies.

²³⁷

Xavier 2006.

E.8. Implementation issues

The following section discusses some properties that are desirable in the implementation of any funding mechanism, including transparency and accountability, and ensuring that proposed mechanisms are non-discriminatory. Of note, Australia is a signatory to the *WTO Agreement on Basic Telecommunications* which, relevantly, states that:

Any Member has the right to define the kind of universal service obligation it wishes to maintain. Such obligations will not be regarded as anti-competitive per se, provided they are administered in a transparent, non-discriminatory and competitively neutral manner and are not more burdensome than necessary for the kind of universal service defined by the Member.

In addition:

Appropriate measures shall be maintained for the purpose of preventing suppliers who, alone or together, are a major supplier from engaging in or continuing anti-competitive practices [including ...] engaging in anti-competitive cross-subsidisation.

Hence, in implementing a universal service scheme, these obligations may need to be considered. Australia has also subscribed to the APEC principles on cost-based interconnection that discourage the inclusion of internal cross-subsidies to account for the delivery of the USO.

E.8.1. Transparency

One of the desirable properties of a USF is that it is both visible and measurable. Transparency can be achieved in a number of ways ranging from the publication of the rules and regulations which apply to the USO, to the universal service provider having to publish separate accounts for those services which are uneconomic and profitable to provide.

In the absence of a transparent robust funding mechanism, a universal service provider is able to allege that it is not being adequately compensated for services provided in fulfilment of its universal service obligations. Telstra has, in the past, claimed that the universal service obligation coupled with retail price parity obligations makes service provision in commercially unviable areas unprofitable. According to Telstra this shortfall is not adequately compensated for by the USF.

This argument was most recently put forward by Telstra in its attempt to have wholesale prices for its ULLS averaged across Australia. The lack of any evidence to support or refute the claim makes it difficult to conclusively reject an argument by a universal service provider that it is not receiving adequate reimbursement from the USF.

Accordingly, the – real or perceived – shortfalls of the USF puts pressure on other policy levers to ameliorate or adjust for the shortcomings of the universal service scheme. However, the presence of a transparent funding mechanism would place the onus on the universal service provider to prove that the funding mechanism does not adequately compensate for losses. A transparent funding scheme would also be able to adjust, if necessary, to any deficit or surplus.

Funding mechanisms which are internal to the universal service provider are effectively invisible and as a result it is difficult to obtain any real oversight over the manner in which uneconomic services are funded. The ACCC's preference is for the funding mechanism to be external to the universal service provider. External mechanisms are highly visible and are subject to oversight.

It should be noted that any funding mechanism used to support the provision of uneconomic services imposes a cost upon one part of society in order to assist another. As such public debate of the issues surrounding universal service would seem to be important.

E.8.2. Accountability

The provision of reliable access to services, and in particular emergency services, in the NBN context presents some issues which were not present in the PSTN context. The prioritisation of voice traffic over an IP network, technical problems and the reliance on a power supply to provide services present additional challenges to the provision of universal service.

It is difficult for internal mechanisms to impose accountability on service delivery. As such external mechanisms will be required to ensure a specified level of quality of service is maintained over the NBN. Such provisions could be contracted into the NBN operator's obligations or be set with reference to performance benchmarks.

The importance of accountability is highlighted in the RTIRC's recommendations. It recommends that the Government develop, publish and implement a 'plan of measures' to ensure that all individuals and all small businesses can purchase services that meet their communications service standards (CSS), wherever they live or work in Australia, on an equitable basis.²³⁸ Further, it recommends that an independent body, not subject to ministerial direction, be required to conduct an audit at least every three years on the effectiveness of the Government's 'plan of measures' in ensuring communications services meeting the standards are available to be purchased by all, and this audit be tabled in Parliament.²³⁹ Similar measures could apply to services provided within the NBN footprint.

E.8.3. Anti-competitive conduct concerns

There may be concerns with any funding mechanism that there is no direct relationship between the revenues raised to fund uneconomic services and actual expenditures to support provision of services to these consumers.

These concerns may be particularly acute in the case of internal funding mechanisms. Internal cross-subsidies may be used, in the short-term, for anti-competitive purposes rather than for service provision. For example, in the NBN context, this could be by using the revenues gained from metropolitan users of key entry level voice and broadband services to temporarily allow lower prices to be charged in competitive markets, on say presumably (initially) more expensive services, such as high speed broadband. Clearly defining the services to which the NBN's pricing and coverage objectives are to apply — both as the source of revenues and the target of revenues —

²³⁸ RTIRC 2008.

²³⁹ RTIRC 2008.

becomes very important, as does monitoring and enforcing that the flow of funds only occurs between these services. This is difficult to do with internal mechanisms.

Another issue is whether a NBN operator that also provides services in retail markets will be willing to offer access to non-facility (service) based operators in low cost/high profit regions on equivalent non-price terms to what it offers to its retail arm. There may be an incentive not to do so in order to prevent the revenue source for cross subsidies being eroded. The NBN has the potential to enable greater service layer independence from the main network such that third party service providers can provide customers access to a range of IP based application services without revenues necessarily flowing to the network provider.²⁴⁰ If this is the case, a vertically integrated NBN operator may have incentives to degrade the quality of service provided by non facility based service providers in low cost/high profit areas so that customers switch back to procuring application services from the network provider in order to sustain internal cross subsidies.

These issues are of less concern (if any) where structural arrangements are such that incentives for anti-competitive behaviour are minimised. The issue reverts to a standard analysis of the adequacy of funding, and how to ensure quality of service standards are maintained and improved upon over time.

E.9. Non-ubiquity of the NBN — the last 2 per cent of premises

At the same time as releasing the RFP, the Minister called for submissions to be made to the RTIRC on policy and funding initiatives to provide high speed broadband to the last 2 per cent of premises not services by the NBN. The Minister noted that this could include enhancing the ABG program to achieve outcomes comparable to the NBN. These submissions are not related to the RFP process and are considered separately.²⁴¹

It is likely to be important to consider how the mechanism used to fund uneconomic services on the NBN (if any is in fact needed) interacts with the mechanism used to fund the remaining 2 per cent of premises not covered by the NBN's pricing and coverage requirements. The RTIRC note the impact of the NBN process on their deliberations:

The complexities on the NBN have made it difficult for this Committee to make specific recommendation in some areas relating to the future adequacy of significant telecommunications services. Accordingly, the Committee intends to meet after the awarding of the NBN contract to consider the impact of the implementation of the NBN on matters relating to the adequacy of services in regional parts of Australia.²⁴²

If the mechanism for funding uneconomic services on the NBN is internal to the NBN operator (for example, averaged access prices) and the NBN operator does *not* provide services to the last 2 per cent of premises, consideration will need to be given to a separate mechanism for funding uneconomic services for the last 2 per cent of premises.

²⁴⁰ Xavier 2006.

²⁴¹ RTIRC 2008.

²⁴² Ibid.

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If an internal mechanism is used to fund the last 2 per cent of premises, but the operator servicing these areas is not the NBN operator, this operator may not have any profitable services from which to source any cross subsidy. This firm's operations in other areas (if they have any at all) will presumably be purchasing access from and competing with the NBN. This means that the firm's revenues, and subsequently profits, earned in these areas, will be constrained by the price it pays to access the NBN in these other areas, and competition and/or retail price controls.

So, if the NBN operator is *not* required to serve the last 2 per cent of premises, and another operator does so, it seems unlikely that internal cross-subsidies will be a viable mechanism for funding the last 2 per cent of premises. The last 2 per cent could be funded using an external mechanism, such as a USF.

If an external mechanism is used to fund the NBN's objectives, such as a USF, the mechanism could be used to fund uneconomic services both within and outside the NBN footprint. This would likely lead to less distortions in competition and investment between the NBN footprint, and the last 2 per cent.

Another alternative may be that the NBN operator be required to also provide services to the last 2 per cent of premises, using the same mechanism as used for the NBN footprint. Indeed, if there are actually no uneconomic services within the 98 per cent NBN footprint, the last 2 per cent of premises could effectively be the only remaining uneconomic services for which a funding mechanism is required.

However, currently, unlike services provided over the NBN, there is no requirement for those operators providing services to the last 2 per cent of premises to set retail prices on a uniform basis or with reference to the price of NBN services. Likewise there is no requirement at this stage for non-NBN services to provide minimum speeds of 12 Mbps (though the RTIRC note that the 12Mbps will need to be matched in non-NBN areas).²⁴³ This may result in lower quality services being priced at a higher level than the NBN services, or lower quality services being set at the same price level. Depending on the policy of the Government, this may or may not be a concern. There may be a desire to marry up the retail prices for service to the last 2 per cent with those prices offered for NBN services. This would be a matter of government policy, though it would seem that if prices were to be married up, using the same funding mechanism as applied for the NBN to the last 2 per cent of premises has the potential to lead to less distortions in investment and consumption across regions. This perspective is put forward by the Queensland Government:

The subsidy to provide a broadband service to non-NBN consumers should not be funded through a levy on the telecommunications industry. The Australian Government should fund the subsidy in the same manner in which it has funded the NBN, that is, through an Australian Government budget allocation.²⁴⁴

Although this assumes uneconomic services on the NBN will be funded via government subsidy, it highlights that consistency in the mechanisms used to fund uneconomic services across regions is a consideration. On the other hand, whilst Optus also note the interaction between policies to promote coverage within and

²⁴³ Ibid.

²⁴⁴ Queensland Government 2008.

outside of the NBN footprint, they submit that the costs of funding the last 2 per cent should not form part of the consideration of costs and prices for the NBN, and that these costs should be considered as part of the Government's separate review of the USO arrangements, taking into account the number of current Government initiatives to provide funding for telecommunications in remote areas (such as the ABG).

E.10. Conclusion

Simultaneously achieving the objectives of uniform retail prices for key entry level voice and broadband services and 98 per cent NBN coverage means that a mechanism may be required to fund the provision of services to consumers in regions that it is uneconomic to provide these services to.

The costs of providing these services may reduce relative to the legacy network with the NBN upgrade, hence there may be less uneconomic services to fund. Further, the NBN's coverage and uniform pricing objectives apply to 98 per cent of services, as opposed to 100 per cent for the legacy network. Depending on the technologies deployed in traditionally high cost areas, there may be potential for there to be no uneconomic services within the NBN footprint.

Of note, the NBN RFP requirements extend existing universal service objectives from only voice and narrowband, to also include broadband. Further, whilst on the legacy network, the infrastructure used to provide voice and broadband differed, with next generation networks, the same infrastructure provides the voice and broadband service, and the same infrastructure that provides entry level services is able to provide 'premium' versions of these services at little or no extra cost. Assessing how services are defined and the costs that are allocated to them will therefore be important in assessing Proposals' proposed funding mechanisms.

The issues that have arisen with determining the level of subsidy under the current universal service regime should arise to a far lesser extent following the NBN upgrade. This is because via the NBN RFP process, Proponents will have to explicitly state the technologies and costs of these technologies they intend to deploy in different regions, and the retail prices they intend to charge — they are effectively required to explicitly state what the costs of funding uneconomic services (if there are any) will be. This removes the ability of the NBN operator to come forward in the future and claim a funding shortfall.

If there continue to be uneconomic services on the NBN, the mechanisms that Proponents put forward to fund them must be assessed. Cross subsidies and ADCs have been the least sustainable mechanisms under the current regime:

- Internal cross subsidies mean that the prices paid for services diverge from the costs of providing them. This has consequent effects on competition, and efficient investment in and use of infrastructure.
- Wholesale cross-subsidies — that is, averaged access prices — are unsustainable if there are large differences in costs across regions and there is competition at the wholesale level in regions which provide the subsidy (e.g. metropolitan markets). However, if access seekers in metropolitan areas have no other option but to

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purchase access services from the NBN operator — that is, if there is no possibility that the NBN will be bypassed — averaged access charges may be viable.

- Further, if the costs of providing services, either at the retail level or the wholesale level are similar across regions — as there is potential for with the adoption of next generation access, depending on the technologies adopted in traditionally high cost areas — uniform/averaged access prices would also be suitable, because they would more or less be cost-reflective. Indeed, it would seem that if lower cost technologies are deployed in traditionally high cost areas, there is the potential for the uneconomic service issue to fall away altogether, or be significantly reduced. In addition, the NBN operator is not, at this stage, required to service the last 2 per cent of premises — the cost differentials within the 98 per cent footprint may be sufficiently small such that an averaged/uniform wholesale price is broadly cost-reflective.
- Internal cross-subsidies, being internal to the NBN operator, lack transparency and accountability. Further, with a vertically integrated NBN operator, they could lead to anti-competitive conduct concerns. Australia is obligated under the *WTO Agreement on Basic Telecommunications* to only implement funding mechanisms that are transparent and allow accountability.

It is important to note that, if access prices are de-averaged (to reflect cost differentials across regions) it is still possible to achieve uniform retail pricing objectives. Direct subsidies can be offered to operators in high cost areas to recover the gap between the uniform retail price and costs. Hence, there would be no disincentive to offer retail services in high cost areas at a price different to that offered in low cost areas. These subsidies could be sourced from a USF.

A USF provides an alternative means of funding uneconomic services to cross-subsidies.

- Subsidies would be provided from the fund to the operator or operators that provide services to uneconomic regions to compensate them for their losses in doing so.
- The mechanism can be structured such that either one operator, for example, the NBN operator, is the only service provider in uneconomic regions (by only allowing the NBN operator access to subsidies i.e. providing subsidies at the wholesale level), or multiple retail operators provide services in uneconomic regions (by providing subsidies at the retail level).
- It is desirable that funds for the USF are collected in the most efficient and transparent way possible. Which of the three broad options is most efficient and transparent will depend on the specifics of their implementation.

Consideration also should be given to the inter-relationship between those uneconomic services provided within the NBN footprint and those services provided to the last 2 per cent of premises. In particular, if an operator other than the NBN operator services the last 2 per cent of premises, internal mechanisms are likely to be an unsustainable mechanism for funding the last 2 per cent of premises. On the other

hand, if the NBN operator is required to service the last 2 per cent of premises, it would seem that distortions in competition and investment across regions would be minimised if a consistent funding approach were to be taken. Consideration should also be given to whether it is desirable that there be differences in prices and quality for equivalent services within and outside of the NBN footprint — currently, no requirements for quality and price have been laid out for the last 2 per cent of premises.

Appendix F. Structural arrangements and equivalence

F.1. Executive Summary

- The structural arrangements of the NBN will be an important determinant of the nature and scope of competition which will exist in Australia's communication markets for at least the next 15 years.
- The NBN operator is likely to have market power and if it is vertically integrated (that is, providing retail as well as wholesale services) then incentives and ability for it to discriminate against its wholesale customers is greater than if it only offered wholesale services.
- Since the liberalisation of the Australian telecommunications market there have been limited opportunities to address the competition issues created due to the presence of a vertically integrated incumbent. The NBN process creates a unique opportunity to address these issues and put in place structural arrangements which will ensure equivalence and promote competition to the benefit of end users.
- One of the Commonwealth's objectives set out in the RFP is to establish a NBN that facilitates competition through open access arrangements that "ensure equivalence" of price and non-price terms and conditions, and provide scope for access seekers to differentiate their product offerings.
- The ACCC notes that the use of the word ensure implies that a very high threshold needs to be met to demonstrate that this objective has been achieved.
- Since the introduction of managed competition in 1991 and open competition in 1997, Telstra has been subject to an access regime and since 2001 this access regime has been complemented with accounting separation measures. In June 2006, the government introduced a form of functional separation, the 'operational separation' framework over Telstra's fixed-line operations. However, since coming into effect the operational separation arrangements that apply to Telstra have been shown to be ineffective in a number of essential areas.
- The ACCC is of the view that equivalence in access over an NBN can only be ensured by a non-integrated or a fully structurally separated Proponent. That is, vertical integration of any form into downstream markets, even when subject to functional separation, will not ensure equivalence such that this objective has been fulfilled.
- If the NBN operator is vertically integrated there are a range of regulatory tools that could be put forward to assist in the promotion of equivalence in access to the NBN. These tools include 'horizontal separation', 'functional separation', 'access regulation', 'accounting separation' and 'behavioural undertakings'.
- Horizontal separation involves the splitting of ownership of potentially substitute functions of a business. While it may be pro-competitive in certain circumstances, it can only assist in promoting equivalence where it substantially constrains the market power of the NBN operator. If not, horizontal separation should not be seen as a complete alternative for other structural measures. Rather, any horizontal separation measures would need to be coupled with other mechanisms, such as a strong functional separation regime, in order to assist in promoting equivalence.

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- Functional separation, when successfully implemented, may go some way to addressing concerns regarding equivalence. In this appendix the ACCC sets out what it considers to be the minimum requirements of a robust functional separation model to apply to a vertically integrated NBN operator with market power.

F.2. Introduction

One of the Commonwealth's objectives for the National Broadband Network (NBN) is that it:

Facilitates competition through open access arrangements that ensure equivalence of price and non-price terms and conditions, and provide scope for access seekers to differentiate their product offerings.²⁴⁵

The ACCC notes that the use of the word “ensure” implies that a very high threshold needs to be met to demonstrate that this objective has been achieved. That is, vertical integration of any form into downstream markets, even when subject to functional separation, will not ensure equivalence such that this objective has been fulfilled. Nevertheless, measures such as a strong functional separation model may go some way to addressing concerns regarding equivalence.

The Request for Proposals (RFP) documentation does not require Proponents to have particular structural arrangements, instead requesting that Proponents:

Submit their proposed arrangements for ensuring open access to the NBN, including measures or models to ensure that access is provided on equivalent price and non-price terms and conditions.²⁴⁶

The RFP does however acknowledge the importance of structural arrangements of the NBN when a Proponent has vertically integrated operations. A vertically integrated NBN Proponent would:

- own and operate the NBN infrastructure, charging third parties to access this infrastructure so that these third parties can service customers in downstream retail markets; and
- operate a retail business which uses the NBN infrastructure to provide services to customers. It is in the retail market(s) that the NBN operator would face competition from those third parties who pay it to access its NBN infrastructure.

The RFP requires a vertically integrated Proponent to demonstrate what structural measures or models it proposes to put in place and maintain to prevent inappropriate self-preferential treatment and ensure that effective open access is achieved on terms required by the Commonwealth.²⁴⁷ Proponents are required to specify:

..... what measures and models it proposes be put in place to ensure equivalence between itself and its wholesale customers in relation to the supply of interconnection access and other wholesale services.²⁴⁸

However, as noted above, if a Proponent submits a vertically integrated NBN model, there exists no structural arrangement that can be put forward that will ensure (in the strong sense of the word) that services are provided on an equivalent basis.

²⁴⁵ Department of Broadband, Communications and the Digital Economy, Request for Proposals to roll-out and operate a National Broadband Network for Australia, RFP Number DCON/08/18, April 2008 (The RFP), section 1.3.1(10)

²⁴⁶ Ibid, section, 1.5.16

²⁴⁷ Ibid, section 1.5.16

²⁴⁸ Ibid, Schedule 2 section 1.4(iii)

This paper explores the measures or models which may be implemented by a vertically integrated Proponent to assist in the promotion of equivalence between itself and its wholesale customers, but will inevitably be unable to guarantee equivalence.

It is important to note that since the liberalisation of telecommunications markets in Australia there have been a limited number of opportunities to address the structure of the vertically integrated incumbent, Telstra. Where such opportunities have arisen, incremental and arguably insufficient steps have been taken to address both Telstra's ability and incentives to discriminate against its downstream competitors and in favour of its own retail arm. While in the context of the legacy copper network the structural separation of Telstra has been contemplated, it has never been implemented.

That said, in the context of the NBN, questions around the appropriate structural arrangements should not be focused on Telstra, rather they should be focused on the appropriate structure of the NBN operator taking into account the experiences in dealing with the vertically integrated telecommunications incumbent in the past. Importantly, the structure of the NBN will have flow on implications for competition in the communications sector for at least the next 15 years.

Section 3 of this paper provides an overview of the structural issues raised in the regulatory submissions to the NBN Expert Panel.

Section 4 examines the evolution of structural arrangements within the Australian telecommunications industry since 2001.

Section 5 examines full structural separation – the only vertical arrangement which can ensure equivalence.

Section 6 outlines the types of arrangements that may go some way to assist in promoting equivalence, providing an overview of horizontal separation, functional separation, access regimes, accounting separation measures and behavioural undertakings. In relation to functional separation, section 6 outlines what it considers to be the minimum requirements of a robust functional separation model to apply to a vertically integrated NBN operator with market power.

Section 7 looks at effects of the NBN build on the incentives and ability of a vertically integrated operator to discriminate.

F.3. Regulatory submissions

The majority of regulatory submissions to the NBN Expert Panel commented on the issue of the structural arrangements to apply to the NBN operator. In general there was a significant amount of support from industry, government, consumer groups and individuals for structural or, at the very least, functional separation and, consequently, strong equivalence requirements.

Optus submitted that existing provisions of the TPA have failed to constrain Telstra to date and they are ill suited to a NBN environment. Optus submitted that the “Government must therefore deal with the issue of market power at its source...” by imposing structural separation.²⁴⁹ Optus submitted that the ideal form of structural separation is to have no common ownership between the owner of a NBN and any retail telecommunications service provider. In support of its submissions, Optus provided expert reports by CEG and Dr Chris Doyle (Warwick University) advocating structural separation.²⁵⁰

Optus submitted that the ACCC should remain responsible for the oversight of access prices and terms and conditions and should also have a clear set of rules to allow it to enforce ring-fencing.²⁵¹ The submission included a detailed ‘plan’ for structural separation.²⁵² Optus noted that the Government can implement structural separation through legislation, licence conditions, formation documents for an NBNC_o or a combination of all these measures.

Terria broadly supported Optus’ submissions on the structural separation model and noted that operational separation and/or ring fencing can also assist. Terria noted that the two key elements to effective ring-fencing arrangements are price and non price terms and argued that pricing terms should include imputation testing and rules regarding price discrimination. Terria submitted that the ACCC should play a key role in the oversight of an appropriate Special Access Undertaking.²⁵³

AAPT and PowerTel argued that structural separation would provide a level playing field for access seekers and require less ongoing regulation, as competitive incentives would be built into the market structure.²⁵⁴

Acacia Australia argued the NBN provider should only provide wholesale services and, as a consequence, all of the benefits of structural separation would be achieved. Acacia Australia also argued that under structural separation there would be no incentives for such a provider to engage in discrimination against its wholesale customers.²⁵⁵

Notably, Telstra was the only industry participant whose submission was strongly in favour of vertical integration and strongly opposed to structural or functional separation of a NBN. In opposing structural separation Telstra argued that vertical integration enables the most efficient provision of telecommunications services and

²⁴⁹ Singtel Optus, *Optus Submission - Regulating the National Broadband Network*, June 2008 p4.

²⁵⁰ Ibid., appendices A and B.

²⁵¹ Ibid., p44.

²⁵² Ibid., appendix C.

²⁵³ Terria, *Terria Regulatory Submission*, June 2008.p9.

²⁵⁴ AAPT Limited and PowerTel Limited, *Submission by AAPT Limited & PowerTel Limited in response to the Minister for Broadband, Communications and the Digital Economy Invitation for Comments on a National Broadband Network Regulatory Framework*, 25 June 2008 p9.

²⁵⁵ Acacia Australia Pty Ltd, *Acacia Australia Pty Ltd – NBN Regulatory Submission*, June 2008.

that international experience shows that separation models have failed and functional separation models implemented to date have been ineffective and expensive.²⁵⁶

Many of Telstra's competitors²⁵⁷ also commented on the negative effects horizontal integration may have in respect of competition in supplying services on a NBN – in particular, the development of new content services which will drive demand on the new network.

In general, most submissions from industry, government, consumer and welfare groups and individuals also made clear that, regardless of the structure or form of a NBN entity, it is critical to ensure equivalence of price and non-price terms of access in order to ensure competitors can compete on an equal footing in retail markets.

F.4. Development of vertical separation policy within the Australian telecommunications industry since 2001

While the structural arrangements of the NBN have been the focus of the regulatory submissions to the NBN Expert Panel it is important to recognise that discussions around the appropriate structure of the telecommunications industry are not unique to the NBN process. While a more detailed examination of the history of the industry is contained in chapters 3 and 4 of the Report, this appendix examines the development of vertical separation policy since 2001.

The first separation measure to be introduced into the Australian telecommunications industry was Accounting Separation pursuant to the *Telecommunications Act* 1991 (Cth), which required the regulator to develop an accounting separation regime referred to as the chart of account and a cost allocation manual. The regime however only required horizontal accounting separation between each carrier's retail services.²⁵⁸

In 2001, the ACCC introduced its Telecommunications Industry Regulatory Accounting Framework (Record Keeping Rules) issued under section 151BU of the TPA. These Record Keeping Rules required Telstra to keep vertically separated accounts on a historical cost basis and report revenues and costs for Telstra's retail and wholesale services (including its internal wholesale services separately).

A second set of accounting separation rules were implemented by the ACCC in June 2003 and required vertical accounting separation under a current cost accounting basis. In addition to this, in June 2003, the Government directed the ACCC to implement an enhanced form of accounting separation of Telstra. This direction required the ACCC to report on key performance indicators for non-price terms and conditions that compare service performance between retail and wholesale supplied

²⁵⁶ Telstra, *Telstra Corporation Limited, Public submission on the roll-out and operation of a National Broadband Network for Australia*, 25 June 2008.

²⁵⁷ Optus, Terria, Austar, Macquarie, Hutchison and Vodafone.

²⁵⁸ Doyle, 'Structural separation and investment in the National Broadband Network environment', *A Report for SingTel Optus* June 2008

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services.²⁵⁹ The government's purpose in establishing the enhanced accounting separation framework for Telstra was to provide the ACCC, access seekers and the public with greater transparency with respect to Telstra's wholesale and retail costs.²⁶⁰ The accounting separation regime, which is still in force at present, requires the notional ex-post allocation of costs across wholesale and retail operations, and therefore does not contribute greatly to detecting and remedying specific occurrences of anti-competitive conduct.

In 2005, the Productivity Commission completed an inquiry into the impacts of National Competition Policy reforms. In releasing its final report, *Review of National Competition Policy Reforms*²⁶¹, the Productivity Commission recommended that a quasi-structural regulatory remedy for Telstra should be considered ahead of its full privatisation in 2006. The Productivity Commission also expressed a clear preference for that remedy being functional separation (operational separation), concluding that²⁶² :

...potential benefits of full structural separation of Telstra's wholesale and retail arms are not sufficiently large to justify the efficiency and transaction costs that would entail.

For similar reasons the Productivity Commission stated that it was unconvinced that major horizontal structural changes (in this case requiring Telstra to divest its cable network) would be worth pursuing in telecommunications. In relation to horizontal separation it was noted that²⁶³:

...precluding Telstra from direct involvement in cable networks could potentially deprive the market of its experience in network development... and also the investment capital that it could bring to the process. There is also a risk that recourse to divestiture could reduce general investor confidence and thereby retard, rather than enhance, the rate of new network development. Splitting the cable network from Telstra's other assets would again raise a range of technological issues. And like vertical structural separation, it could be a procedurally complex and time consuming process with major implications for the proposed privatisation of Telstra.

In April 2005, the Department of Communications, Information Technology and the Arts (DCITA) released an issues paper seeking comments and views from the telecommunications industry and other interested parties about whether it would be appropriate or desirable to make further changes to the telecommunications competition regime.²⁶⁴

An outcome of this review was the *Telecommunications Legislation Amendment (Competition and Consumer Issues) Bill 2005*, which introduced an 'operational separation' framework for Telstra to support greater equivalence and transparency in

²⁵⁹ O'Leary G, *Enhancing Competition in Telecommunications: Accounting Separation of Telstra's Operations*, Research Note no. 39 2003-04, March 2004.

<http://www.aph.gov.au/library/pubs/rn/2003-04/04rn39.htm>, Accessed 06/08/2008

²⁶⁰ Department of Communications, Information Technology and the Arts, *Draft Direction on Telstra's accounting separation issued for public comment*, media release, 19 March 2003.

²⁶¹ Productivity Commission, *Review of National Competition Policy Reforms*, February 2005

²⁶² Ibid p.247

²⁶³ Ibid p. 244

²⁶⁴ DCITA, *Telecommunications Competition Regulation – Issues Paper*, April 2005, page 3

Telstra's wholesale and retail operations. At the time of implementing this operational separation regime it was noted that:

Telstra is a vertically integrated firm which retains a dominant market position in many telecommunications markets. Telstra also owns infrastructure which its competitors need to access and interconnect with in order to compete against it. Telstra's control over this infrastructure, combined with its market position, creates an incentive and the ability for it to favour its own retail business in the provision of access to this important infrastructure. Telstra's vertical integration also creates a lack of transparency that makes it harder for the ACCC to effectively enforce the competition regulations.²⁶⁵

The Government specified that one of the fundamental aims of operational separation is 'to provide transparency that Telstra is not favouring its own retail activities over the activities of its wholesale customers, while allowing Telstra to obtain legitimate benefits from vertical integration.'²⁶⁶ This has been expressed more simply as the concept of 'equivalence'.

The 'operational separation' regime required Telstra to prepare a draft operational separation plan (**OSP**) directed towards the achievement of the aim and objectives of operational separation; equivalence and transparency, and provide it to the Minister for approval.²⁶⁷ The Minister approved Telstra's OSP on 23 June 2006.

Under the OSP, Telstra has provided that it will maintain three business units, wholesale, retail and 'key network' and that it will operate these businesses 'substantially separate' from each other. The OSP includes four strategies aimed at promoting equivalence these include:

- Service Quality Strategy (SQS) – aimed at ensuring the standard of delivery of Eligible Services²⁶⁸ supplied to wholesale customers is equivalent to the standard of delivery of comparable Eligible Services supplied to the Retail Business Units.
- Information Equivalence Strategy (IES) – describes the measures that Telstra will implement to demonstrate that the provision of information provided by the Key Network Services Business Unit or the Wholesale Business Unit to wholesale customers about relevant changes to Telstra's network is, to the extent possible, equivalent to the provision of the same or similar information to the Retail Business Unit.
- Information Security Strategy (ISS) – outlines the measures Telstra will adopt to protect confidential information relating to Telstra's wholesale customers,

²⁶⁵ Telecommunications legislation amendment (competition and consumer issues) Bill 2005, Explanatory memorandum, pg 13

²⁶⁶ Explanatory Memorandum to the *Telecommunications Legislation Amendment (Competition and Consumer Issues) Bill 2005*, page 82

²⁶⁷ Minister for Communications, Information Technology and the Arts, 'Telecommunications (Operational separation – designated services) Determination (No.1) 2005' *Explanatory Statement 2005*

²⁶⁸ An Eligible Service is defined as being a listed carriage service (within the meaning of the Telecommunications Act 1997) or a service that facilitates the supply of a listed carriage service (within the meaning of that Act); where the service is supplied, or is capable of being supplied, by a carrier or a carriage service provider (whether to itself or to other persons).

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in order to promote the objective of providing high quality services to wholesale customers and to meet Telstra's obligations under the OSP.

- Customer Responsiveness Strategy (CRS) – aimed to ensuring that Telstra is responsive to complaints made by its wholesale customers; establishes a process for resolving disputes between Telstra and its wholesale customers; and describes the measures that Telstra will implement to monitor its compliance with the SQS and the IES.

In addition, Telstra's OSP also provides for a price equivalence framework (PEF) which seeks to provide an ongoing assurance that Telstra is not favouring its retail arm by supplying services to itself at prices which are unjustifiably lower than those offered to its downstream competitors. The PEF requires Telstra to conduct imputation testing with the intention of assessing the impact of a material price change as defined by Telstra on the margin available to efficient competitors.

Under the operational separation model, whether Telstra's OSP should be varied, or a rectification plan prepared in respect of any contraventions, is ultimately a matter for the Minister. The role of the ACCC is essentially to investigate and report matters to the Minister as appropriate. In terms of remedying a breach, Telstra's OSP can be seen to contain a "two strikes policy", as the ACCC can only take enforcement action when a 'rectification plan' has been contravened, and a rectification plan would only exist where the Minister has first required Telstra to prepare such a plan and has accepted it.

Since coming into effect in June 2006 the operational separation arrangements that apply to Telstra have been shown to be ineffective in a number of essential areas. Since June 2006 Telstra has been able to:

- Supply ADSL2+ services on a retail basis only;
- Ignore the ACCC's written advice on imputation testing principles;
- Deflect wholesale customer complaints on the basis they were not made under the operational separation plan;
- Provide whole-of-business incentives to executives in the ring-fenced divisions; and
- Require end-user customers who are customers of access seekers to provide Telstra retail units with information that is confidential to the access seeker.

In Senate Estimates in June 2008, the ACCC chairman, Graeme Samuel, made the following comment about the effectiveness of Telstra's OSP:

We continue to receive complaints of conduct that suggest that the objective of equivalence, which was the objective of the regime, is not being achieved. There have been some instances of conduct since the regime's inception which, while it is not clear they breach the operational separation plan, do not promote the objective of equivalence which was the fundamental objective of the plan in the first place. In relation to the other objective of transparency, there is some additional reporting that the regime provides. However, this has been of limited benefit and is at a highly aggregated level. I guess, in summary, we would have to say that the

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regime is fundamentally unduly complex. There is a lot of discretion left to Telstra. There are limited self regulatory mechanisms and unduly convoluted processes to implement any corrective action.²⁶⁹

The ACCC is of the view that the operational separation regime applying to Telstra is a weak form of functional separation which, in its current form, is not working as Government intended.

The ACCC has written to the relevant Minister advising of its concerns in relation to the apparent shortcomings in the OSP:

- First, on 6 February 2007, in relation to concerns that Telstra was rewarding ostensibly ring-fenced technicians for providing retail sales leads and introducing higher quality ADSL services for retail customers before advising wholesale customers; and
- Second, on 27 February 2008, in relation to Telstra's failure to provide information to the ACCC in response to a formal request made under clause 6.8 of Telstra's OSP. The request required Telstra to produce the model it uses to assess its pricing under the PEF after notifying the ACCC of a material price change.

To date, no further action has occurred in relation to these matters.

F.5. Achieving equivalence through structural separation

For the reasons set out below, the ACCC's view is that ensuring (in the strong sense) equivalence in access can only be achieved by a non-integrated or a fully structurally separated Proponent. Full structural separation requires the legal separation of particular assets and activities of a vertically integrated entity into separate corporate entities with entirely separate owners / shareholders.

There are a number of legitimate reasons why a firm may choose to vertically integrate. For example, a vertically integrated firm can avoid the transaction costs associated with dealing with other firms (e.g. costs related to establishing and administering relationships with other firms). These transaction costs can increase when they involve relationship-specific investments²⁷⁰ or contractual incompleteness. Vertical integration also allows a firm with market power to avoid a series of mark-ups over marginal cost that each firm in the vertical chain builds into its wholesale price in order to earn a profit (referred to in the economic literature as double marginalisation).

On the other hand a vertically integrated firm with market power has both the incentive and the ability to discriminate against its downstream competitors via both price and non-price means. There may also be some vertical diseconomies which may

²⁶⁹ Graeme Samuel, Chairman, ACCC, Senate Estimates Standing Committee on Economics, 5 June 2008

²⁷⁰ A relationship-specific investment is one which is specifically tailored to the needs of another firm in the vertical production chain and where the value of this investment is significantly reduced outside of this particular relationship.

arise as firms take on additional functions which are outside the scope of its core functions and which the firm is not well equipped to perform.

There is no hard and fast rule that more or less integration in a particular firm or industry would be optimal at any particular point in time. Indeed, market structures continually change through mergers and acquisitions as well as divestiture activities of private firms. Often, this is driven by changes in technology. However, it may be that in some cases vertical separation can enhance the value of separated firms. That is, there may be vertical dis-economies of scope. One possible source of such a decline in efficiency is loss of ‘management focus’, as the skills required to operate the two components are distinctly different. In such circumstances, the actions of capital markets tend naturally towards less integrated structures.

An example of this is the Time Warner Inc announcement in May 2008 that it would legally and structurally separate from the second largest cable operator in the United States, Time Warner Cable Inc. Time Warner Inc President and CEO Jeff Bewkes commented that after the separation each company would have a greater strategic, financial and operational flexibility and would be better positioned to compete within their respective markets. Separating the two companies would also help their management teams focus on realizing the full potential of the respective businesses. Time Warner Cable President and Chief Executive Officer Glenn Britt added further:

Our [Time Warner Cable Inc] separation from Time Warner also enhances our ability to compete aggressively and perform well in a highly competitive environment by delivering the innovative telecommunications services that our customers need, while making prudent investments to deliver continued value for our stockholders.²⁷¹

In addition to this split, Time Warner also announced its plans to divest its AOL's dial-up Internet and advertising businesses into separate divisions by early 2009 after merging in 2000. It was noted that in recent times AOL's financial performance had declined and that the split would allow Time Warner to focus on creating content rather than distributing it.

Australian examples of companies choosing to structurally separate aspects of their businesses include:

- Australian Gas Light splitting its infrastructure assets from its retail and merchant energy business in 2005 on the basis that the move would create greater long-term value for shareholders;²⁷² and
- Toll splitting off its infrastructure assets (ports and the Pacific National rail business) from its logistics business in 2007. Regarding the re-structure Toll stated that “dynamic growth opportunities were identified in both businesses, building on Toll's current strong results and performance.”²⁷³

²⁷¹ Time Warner, ‘Time Warner Cable agree to separate’, 21 May 2008

²⁷² See comments by chairman, Mark Johnson, in O’Sullivan, M, “AGL to float retail assets”, 1 November 2005 (Sydney Morning Herald, online version).

²⁷³ See comments at <http://restructure.toll.com.au/home.asp>.

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There is also the potential for structural measures to encourage efficiencies as non-core functions of a firm, which it may have been ill-suited to perform, are divested and management is able to focus on the firm's core business operations.

Reflecting this, firms will tend to integrate some businesses within a vertical chain but not others. Where a firm is not subject to effective competition, it may be slow to move to this optimal position, or it may deliberately choose to remain more highly integrated for strategic reasons. In some cases arms-length contractual arrangements can better capture efficiencies of vertical integration.

When compared to the vertically integrated firm, full structural separation has the potential to bring greater benefits where:

- it would be expected that a vertically integrated network operator would have the incentive to favour its downstream affiliates over third party access seekers; and
- it is unlikely that these incentives could be effectively countered through other forms of regulation.

At a general level, where there is market power, private interests in integration (ie. interest in profits) can diverge from public interest in competition and social welfare.

An integrated network operator would be expected to have a strong incentive to discriminate when:

- it has market power in the upstream market,
- equivalence in access might risk profit contribution – i.e., where:
 - a materially higher return is available on retail supply than from providing network access services; and
 - effective competition in downstream markets would result in the erosion of excess profits if access seekers had equivalent access to the upstream input; and
 - countervailing incentives – such as those that might exist under the threat of effective competition across all levels of production (eg. if HFC and/or wireless networks provided strong competitive constraint) – are weak.

Implementing full structural separation may encourage dynamic efficiencies through the promotion of competition in downstream services. It may also permit lighter-handed regulation elsewhere (such as price-cap regulation), and may increase the effectiveness of targeted regulatory intervention that is required.²⁷⁴

However, unless the board and management of the firm in question are committed to the outcomes, full structural separation may be a disruptive process. There may be some transactional costs associated with separating an entity, for example the cost of reorganising the separate businesses.

²⁷⁴ For instance, structural separation measures would ensure that robust data will be available to assist in regulatory decision-making.

A pivotal issue in structurally separating an integrated entity is the question of where to separate. Given the information asymmetry that exists between the regulator and the firm, full structural separation is more likely to occur at the “right point” and hence be more effective in the situation where the firm is co-operative or voluntarily offers to structurally separate. In the absence of full information there is a much greater risk that the point of separation will not occur at the optimal point.²⁷⁵ It is likely that the task of identifying the appropriate point of separation is easier in the context of the provision of next generation services than it is in relation to legacy services.

The Singapore Government has stipulated full structural separation as its preferred structural model for its Next Generation National Broadband Network (Next Gen NBN). The Singapore Next Gen NBN tender requires *structural separation* of the passive network²⁷⁶ operator (NetCo), from the downstream service layer²⁷⁷ operators (OpCo). Furthermore, the Next Gen NBN will require the OpCo to be *operationally separated* from retail service providers. The Singapore model differs to others being pursued internationally, as a form of full structural separation would be applied to the NetCo. That is, the OpCo (and presumably other downstream service providers) could not own a controlling interest in the operations of NetCo. That said, Singtel has a 30 per cent stake in the OpenNet consortium which was awarded the NetCo tender on 26 September 2008.²⁷⁸

F.6. Measures to assist in promoting equivalence in the presence of vertical integration

As discussed in section F.2 above, if a Proponent submits a proposal based on it being a vertically integrated NBN operator, it is required to specify what measures and models it proposes to put in place to prevent inappropriate self-preferential treatment and ensure equivalence between itself and its wholesale customers.²⁷⁹

As noted above, no vertically integrated Proponent can go as far as entirely ensuring equivalent open access. As such, this section examines a range of second best solutions which may go some way to providing open access and promoting equivalence of price and non-price terms and conditions but will ultimately not be able to guarantee it. It is important that this section is read in this context.

Whether a particular structural measure should be adopted will depend upon an analysis of whether it is likely to promote effective competition, efficient market outcomes and consumer welfare. It is difficult to quantify many of the long-term

²⁷⁵ Telstra Corporation Limited, Public submission on vertical integration and separation, 25 June 2008, appendix C (Jamison, M. and Sichter, J., *Experiences with Business Separation in Telecommunications*, 23 June 2008).

²⁷⁶ Passive infrastructure refers to the non-electronic infrastructure for example wire lines, ducts etc

²⁷⁷ Service layer infrastructure refers to switches, routers etc

²⁷⁸ OpenNet will use ducts and other underlying passive infrastructure belonging to its partner, SingTel to deploy the fibre network. SingTel has committed to transfer these assets to a separate asset company (AssetCo) by 2011, and will reduce its ownership in that company by 2014. AssetCo will lease back access infrastructure to OpenNet in a 25 year lease.

²⁷⁹ RFP, Schedule 2 section 1.4(iii)

benefits and costs identified in this form of analysis. Consequently, any such the analysis needs to be undertaken on a qualitative as well as quantitative basis.²⁸⁰

There are a range of regulatory tools that could be put forward by a vertically integrated Proponent to assist in the promotion of equivalence in access to the NBN. These tools (which are not necessarily mutually exclusive) include ‘horizontal separation’ (although relevant only in the context of an NBN Operator with ownership interests in another network, such as an HFC network), ‘functional separation’, ‘access regulation’, ‘accounting separation’ and ‘behavioural undertakings’.

Functional separation is one model that, when successfully implemented, can go some way to addressing concerns regarding equivalence. In this section, the ACCC sets out what it considers to be the minimum requirements of a robust functional separation model to apply to a vertically integrated NBN operator with market power.

However, in and of itself, functional separation, either used in isolation or in conjunction with any of the other tools described in this chapter, is not sufficient to ensure that equivalence will be achieved. The ACCC is of the view that equivalence in access over an NBN can only be ensured by a non-vertically integrated or a fully structurally separated Proponent.

F.6.1. Horizontal separation

Horizontal separation involves the splitting of ownership of potentially substitute functions of a business.²⁸¹

In Australia there is a level of horizontal integration in the telecommunications context given that both Telstra and Optus, in addition to providing services over the copper access network, also own their own cable (HFC) networks. Telstra, in addition, owns 50% of the dominant pay TV provider, Foxtel.

Australia is one of the few countries that permitted the incumbent telecommunications operator to also own an HFC network. Other countries where there is or has been common ownership of cable and telecom networks include Denmark and Portugal.

International evidence suggests that the best prospects for full-facilities based competition in telecommunications markets (and therefore the strongest case for regulatory rollback) is where there is intense competition between copper and cable networks. Both networks utilise optical fibre technology and are capable of providing a range of services including basic telephony and high-speed broadband services²⁸² (particularly with development of new DOCSIS standards to improve broadband speeds over HFC). Cable networks have the added advantage of also being capable of providing pay-TV services.

²⁸⁰ This difficulty is recognised in Hilmer, *supra*, at p.221

²⁸¹ OECD (2001), *Restructuring public utilities for competition*, p. 8.

²⁸² Telstra’s HFC network offers speeds of up to 30 Mbps to 1.7 million homes with the remaining 0.8 million homes accessing speeds of up to 17 Mbps. Optus’ HFC network offers speeds of up to 20 Mbps to ‘MyHome’ and ‘Fusion’ subscribers and 9.9 Mbps to other subscribers. As a portion of the coaxial network segment is shared between customers, actual speeds will decline significantly with each additional user.

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In its *Emerging Market Structures in the Communications Sector* report (June 2003), the ACCC recommended that the Government, after undertaking a cost / benefit analysis, consider legislating to require Telstra to divest both its HFC network and Foxtel. The ACCC stated²⁸³:

The Commission believes substantial competition benefits would be derived from requiring Telstra to fully divest its HFC network and its 50 per cent shareholding in Foxtel. Divestiture of the HFC would introduce a new infrastructure competitor into the market, establishing conditions for increased rivalry and innovation in the supply of a full range of telecommunications services. If Telstra were divested of its Foxtel shareholding, both Telstra and Foxtel would have improved incentives to supply their services to competitors and Telstra would have diminished ability to use its market power to leverage into converged markets.

In 2005, however, the Productivity Commission, in releasing its final report, *Review of National Competition Policy Reforms*, noted in relation to Telstra's ownership of its cable network and shareholding in Foxtel that:

... though the overseas evidence suggests that the case for horizontal changes is stronger than that for full vertical structural separation, it is still far from clear that such changes would deliver a future net benefit in an Australian context.²⁸⁴

More recently, in late 2008 the ACCC rejected an application from Telstra seeking exemption pursuant to section 152AT of the TPA from its obligations to supply various 'declared' services to Optus within the Optus HFC footprint. The rationale of the application from Telstra was that, where Optus owns its own end-to-end network, competition will be promoted by Optus competing on that network rather than via access to the PSTN. The ACCC, however, rejected the application on the basis that such an exemption would amount to a discriminatory access policy which may also have the effect of deterring future investment in infrastructure. The ACCC also noted that the high content costs faced by Optus in its supply of pay TV services limits its ability to achieve economies of scope over its HFC network.

In contrast to Australia, in the UK, Belgium and Spain, the dominant telecommunications provider was prohibited from offering cable television services. In 1997, the Dutch incumbent (KPN) was forced by the government to reduce its participation in the cable firm Casema from 100% to 20%. Consequently, the telecommunications industry in the Netherlands has become one of the most competitive telecommunications industries on an international scale.²⁸⁵

In other countries, the pressure exerted by regulators (combined with some financial difficulties) has led incumbents to divest their participation in firms that own cable networks. Following pressure from the EC, Deutsche Telekom sold off its last cable networks in 2004. In May 2002 the merger of Telia and Sonera (the telecommunications incumbents of Sweden and Finland respectively) was approved

²⁸³ ACCC, June 2003, *Emerging markets in the Communications Sector* report, p57

²⁸⁴ Productivity Commission, *Review of National Competition Policy Reforms*, February 2005, p 244

²⁸⁵ As at June 2008 the Netherlands' broadband take-up by population was ranked second highest by the OECD. OECD, *Broadband Portal*, <http://www.oecd.org/sti/ict/broadband>, October 2007. The OECD *Broadband Portal* also indicates that the Netherlands had the ninth lowest monthly average broadband subscription prices as at October 2007.

by the EC subject to the condition, among other things, that Telia divest its cable television network.

Other examples of horizontal separation include the formal separation of telecommunications operator AT&T in the United States. AT&T were required to formally separate its long-distance calls business from the Regional Bell Operating Companies' (RBOC) local call services. The basic concern that led to the break-up was that AT&T had utilised its control of bottleneck local telephone networks to foreclose competitors and cross-subsidise its potentially competitive markets.²⁸⁶ It was considered that a full horizontal structural separation would remove the RBOC's incentive to favour AT&T over its long-distance rivals. Since then, the US has moved away from full structural separation between vertically integrated operators. The line-of-business restrictions on the RBOC's (which precluded them from entering long-distance call markets) have been withdrawn.

An option in the current NBN process may be to consider imposing horizontal separation upon the successful Proponent by requiring it to divest any other networks it currently owns and/or operates and requiring it to undertake not to own/operate any such networks in future. This may provide improved scope for up to three independently owned fixed networks, and could reduce the need to regulate services in overlapping coverage regions.

This, of course, heavily depends on the characteristics (eg, geographic reach, capacity, service quality, barriers to expansion) of the networks required to be divested, and the net result in terms of each separate firm's customer base (including its position relative to competitors) and network ownership. When these factors are considered, the ACCC is not satisfied that Optus could provide much constraint on services offered over the NBN by competing via its HFC network. Optus has relatively few pay-TV customers, does not own the most valuable content rights (which limits its ability to fully compete in offering a 'triple play' offering of voice, broadband and video services) and has substantially smaller fixed-line voice and broadband revenues than Telstra.²⁸⁷ Accordingly, the viability of further expansion of Optus' HFC network (which, at present, has limited geographic coverage)²⁸⁸ in Australia is questionable.

On the other hand, in the event the NBN was awarded to a party other than Telstra, there is a greater possibility that Telstra could look to expand geographically and upgrade its HFC network. This is for two main reasons. First, by virtue of its 50% stake in Foxtel, and associated customer base and content rights, it is in a considerably stronger position than Optus in competing on video offerings, whether through Foxtel or its own online or IPTV offerings. Second, Telstra's dominance in terms of share of fixed-line telephony and broadband customers would give it a much larger revenue stream to defend, and consequently much stronger incentives to migrate customers to an alternative network, were it not to be the NBN operator.

²⁸⁶ Jamison & Sichter, 'US experiences with business separation in telecommunications', *public submission on vertical integration and separation*.

²⁸⁷ See Chapter 4 of this report for more detail on copper and cable (HFC) broadband competition.

²⁸⁸ Optus' HFC network is present only in the capital cities of Brisbane, Melbourne and Sydney.

Therefore, in the context of assessing horizontal separation as a measure to address equivalence, consideration as to whether separation would substantially constrain the market power of the NBN operator must be undertaken. If not, horizontal separation should not be seen as a complete alternative for other structural measures. Rather, any horizontal separation measures would need to be coupled with other mechanisms, such as a strong functional separation regime, in order to assist in achieving equivalence.

In any case, the costs and benefits associated with requiring horizontal separation would need to be carefully balanced. In the context of divesting an HFC network this would include having regard to the direct costs of divestiture, the prospects that this network would be purchased and operated by a third party, the prospects that this network (or other HFC network/s) would be extended beyond its existing footprint to compete with NBN covering 98% of the population and the extent to which HFC networks will be an effective substitute for the NBN. A further relevant consideration is that emerging content delivery mechanisms, such as digital TV and online content delivery (potentially including IPTV), appear to be increasing their capacity to compete with pay TV, and might in some circumstances diminish pay-TV's role as a key driver for telecommunications infrastructure roll-outs. Accordingly, while divestiture of an HFC network may go some way towards promoting equivalence, there are doubts as to whether it would be sufficient to fully ensure it.

F.6.2. Functional separation

Functional separation attempts to replicate the incentive properties of structural separation where structural separation cannot be achieved or is not feasible and/or where horizontal separation would not be sufficient to provide a competitive constraint upon the NBN operator. Functional separation is a broad term used to define various models which segregate particular assets and other inputs into a separate division without requiring separate ownership for that division.

The key feature of functional separation models is that the network provider operates at arms length from the downstream service providers. It usually requires operations and management separation and carries the potential for decisions to be made independently by the separated division and the rest of the company. Models implemented internationally require that the separate divisions trade using *identical processes*, including explicit prices, for both internal (within the same company) and external customers in a way that can be verified.

Functional separation, however, is very much a second best outcome to a situation where there is no common ownership between the network owner and a downstream retail entity. While functional separation can have a measurable effect on the incentives to discriminate, it creates an artificial and fundamental internal conflict between the overall profit maximisation objectives of the firm's common ownership and the separated business units. As a result, firms will typically seek to circumvent its requirements through whatever means are legally available. Accordingly, even the most robust functional separation regimes require extensive on-going monitoring and enforcement, which may be costly.

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Functional separation therefore complements and ameliorates, but does not obviate, the need for other regulatory tools and monitoring functions to deal with the ability of a vertically integrated firm to discriminate.

Set out below is an examination of international experiences with functional separation in the telecommunications industry as well as an examination of functional separation models operating in the energy sector in Australia. This is followed by the ACCC's views on what it considers to be the minimum requirements of a robust functional separation model to apply to a vertically integrated NBN operator with market power.

International experience with functional separation in the telecommunications industry

Functional separation has been implemented in a number of jurisdictions in recent times in relation to existing copper networks.

In Europe, functional separation of operators with significant market power has had some support. The European Regulators Group has advocated the inclusion of functional separation as a *supplementary* remedy under the current EU electronic communications regulatory framework for markets where general non-discrimination obligations have been shown to be ineffective.²⁸⁹ The EC has since accepted this recommendation.

In November 2007, the European Commission presented its proposals for reforming the European Union telecommunications framework. The legislative proposals provide National Regulatory Agencies (NRAs) with the additional remedy of functional separation as an exceptional remedy subject to the European Commission's supervision. The European Commission has, however, been very careful to provide guidelines on the use of functional separation as a remedy. It believes that, in exceptional cases, functional separation may be a justified where there has been persistent failure to achieve effective non-discrimination in several markets and where there is little or no prospect of infrastructure competition within a reasonable time-frame, after recourse to one or more regulatory actions previously considered to be appropriate.²⁹⁰

On 8 July 2008, the European Parliament Committee on Industry, Research and Energy voted to adopt 'functional separation' of telecommunications companies as a last resort regulatory tool for national regulators.²⁹¹ By that time, some European member states had already commenced development of such models.

²⁸⁹ ERG, *ERG opinion on functional separation*, 2007

²⁹⁰ Nicoletti, Stefano; Holmes Jim. 2008 'Structural and functional separation: the experience in Europe so far', *Telecommunications Journal of Australia* 2008 58(1): pp 8.4

²⁹¹ Under the proposal a national regulator may, as "an exceptional measure", require telecoms operators to separate their network services from their content ones by creating a separate business unit to run the network services. This unit should then provide all network user firms with access products and services on equal terms. However, the national regulator may apply this remedy only if both the Commission and Body of European Regulators in Telecommunications confirm that no other measure has achieved effective competition and that, without the remedy, there is little prospect of future infrastructure-based competition.

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On 19 April 2007, the National Post and Telecom Agency (PTS) was directed by the Swedish government to investigate the preconditions for and propose the formulation of legislation for the separation of a vertically integrated telecommunications operator. PTS proposed the introduction of a regulatory tool which provided it with the authority and powers to impose requirements for vertical separation of a dominant integrated telecommunications operator. PTS considered both full structural separation as well as functional separation and concluded that structural separation as well as functional separation would be needed to solve the current problems of competition in the Swedish market. PTS has recommended that, as a rule, the functionally separate business units of a telecommunications operator should be its own legal entity in the form of a limited company. Legislators in Sweden will shortly enact legislation to allow the regulator PTS to mandate these changes. These changes go beyond the functional separation undertaken in the UK with Openreach (as discussed below).²⁹²

In the United Kingdom, Ofcom's Strategic Review of Telecoms concluded in 2005 that changes were required to the incumbent BT to provide "real equality of access" for competitors to facilitate the growth of competition, innovation and investment certainty in the UK telecommunications sector. Faced with the possibility of having full structural separation imposed, BT chose to create a functionally separate business unit called Openreach to manage access and backhaul networks. Openreach is an access services division which is responsible for both maintaining the physical network layer and providing access. The second ring-fenced affiliate is BT Wholesale, which supplies managed services only (with access services, including line rental, supplied by Openreach).

Functional separation was also announced in New Zealand in September 2007. On 30 March 2008, Telecom NZ's plan for functional separation was approved by the relevant Minister. The responsibility for the physical network layer of the access and backhaul networks (including existing and future fibre and wireless access assets) was given to Chorus, a division of Telecom NZ. This division also provides network access services to Telecom NZ and to access seekers. The 'wholesale business unit' is responsible for the supply of specified managed services, including bitstream services, to wholesale customers or Telecom NZ's retail business units.

Table 1 provides a comparison of the key elements of two of relatively advanced models of operational separation (those which apply in the UK and the New Zealand) with the Australian operational separation model. Despite these models being two of the most advanced models in place internationally, the ACCC is of the view that it is still too early to be definitive about the relative success (or otherwise) of each.

European Parliament, *Parliament set to ring in changes in telecoms market*, July 2008
http://www.europarl.europa.eu/news/public/focus_page/052-29881-156-06-23-909-20080526FCS29861-04-06-2008-2008/default_en.htm

²⁹² National Post and Telecom Agency, *Improved broadband competition through functional separation: statutory proposal for non-discrimination and openness in the local loop*, June 2007

Table 1: Comparison of the Australian, UK and New Zealand operational separation models

	AUSTRALIA	UNITED KINGDOM	NEW ZEALAND
Organisational split	<u>Notional</u> . Telstra still operates the Key Network services division which deals with Telstra and access seekers. 1. Key Network services (Telstra branded) 2. Wholesale business unit (for both unbundled and managed services) 3. Retail Services Unit	<u>More substantive</u> . Network services division separately branded. 1. Network services (separately branded) – <i>Openreach</i> 2. Wholesale business units (separate for (i) unbundled and (ii) managed services) – <i>BT Wholesale</i> 3. Retail business unit – <i>BT Retail</i>	<u>More substantive</u> . Network services division separately branded. 1. The Access Network Services (ANS) unit (separately branded, must not include the word “Telecom”) 2. Wholesale unit 3. Telecommunications Fixed Network business unit (other than ANS and wholesale unit) 4. Retail unit
Accounting arrangements	<u>No requirement</u> for separate accounts	Requirement for separate accounts	Requirement for separate accounts of ANS
Assets allocated between units	No	Yes	No
Price Equivalence measures	<u>Relatively weak</u> . Imputation testing proffered but Telstra has not yet provided relevant information	<u>Stronger</u> . Transfer pricing to promote internal/external equivalence	<u>Stronger</u> . Transfer pricing to promote internal/external equivalence
Service quality measures	<u>Relatively weak</u> . <i>General</i> equivalence obligation on service quality, KPI reporting on connections, faults and billing but does not necessarily translate into services delivered.	<u>Much stronger</u> . Requirements to use the same regulated wholesale products, at the same prices and using the same transactional systems/processes, as BT’s retail activities. KPI reporting on provision and repair for wholesale line rental, ULL, IPstream, and billing	<u>Much stronger</u> . Requirements to offer same products and services at both the wholesale and retail levels and use same processes as wholesale KPI reporting on connections, faults and billing to demonstrate equivalence of inputs.
Customer Support Measures	<u>Questionable</u> . Dispute resolution and responsiveness measures managed by Telstra internally	<u>More robust</u> . Independent complaints body	<u>More robust</u> . Independent complaints body
Governance	<u>Relatively weak</u> . Externally audited annual compliance report to Minister, Board committee oversight, designated executive with day-to-day responsibility, staff training obligation.	<u>More robust</u> . Externally audited annual compliance report. Equality of Access Board committee oversight (independent directors). Requirements regarding reporting lines, senior staff engagement	<u>More robust</u> . External audit of Independent Oversight Group’s (IOG) annual report, arms-length rules applying to certain Telecom personnel, requirements regarding reporting lines, requirements for setting ANS policies to ensure that ANS operates on a stand-alone basis.
Regulator	Responsible Minister, ACCC investigation function and regular reporting function	Ofcom investigatory and regular reporting function	NZ Commerce Commission – Enforcement role IOG – independent oversight role
Timing	Commenced June 2006.	Commenced late 2005.	Commenced 31 March 2008
Enforcement Options	<u>Relatively weak</u> . Many steps before ACCC can take action. “Two strikes” policy requiring intervention of Minister	<u>Stronger</u> . Ofcom can prosecute breaches of OSP undertakings. Financial penalties up to 10% of relevant turnover	<u>Stronger</u> . Commerce Commission can prosecute breaches of OS - \$10m for each breach, \$500k per day for continuing breaches

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Experience in Australia with functional separation in the energy sector

Further guidance on functional separation models can be taken from examining those models implemented in the energy sector in Australia. One such model is prescribed by the *National Gas Law* (set out in the Schedule to the *National Gas (South Australia) Act 2008* (SA) and associated legislation applicable in other states and territories) (National Gas Law).

A service provider of a pipeline covered by the National Gas Law is required to comply with the minimum ring fencing obligations set out in Chapter 4, Part 2. The National Gas Law requires that the service provider:

- be a legal entity (s. 131);
- not conduct a related business (s. 139);
- establish and maintain separate and consolidated accounts (s. 141);
- not prevent or hinder access to a relevant service (s. 133);
- ensure that marketing staff do not work for associates (s. 140); and
- ensure that related businesses not contract with each other on terms that are different to those that would be entered into with unrelated businesses. Contracts between related business should be neither anti-competitive in effect nor be on terms that are different to entities that are unrelated (unless approved) (ss. 147-148).

Under section 229 of the National Gas Law, the Australian Energy Regulator (AER) has responsibility for initiating proceedings in relation to an alleged breach of the National Gas Law. A penalty of up to \$20,000 for a natural person or up to \$100,000 for a body corporate may be imposed by a court for a breach of the ring-fencing requirements.²⁹³

There are other regimes operating in the Australian energy sector that were established by alternative legislation. For example, in the ACT, the relevant ring-fencing obligations applying to ActewAGL's electricity operations are set out in Independent Competition and Regulatory Commission's (ICRC) *Ring Fencing Guidelines For Gas and Electricity Network Service Operators in the ACT*, published in November 2002.²⁹⁴ Generally speaking, these obligations are more restrictive than those set out in the National Gas Law.

Under ICRC's guidelines, the service provider must:

- be a legal entity (s. 3.1(a));
- not carry on or cross-subsidise a related business (s. 3.1(b) and (c));
- establish and maintain separate and consolidated accounts (s. 3.1(d) and (e));

²⁹³ See Chapter 8 of the National Gas Law.

²⁹⁴ A copy of which is available at the Independent Competition and Regulatory Commission's website at www.icrc.act.gov.au. Note that under the rule 6.17 and clause 11.14.5 of the National Electricity Rules ICRC's guidelines apply to ActewAGL's electricity operations. However, as at 1 January 2009, the ring fencing requirements in sections 137-146 of the National Gas Law commenced applying to ActewAGL's gas operations (section 39 of Schedule 3 of the National Gas Law).

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- allocate shared costs in a manner consistent with a methodology that is consistent with generally accepted accounting standards and is otherwise fair and reasonable (s. 3.1(f));
- protect confidential and commercially sensitive information (s. 3.1(g), (h), (i), (j), (k), (l));
- ensure that marketing staff do not work for related businesses (s. 3.1(m));
- ensure that operational staff involved in providing the following services do not also work for related businesses:
 - enquiries, including fault calls;
 - connection, disconnection and reconnection;
 - customer transfers;
 - meter provision and meter reading; and
 - processing of data generated from the above activities (s. 3.1(n));
- develop and put in place procedures regarding protection of confidential information (s. 3.1 (o) and (p));
- ensure that the utility’s office space is physically separate from that of related businesses – NB. physical separation may be accomplished by having office space in separate buildings or, if within the same building, on separate floors or with separate access (s. 3.1(q));
- ensure security of access to the service provider’s information system and confidential information – NB. These measures allow for the sharing of information systems provided there are appropriate access restrictions, for example “Chinese Walls”, or password access only (s. 3.1(r));²⁹⁵
- conduct business with related businesses at arms length and in a competitively neutral manner (s. 3.1(s)) – arrangements with related businesses should be:
 - on a contract basis with terms and costs clearly defined;
 - transparent; and
 - on terms no more favourable than would be offered to a third party in the same commercial circumstances (s. 3.1(s)); and
- not engage in joint marketing, advertising, promotion or product development with a related business in a manner that gives the related business a competitive edge or misleads customers .

The ring-fencing requirements set out in both the National Gas Law and ICRC’s guidelines have a number of differences to the functional separation models operating in the telecommunications industries in the UK and NZ. For example, ring-fencing measures in the energy sector:

- generally allow the sharing of some staff (such as human resources, corporate services and IT staff) between ring-fenced units;

²⁹⁵ See also discussion on page 11 of ICRC’s *Ring Fencing Guidelines For Gas and Electricity Network Service Operators in the ACT*.

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- often allow the sharing of information systems between ring-fenced units;
- do not require board separation between ring-fenced units; and
- are enforceable by penalties that are relatively low compared to those applicable in the functional separation models operating in the telecommunications industries in the UK and NZ.

Minimum requirements of a robust functional separation model to apply to a vertically integrated NBN operator with market power

Below is a list of what the ACCC considers to be minimum requirements of a robust functional separation model to apply to a vertically integrated NBN operator with market power. These are largely based on the functional separation models operating in the telecommunications industries of the UK and NZ given the similarities that can be gleaned between the telecommunications industries of the UK, NZ and Australia.

- *Arms length transactions* requiring that the network owner's business dealings with its downstream operations are conducted in the same way as their dealings with unrelated third parties, that is, at arms length.
- *Creation or designation of discrete organisational divisions* which are then assigned responsibility for specified operations. These can either be a division of the existing firm or a subsidiary company. Each of these affiliates is ring-fenced from other affiliates of the firm. The organisation of the firm's other affiliates, including downstream retailing affiliates, and allocation of remaining operations between them, remains at the firm's discretion. An effective functional separation regime would require each business unit to have separate business systems which assign control over necessary infrastructure, operational support systems and information systems (eg accounting systems) to the ring-fenced divisions. In addition, line of business restrictions would need to be imposed to prevent other affiliates replicating the functions that have been ring-fenced.
- *Price equivalence measures* requiring affiliates pay the same for their access to the network as wholesale customers. This involves establishing a transfer pricing system and the preparation of separate accounts for the ring-fenced affiliates, and retail affiliates, of the firm that are prepared on the basis of these transactions. This differs from imputation testing models, as are used in Part XIB anti-competitive or competition investigations, which seek to identify for regulatory purposes an implied access price for affiliates by deducting an estimate of higher layer costs from average retail prices that are offered. Without ex ante separation of the relevant business units, however, there is no requirement that this implied price must reflect the same tariffs faced by wholesale customers. Further, there is no requirement under an imputation testing only model for retail or wholesale affiliates to account for their use of the network on an arms length basis.
- *Non-price equivalence measures* requiring that the same access products are offered, and the same processes and systems are used to provide operational support (service qualification and provisioning, fault handling and billing) to the retail and wholesale customer facing affiliates and to access seekers. Equivalence in technical quality is promoted by the use of the same access products, while equivalent operational quality is promoted by the use of the same operational

support systems.²⁹⁶ This differs to a more light-handed approach that permits differences in processes provided that specified measures of relative performance do not differ. This alternative approach provides less assurance and is dependent upon robust and encompassing measures being designed and implemented, and even then permits targeted discrimination.

- *Governance arrangements* where each business unit employs separate staff. That is, staff would be prevented from being employed within more than one business unit, or transferring between them. To be most effective this obligation should extend to *all* staff – including all employees, directors and officers. Each business unit is required to occupy separate premises with direct reporting lines to senior management for ring-fenced divisions. In addition, remuneration and incentives (including short-term incentive schemes such as annual bonuses as well as long-term incentive and remuneration schemes) for all staff in ring-fenced divisions be on unit performance and independently of whole-of-business performance. Strong governance arrangements should include oversight by a body similar to the Equality of Access Board that was established in the UK to report and advise on BT’s compliance with its ring-fencing obligations.²⁹⁷
- *Enforcement provisions* to deal with breaches. Functional separation models should be implemented pursuant to a legislative framework that permits court enforcement and imposition of penalties and/or injunctions in respect of established breaches. The greater the size of the potential penalties, the greater the deterrent. In the UK financial penalties for a breach of BT’s operational separation regime may be up to 10% of relevant turnover.²⁹⁸ In New Zealand, the breach of the separation undertakings by Telecom could result in a pecuniary penalty of up to \$10 million for each breach, plus \$0.5 million per day for continuing breaches.²⁹⁹ The ACCC is of the view that pecuniary penalties for breaches of a functional separation regime to apply to a vertically integrated NBN operator with market power should at least be comparable with the current penalties for breach of the standard access obligations set out in section 152AR of the TPA – being a maximum of \$10 million for each contravention.³⁰⁰

While these measures can be important to effectively deter discrimination, this is not to say that under a functional separation model more transactional work is placed onto the regulator. On the contrary, these models aim to reduce the need for regulatory intervention on points of detail. This is by (i) establishing organisation arrangements that reduce incentives to discriminate; and, (ii) creating independent oversight of the network operator’s management of complaints and

²⁹⁶ The issues surrounding equivalence in ‘process’ vs. ‘product’ are elaborated on in appendix H

²⁹⁷ See clause 10.9 of BT’s Undertakings provided to Ofcom pursuant to section 154 of the *Enterprise Act 2002* (UK).

²⁹⁸ See section 97 of the *Communications Act 2003* (UK).

²⁹⁹ See subsection 80(2B) of the *Commerce Act 1986* (NZ).

³⁰⁰ Note that by virtue of section 61 of the *Telecommunications Act 1997* (Cth) (**Telco Act**) and section 152AZ of the TPA, it is a condition of carrier licences to comply with the standard access obligations contained in section 152AR of the TPA. Subsection 68(1) of the *Telco Act* provides that a carrier must not contravene a condition of its carrier licence. Section 570 of the *Telco Act* empowers the ACCC to institute a proceeding in the Federal Court for the recovery of a pecuniary penalty not exceeding \$10 million in respect of each contravention of subsection 68(1) of the *Telco Act*.

alternative dispute resolution mechanisms, such as the UK's Office of Telecommunications Adjudicator.

- *Equivalence of information* whereby access seekers and ring-fenced affiliates have equivalent access to information. In addition procedures need to prevent access seeker's information that is provided to the network services unit or the managed wholesale services unit, from being disclosed to the retail unit. It is important that access seekers have full confidence in the fact that a vertically integrated access provider cannot pass on information to its retail arm in relation to the retail customers of access seekers. Information security and equivalence measures are important to ensure the promotion of dynamic efficiency and innovation. For example, in the circumstance where an access seekers requires a modification of the access service to enable a new product to be offered in the retail market, there needs to be sufficient mechanisms in place that prevent the access provider sharing this new idea with its retail arm prior to its competitor's launch.

The ACCC is of the view that the current Telstra OSP and the supporting legislative framework would not provide a suitable model to implement functional separation for the NBN operator. In Telstra's current OSP many of the organisational arrangements listed above are missing, or are so weak they can be readily circumvented.

F.6.3. Access Regime

An access regime generally establishes legal rights for third parties to access and use an incumbent's infrastructure services on reasonable terms and conditions. Concurrently the incumbent is required to provide access to third parties to declared services.

In Australia, the current telecommunications access regime was introduced in 1997 via Part XIC of the *Trade Practice Act 1974* (TPA). Under Part XIC an access provider is required to provide access to an access seeker for certain 'declared' services. Where an access provider and an access seeker are unable to reach commercial agreement on terms and conditions of access, the ACCC is required to arbitrate disputes subject to consideration of the criteria set out in section 152CR of the TPA.

Access regulation typically tries to minimise monopoly pricing and seeks to promote downstream competition by allowing competitors access to certain essential bottleneck infrastructure.

It appears that while the operation of an access regime can help address the 'monopoly pricing problem' arising from control of natural monopoly infrastructure, it is arguably less effective in promoting equivalence in non-price terms of access. This arises from:

- the risk that equivalence in access poses to profit contribution from downstream affiliates; and,
- difficulties in the regulator identifying the price, service-level and other non-price terms of access at which the vertically integrated provider supplies its own affiliates, and associated delays in mandating equivalence through existing regulatory measures.

Delays in equivalence in turn harm the competitive process. Further, this harm can potentially extend beyond any initial period of delay of equivalent access. Downstream affiliates may gain first-mover advantages³⁰¹ that can entrench their price-quality offers.

In introducing a legislative framework to support operational separation of Telstra, the government noted that an access regime alone may not be sufficient to prevent discrimination:

The current regulatory regime has enabled competition to develop in the telecommunications market, but it has not fully prevented Telstra from discriminating in favour of its own retail operations. Addressing this issue, at this time, is important to enable competition to continue to develop.³⁰²

F.6.4. Accounting separation measures

Accounting separation is a non-structural measure primarily aimed at increasing transparency of pricing vertically integrated operators. Accounting separation essentially comprises a scorecard of a network operator's relative performance, on average, and in respect of some aspects of access, in providing access to affiliates and third parties. While these measures do not directly guard against discriminatory conduct in relation to pricing, they can provide a degree of transparency to third-party access seekers over a network operator's relative performance. This increased transparency could in certain circumstances promote efficient entry and exit by access seekers, and/or complement the effectiveness of other forms of regulation to promote equivalence.³⁰³

While accounting separation is primarily aimed at increasing transparency of pricing matters, certain non-price measures (such as key performance indicators on non-price terms and conditions) can also be a component.

As discussed earlier in section F.4, an enhanced accounting separation regime has been imposed on Telstra since 2003. However, as noted in the explanatory memorandum to the legislative framework for the operational separation of Telstra, accounting separation models that have operated do not appear to have contributed materially to the promotion of competition. This could reflect inherent limitations in the ability of ex-post regulation to provide timely and effective remedies for instances of discrimination which may be identified through accounting separation measures. As such, the ability of accounting separation measures to counter incentives to discriminate are limited. Alternatively, this could be due to limitations in the nature or scope of the reported measures - providing little ability to detect material forms of discrimination would be readily detected. For instance:

³⁰¹ such as by contracting end-user customers or selling service-specific CPE

³⁰² Telecommunications Legislation Amendment (Competition and Consumer Issues) Bill 2005, Explanatory memorandum, 2005 at p.2

³⁰³ Transparency of itself would not be expected to promote entry without the credible threat of other forms of regulation that could quickly remedy identified discrimination. Hence while accounting separation may complement other forms of regulation, it will be insufficient to provide an effective substitute. [Source: Hilmer, supra, at p.220]

- reported performance measures are necessarily of an average nature, and hence are able to mask targeted discrimination, e.g., against a potentially disruptive entrant.
- reported measures can be of a notional nature – e.g., in respect of pricing, they have not required transfer-pricing and a full separation of accounts, but rather are based upon modelling assumptions around efficient cost of service provision.
- the reported measures are necessarily provided at the end of the reporting period, and hence there can be delays in discrimination being detected.
- the non-price performance measures are necessarily limited in scope (and hence care must be taken in interpreting these data).³⁰⁴

F.6.5. Behavioural undertakings

A behavioural undertaking can be described as a commitment by a firm, to a regulator, court or government, to take a particular action or refrain from taking a particular action, even though such an action may be profit maximising. To be effective behavioural undertakings need to be capable of being implemented, adhered to, and monitored. Furthermore, in circumstances where they are breached they need to be capable of being enforced and penalised.

Behavioural undertakings could be a suitable means by which to mitigate against identified instances of discriminatory conduct. Generally speaking behavioural undertakings are a set of ongoing remedies which seek to constrain a firm's behaviour in relation to specific price and/ or non-price matters.

Section 87B of the TPA allows the ACCC to accept a written undertaking given by a person *in connection with a matter* relating to a power or a function of the ACCC under the TPA. That is, there needs to be a substantial relationship between the conduct complained of and the undertaking accepted. These undertakings are commonly known as s.87B undertakings.

In relation to s.87B undertakings the ACCC has outlined in its Merger guidelines that it has a strong preference for structural undertakings, noting that behavioural remedies are rarely appropriate on their own to address competition concerns. However, on occasion behavioural undertakings may be appropriate as an adjunct to a structural remedy.³⁰⁵

The ACCC also noted in its Merger guidelines that it is particularly rare for the ACCC to accept behavioural remedies that apply on a permanent basis due to the inherent

³⁰⁴ For instance., under its current operational separation plan Telstra's reported KPI's do not measure technical equivalence, and so Telstra can report that there has been no material discrimination in wholesale ADSL services whilst supplying higher-quality xDSL services (such as ADSL 2+) only to retail units. Other known limitations concern the inability to measure accuracy of service qualification data provided to access seekers, or measure incidence of other impediments that discourage placement of orders.

³⁰⁵ ACCC Merger Guidelines, November 2008, pg 63

risk to competition combined with the monitoring and enforcement burden such remedies create.³⁰⁶

Where a person has breached a s.87B undertaking the ACCC may seek an order from the court directing the firm to comply with the undertaking or compensate any other person who has suffered loss or damage as a result of the breach. However, monitoring compliance with the undertaking, establishing a breach and then gaining a resolution via the court process is likely to take some time and be costly even in the circumstances where a clear breach can be established.

The Alinta case provides a recent example of the ACCC seeking an order for a breach of a behavioural undertaking and the timeframes involved in seeking a remedy. In October 2004 Alinta gave a behavioural undertaking to the ACCC under s.87B of the TPA as a part of its acquisition of the Dampier to Bunbury Natural Gas Pipeline. The ACCC required Alinta to give undertakings to the ACCC in order to address potential competition issues arising from that fact that Alinta would become an owner and manager of the pipeline, as well as a shipper on the pipeline. The undertakings sought to prevent Alinta from using its part ownership of the pipeline and management role, to discriminate against other gas shippers that used the pipeline.

In September 2006, the ACCC filed proceedings against Alinta in the Federal Court for breach of the undertakings over the period 23 January 2006 until 6 October 2006. The ACCC alleged that an Alinta employee was seconded to the pipeline business and involved in commercial negotiations in breach of the undertakings.

The Court handed down a decision in August 2007 requiring Alinta to make certain declarations that it had breached these undertakings and ordered it to pay the ACCC's costs.³⁰⁷

The reason the utility of behavioural undertakings is limited is that they do not directly realign the incentives of the business entities with which access seekers deal to gain access. Rather, the undertakings must be taken in an iterative fashion, with each revision preceded by a detailed inquiry to overcome informational asymmetry between the regulator and the access provider, and which can then be followed by the emergence of new instances of discrimination. To be effective, behavioural undertakings need to contain workable mechanisms for the on-going monitoring, compliance and investigation of the specific terms of the undertaking.

Further, existing regulatory structures applying to telecommunications do not lend strong support to this approach unlike other regulatory regimes in Australia or those applying to telecommunications markets in other jurisdictions.³⁰⁸ Part XIC does not

³⁰⁶ ACCC Merger Guidelines, November 2008, pg 63

³⁰⁷ ACCC media release 235/07 29 August 2007, "Federal Court declares Alinta breached s87B undertakings"

³⁰⁸ For instance, CMT, the Spanish regulator, has required Telefonica ensure equivalence in the local loop information systems (which are termed 'service qualification' systems in Australia) that it supplies to retail and wholesale customers, and take other specified actions to ensure equivalence. The obligations will be incorporated into Telefonica's standing offer, rather than being contained in functional separation undertakings. [Source: Cullen International, *Telecommunication WE, Big 5 Update 93, March 26 – April 22, 2008*]

permit regulatory specification of the tariffs or non-price terms that the access provider must offer to all access seekers.³⁰⁹ Under Part XIC, whether an access provider submits an undertaking that would allow for all access seekers to be covered is at its discretion. In the absence of a credible threat of further regulatory intervention, the access provider has little incentive to provide robust undertakings that would constrain behaviour it considers beneficial at a whole-of-business level.

F.7. Effect of NBN build

Whether a vertically integrated operator of the NBN would have strong incentives to discriminate will depend upon the characteristics of the NBN, its operator and the access and other regulatory arrangements proposed for it.

That said it is clear that a vertically integrated NBN operator will be able to discriminate over matters such as provisioning and fault repairs as well as the availability of network information and operational support systems. The NBN operator would likely have strong incentives to do so, especially where:

- facilities-based competition is weak;
- access prices are regulated and cost-oriented and retail services are not;
- downstream service differentiation is supported;
- costs are also fixed and present in downstream service provision; and/or,
- downstream margins are expected to be high.

There is the potential for the NBN build or other developments to alter the network operator's incentives to discriminate.

In reaching its draft view to reject the FANOC's Special Access Undertaking, the ACCC expressed the view that the proposed operator of that network would be to some degree vertically integrated and leaving price and non-price terms of access to its discretion would give rise to competition concerns. In its draft decision the ACCC considered that:

... a vertically separated ownership model could reduce incentives for the access provider to discriminate between downstream users of the access service and, therefore, facilitate strong and effective competition between access seekers in retail markets. Where such an ownership model is in place, the ACCC considers the need for regulatory oversight of non-price terms and conditions of access, in particular, could be relatively low.³¹⁰

F.7.1. Incentives to discriminate

As noted above, a vertically integrated network operator with market power will retain incentives to discriminate, except where market developments and/or access

³⁰⁹ Rather, price and non-price terms of access are either commercially negotiated between relevant parties or determined by the ACCC through the dispute resolution framework established under part XIC of the TPA. This framework reflects a 'negotiate/ arbitrate' model, by which parties are encouraged to seek agreement on terms and conditions of access to declared services through direct, bilateral negotiations.

³¹⁰ ACCC, December 2007 Draft decision, *Assessment of FANOC's Special Access Undertaking in relation to the Broadband Access Service*, p6

and other regulatory arrangements make it indifferent between wholesale or retail supply. While functional separation can reduce a vertically integrated operator's incentives to discriminate against its competitors, it may also have the effect of reducing its incentives to innovate and invest. However, any loss in dynamic efficiency should be weighed up against the negative effect on downstream competition. This is noted by Ofcom where it states:

Equivalence of input and functional separation have the potential to minimise the ability of upstream monopolists to discriminate, and remove the incentive for inefficient investment resulting from the ability to leverage upstream market power. It would be possible to improve a bottleneck asset owner's incentives to invest by allowing it to act anti-competitively by leveraging its market power in the downstream market – one of the major risks of regulatory forbearance on next generation access – but the cost of doing so is in terms of the long run dynamic benefits of competition.³¹¹

The following arguments have been advanced in regulatory proceedings before the ACCC, as well as by Telstra in its regulatory submissions on the NBN process,³¹² in support of the view that the operator of a next generation access network may not have strong incentives to discriminate.

Fixed investment

It has been argued that the scale of investment required to build a next generation network will counter incentives for the network operator to discriminate, as it will want to sell next generation services through all available channels to minimise demand-side risks.³¹³

It is possible that changes in the quantum of sunk investment of the network operator will alter its incentives; but it is not clear that this will necessarily reduce incentives to discriminate. For instance, depending upon other regulatory settings, such as how closely access charges are oriented to the cost of providing access, a vertically integrated network operator's incentives to discriminate may be heightened.

Telstra has previously expressed the view that it is the ability to supply downstream higher "value add" services which will generate the demand and margins needed to justify the business case for the upstream network investment.³¹⁴ If margins on downstream services are required to fund the NBN, then incentives to discriminate would appear to be more compelling for the NBN operator than those observed today, where regulation might otherwise preclude them from being realised.

³¹¹ Ofcom, *Future Broadband, Policy approach to next generation access*, 26 September 2007 at p.74

³¹² Telstra Corporation Limited, *Public submission on vertical integration and separation*, 25 June 2008

³¹³ Ofcom has recognised that incentives to discriminate can be reduced by the level of demand-side risk associated with next generation services and the potential for downstream rivals to help grow overall demand for access, provided the network operator is able to profit from providing access. However, Ofcom still considers that functional separation will promote equivalence. [Source: Ofcom, *Future Broadband, Policy approach to next generation access*, 26 September 2007 at pp.5, 107]

³¹⁴ Telstra, 4 February 2008, *Response to ACCC draft decision regarding FANOC's SAU*, para. 31

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It is of note that the capital requirement of the operator of the NBN may be reduced by:

- proceeds generated from the sale of redundant assets e.g. freehold or leasehold over exchange buildings and copper cables. For example, KPN, the Dutch incumbent, anticipates that asset sales will substantially fund its investment in its next generation network.³¹⁵
- access to already depreciated elements of the existing customer access network (ducts and copper loops), especially where a FTTN architecture is implemented.³¹⁶ However this will ultimately depend on whether the written down value of existing assets is fully reflected in access prices.
- the level of public funding and the conditions on which it is provided – e.g., whether the public funding is provided on a non–recourse basis, and/or whether the funds are provided on a fully commercial basis.

Fixed costs in downstream service provision

Downstream service provision may also require investment – including in network equipment (such as switches, routers, application servers and inter-exchange transmission used in the core network), in retail capital equipment (including billing and customer relationship management systems) and content. Competing service providers will likely seek to invest in their own capacity as a means by which to differentiate their downstream service offerings. As a consequence, diversifying sales channels would not completely remove all demand-side risk faced by a vertically integrated network operator.

Reducing other barriers to entry

It has also been suggested that the nature of the NBN, and the (NGN) services that will be supplied over it, will reduce barriers to entry and exit by:

- supporting greater access to customers by multiple service providers;
- simplifying access to the NBN at the transport layer³¹⁷, and
- simplifying downstream service development and distribution.

While these factors may well reduce some barriers to entry and exit, of themselves they do not address whether the potential for discriminatory access to the physical network and transport layers would remain. Consequently, this barrier to entry would not reduce simply as a result of migrating to a NBN that is operated by a vertically

³¹⁵ KPN, *20-F SEC filing of Koninklijke KPN N V*, 3 May 2008]

³¹⁶ Telstra's fixed asset statement, submitted under the telecommunications industry regulatory accounting framework, provides written down values and accumulated depreciation for various CAN asset classes. The most recent statement, as at the end of December 2007, reports a written down value of 67 per cent of original cost for CAN ducts and pipes, CAN copper cables and CAN other cables. The percentage for each of these categories is: 71 per cent, 64 per cent and 91 per cent.

³¹⁷ The transport layer ensures that data is not lost and arrives to its final destination in order. This layer generally sits above the network layer and below the application layer. For a detailed explanation of network layers see Appendix G.

integrated provider. Nor would reducing other barriers to entry reduce incentives for a vertically integrated network provider to discriminate.

For instance, BT has incurred significant costs to reorganise its fixed-line businesses into a vertical chain, but considers that the benefits to it of implementing a functional separation have outweighed these costs. It can be observed that BT's share price did not deteriorate and has outperformed its peers since it agreed upon a functional separation, countering Telstra's claims to the contrary.

Although costs would likely be significant, it could be that certain anticipated costs would not arise, or be of a lesser order, due to the separation being implemented as part of a wide-ranging investment in a next generation access network. As a next generation access network will require moving distribution nodes and replacing many elements of the physical network layer and the transport protocols, there is a correspondingly high need for downstream service providers to make co-ordinated changes to their networks and services.

It is a contentious point as to whether separation impedes this investment being made. Kip Meek in support of Telstra's regulatory submission to the NBN Expert Panel noted:

The demand risks and uncertainties associated with building an NGN, especially where it is intended to replace the PSTN, seem to me to raise doubts about whether a non-vertically integrated approach would be able to achieve the necessary level of investment co-ordination.³¹⁸

In the UK, both Ofcom and BT, as the vertically integrated operator of the current generation network and an investor in a next generation core network, dispute that functional separation could deter otherwise efficient investment in next generation networks.^{319 320} To this end on 15 July 2008, BT announced its plan to invest £1.5 billion in rolling out a FTTC / FTTP network to up to 10 million premises by 2012.³²¹

³¹⁸ Telstra submission to the NBN Expert Panel, Annex A Public submission on vertical integration and separation, Kip Meek, 24 June 2008, p 23

³¹⁹ Ofcom states 'strong competition in current generation broadband has been helped by ensuring that all operators are able to buy exactly the same wholesale products, with the same processes and at the same price, as operators with market power. We propose to apply this principle to next generation access, supported by approaches such as functional separation, essential to reduce incentives for anti-competitive behaviour while retaining incentives for efficient investment.' [Ofcom, *Future Broadband, Policy approach to next generation networks, Consultation*, 26 September 2007 at p.6]

³²⁰ BT states: 'The UK is unique in the progressive regulatory environment Ofcom has promoted. The functional separation model and the creation of Openreach, unmatched in any other country, have created significant innovation, competition and improvements in quality on the basis of equivalence. The UK now has the opportunity to extend that model of equivalence into the NGA world and leap-frog the rest of the world in terms of a similarly competitive, innovative, customer-centric landscape, rather than, as seems to be the risk in other economies, setting out on a path that could lead to patchy geographic coverage with vertical integration denying effective consumer choice.' [BT, *BT's response to Ofcom's consultation document: Future Broadband, Policy approach to next generation networks*, 5 December 2007 at p.5]

³²¹ BT press release, 15 July 2008 "*BT plans UK's largest ever investment in Super-Fast Broadband*" see: <http://www.btplc.com/news/articles/showarticle.cfm?articleid=efd7b1fa-52ed-45bb-b530-734fac577e94>

The NBN architecture and proposed access and regulatory arrangements will all influence the extent to which the network will support downstream service innovation. For instance, standardised network protocols can provide a robust basis for downstream providers to invest in new or better quality services, and to supply them to the extent supported by the access network architecture. In the presence of access regulation to unbundled local loops, competing service providers have invested in overlay networks and supplied higher quality xDSL services over the existing access network.³²²

Similarly, provided appropriate regulatory arrangements were in place over access to the NBN and operational support systems, downstream providers will be able to invest in and supply new or higher-quality services and applications to the extent permitted by that network architecture. That is, as the NBN would comprise a next generation access network that would be capable of supporting very high-quality services, such as VDSL, the NBN should increase the frontier of downstream service innovation that would require no or modest incremental investment in the access network and support systems.

Further, it is unclear how vertical integration would overall provide efficient incentives for investment in new or improved services. Vertical integration would tend to increase competing service providers' concerns that their business plans may be disclosed, or necessary network or operational support system improvements could be frustrated. Hence, vertical integration would weaken rather than strengthen their incentives to invest or make quality improvements. In turn, this could discourage long-run dynamic efficiency and weaken incentives faced by the downstream affiliates of the NBN operator to invest in order to improve their service quality.

So long as the incentives remain for discrimination to occur on the NBN, measures will need to be put in place to ensure that the ability to discriminate is curtailed, and/or acts of discrimination can be quickly identified, penalised and remedied.

F.7.2. Ability to discriminate

In the absence of measures to address the incentive to discriminate, regulatory and/or contractual tools will need to be relied upon to curtail the ability to discriminate.

The anticipated NBN architecture will be unlikely to remove the ability of a vertically integrated network operator to discriminate, especially where it retains control over access to:

- the remaining copper loops (distribution and lead-in) and ducts,
- ports on switches, DSLAMs and/or MSANs at the node in much the same way as Telstra controls this access in the current network,

³²² Competing service providers introduced ADSL 2+ services in April 2005 immediately following its technical specifications being codified in Australia. [Source: Internode, *Internode launches extreme broadband – Australia's first ADSL2+*, 19 April 2005] More broadly, new services and improvements in price/quality offers have been concentrated in those areas where competition has been more effective, such as mobile services, as shown by 2.5G/3G investments and disruptive service/quality offers following the fourth network operator's (Hutchison) entry into 3G in April 2003.

- capacity on shared (or access to dark) fibre paths from the node to the POI (to be associated with a point of aggregation at which interconnection would be viable commercially),
- operational support systems necessary for connections, fault handling and billing; and
- information over current and planned network availability and performance.³²³

However, it should be noted that there is some dispute over whether or not a vertically integrated NBN operator would retain control over access to all of the above listed elements. In addition, there is likely to be scope to re-design all of the existing interface / operating systems for the NBN to preclude discrimination and ensure that access seekers are dealt with in exactly the same manner as a vertically integrated operator's downstream arm. New interface systems could be designed to facilitate easy monitoring and detection of any anti-competitive conduct and therefore would remove the ability to discriminate.

Ex-post anti-competitive conduct enforcement, similar to the provisions under Part XIB, can help deal with anti-competitive discrimination. However, discrimination in and of itself is not always necessarily anti-competitive in its purpose or effect. For example, raising a rival's costs in order to increase profitability (without squeezing rivals out of downstream markets) is discriminatory, but not anti-competitive. Anti-competitive conduct provisions, while they can be effective, can only deal with the more egregious examples of discrimination.

The standard access obligations (SAOs) under Part XIC provide that the price and non-price elements related to declared services are supplied on an equivalent basis. The SAOs are a mechanism intended to directly curtail the *ability* to discriminate (as opposed to anti-competitive conduct provisions). However, the SAOs are limited in scope. Consequently, enforcement provisions and associated penalties for breaches of access obligations under both the *Telecommunications Act* and the *Trade Practices Act* have not been used to date.

Refinements of the SAOs and associated enforcement and dispute resolution mechanisms to increase their timeliness and effectiveness in restraining a vertically integrated operator's ability to discriminate would be a minimum requirement in the absence of structural separation.

F.8. Conclusion

There are sound arguments for detailed consideration to be given to the optimal structure of the NBN operator. The RFP requires vertically integrated proponents to outline measures and models to ensure that access is provided on equivalent terms and prevent inappropriate self-preferential treatment.

In and of itself, the transition to a NGA is unlikely to remove the incentives of a vertically integrated operator of the NBN to discriminate, or reduce the strong countervailing incentives for it to do so.

³²³ Further detail on these issues is set out in Appendix G.

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Full structural separation is the only model which can ensure equivalence in access to the NBN once it has been deployed and ensure equivalence in access while existing services are migrated to the NBN. However, in the absence of full structural separation, while there are a number of other regulatory tools which can assist in the promotion of equivalence, they can not guarantee it.

Access regulation, accounting separation measures and behavioural undertaking (either alone or used in conjunction with one another) have not proven sufficiently effective in delivering equivalence in access in Australia or in other jurisdictions. Functional separation is one regulatory tool which can assist in the promotion of equivalence in access. Several jurisdictions moving towards some form of functional separation over current access networks and/or signalling a preparedness to require functional separation, including for next generation access networks.

Functional separation is an attempt to replicate the incentive properties of full structural separation. If it is considered that full structural separation is not a desirable model for the NBN, then an effective functional separation model would be the minimum required to promote, to the extent possible, equivalence in access. The ACCC is of the view that the existing operational separation arrangements which apply to Telstra are inadequate and would not provide a robust template for an effective functional separation model.

Horizontal separation involves the splitting of ownership of potentially substitute functions of a business. While it may be pro-competitive in certain circumstances, it can only assist in promoting equivalence where it substantially constrains the market power of the NBN operator. If not, horizontal separation should not be seen as a complete alternative for other structural measures. Rather, any horizontal separation measures would need to be coupled with other mechanisms, such as a strong functional separation regime, in order to assist in promoting equivalence.

Appendix G. Service description

G.1. Executive summary

- The Commonwealth's RFP has an objective of facilitating competition by ensuring that there is scope for access seekers to differentiate their service offering to customers. This appendix considers the minimum requirements of a service description for a NBN upgrade with focus on providing an environment conducive to product differentiation and which reduces the likelihood of discrimination.
- To date, regulators have generally considered that, the lower the 'layer' in the network at which access is granted and the closer it is to the basic physical infrastructure that makes up the bottleneck, the less opportunity there is to discriminate between access seekers, and the greater the ability of access seekers to control their own costs and supply chain to differentiate service offerings, innovate and improve service quality.
- The ACCC has previously considered that providing access seekers with greater control over their own business and products, to the extent that it is economically efficient, is likely to minimise discrimination, promote competition and investment in new services, and be in the long-term interests of Australian end-users.
- Although a 'Layer 2' bitstream access service is unlikely to provide access seekers with as much flexibility as existing ULLS or LSS arrangements, it may be the most economically feasible access service for the NBN operator to provide. The ACCC notes that it would be beneficial for access to be provided at various layers of the network. This would allow for access seekers to invest at the level in the network where they would achieve sufficient returns on their investments. This flexibility in access to the network would also better accommodate access seekers in the longer term where costs change and/or further applications are developed.
- It is important that access seekers can access the same service on equal terms, where they can operate in an environment with minimised discrimination. Any bitstream service description should therefore have regard to minimising the potential for discrimination, while still encouraging product differentiation to promote a competitive environment. Ensuring that the wholesale bitstream access service is clearly specified may minimise scope for discrimination. It will also be necessary to monitor operational aspects such as ordering, billing, complaint handling and repairs, although this can be difficult due to the human element required to provide those services.
- The ACCC considers that a bitstream access service with a service specification addressing the following minimum elements would be likely to promote competition and investment in new services, be in the long-term interests of Australian end-users, and meet the objectives of the Commonwealth's RFP:

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- a Layer 2 Bitstream access service, which may be offered at a variety of rates but should include a product that is not throttled as well as a product that is symmetric to the extent that technology permits. Products (both consumer and business grade) should be equally available to all access seekers on a non-discriminatory basis
- a service (whether the bitstream or another service) that allows access seekers to provide a voice service and that provides for standard E 164 numbering and addressing
- a wholesale service which offers:
 - a range of data packet priority options
 - a range of quality of service options to allow retail service providers to offer commercially viable services
 - interfaces that permit a retail service provider to control the network and service configuration (including fault status, if relevant) of its own customers
- points of interconnection which are commercially feasible for service providers and support competition, including competition for backhaul services from the first point of aggregation
- interconnection protocols based on well-accepted standards for broadband, voice and, if applicable, video, which are sufficiently well described to allow access seekers to design and build their own interconnecting facilities
- arrangements for access to buildings, shelters and facilities for interconnection
- equivalent treatment of access seekers in relation to all interfaces (including quality of service provision) required to provide a service
- an appropriate process for amending service specifications in later periods as needed or desirable, and adequate notice periods for any change
- There are two methods by which existing voice services can transition to provision in a NBN environment. One method involves the service taking a bitstream form only at the local node. This would require installation of equipment at the node but allow for the continued use of current equipment at the end user's premises. The other method (which is essential in a FTTH environment, but optional in a FTTN environment) requires equipment to be placed at the end user's premises. Regardless of which method is used, where voice services are migrated to a NBN architecture the access provider and access seekers will need to roll out softswitches. During the transitional period while this occurs, to ensure voice services are smoothly migrated without potential disruption it may be necessary to consider maintaining the copper between exchange and node. This may be a more costly solution.

- The Panel may wish to consider the ongoing provision of services other than voice services that are currently using the PSTN, such as burglar alarms, EFTPOS and traffic lights. The ACCC is not aware of the availability of equipment that could be installed at the node to obviate the need to install new equipment at the customer premises to continue the provision of such services.
- There are also questions associated with the ability to supply customers with speeds of 12 Mbps in line with the Commonwealth objective outlined in the RFP. As applications using data services develop over time, future demand for capacity is likely to rise and may affect the ability to provide such service speed. However, the desired capacity of the network will have a significant impact on the cost of the network. Therefore, there are trade-offs between cost and capacity.

G.2. Introduction

The Commonwealth's RFP highlights the importance of equality of access in any proposed network by stating that Proponents should submit:

Arrangements for open access to their network including measures or models to ensure equivalence of access prices and non-price terms and conditions, and arrangements for allowing access seekers to differentiate their service offering to customers³²⁴

The RFP also sets out that one of the Commonwealth's objectives for the NBN is that it:

Facilitates competition through open access arrangements that ensure equivalence of price and non price terms and conditions, and provide scope for access seekers to differentiate their product offerings³²⁵

The Commonwealth's objectives for the NBN also encompass the minimum speed of services that should be supplied on the NBN, the sort of applications it would be expected to support and the importance of certain key services such as voice, data and video services.³²⁶

Currently, the core economic bottleneck in the provision of telecommunications services is the access infrastructure for establishing a physical connection to the customer premises. The ULLS and LSS are examples of communications services currently being regulated to ensure that the copper loop from the exchange to the customer's premises can be rented by access seekers. When acquiring the ULLS, the access seeker rents the entirety of the capability of the copper loop. For LSS the access seeker rents only the high frequency capability of the copper loop while the access provider uses the low frequency capability. The ACCC regulates access to these services in order to promote competition using this deep level of infrastructure.

³²⁴ Clause 1.9.1

³²⁵ Clause 1.3.1(10)

³²⁶ See objectives 2, 3 and 4 in Clause 1.3.1 of the RFP.

It is likely that the move to a NBN architecture would introduce technical changes to the way telecommunications signals are transmitted across the network. Ultimately, the ACCC expects that a natural monopoly, or a bottleneck, will continue to exist in respect of the customer access network. However, the changes to the network architecture may have significant implications for the manner in which services, and in particular, access services are and can be feasibly supplied on the network.

Regardless of the specifics of the network, it will remain possible to offer an access service or services of some kind in respect of the bottleneck. While it is possible that access to physical parts of the network will be feasible, and access may be needed to promote competition using these deeper layers of the network (such as by providing for access to ducts and/or sub-loops), it seems clear that the key access service that will be feasible and promote competitive outcomes in the foreseeable future will be shared over the NBN fibre capacity.

In contrast to the current ULLS access where access seekers rent the entire capacity of the copper loop, in many, if not most cases, capacity will be shared between competitors on the fibre, from the node. The question therefore arises as to the scope that may exist for discrimination between access seekers in the way in which capacity is shared. As outlined elsewhere in this report, most particularly in Appendix F, where a vertically integrated access provider also competes in potentially competitive downstream markets, it has strong incentives to exclude its rivals through non-price means.³²⁷ Where the access provider engages in exclusionary behaviour this may place them in a stronger position compared to access seekers, as access seekers struggle to overcome the impact of the behaviour.³²⁸ Some examples of exclusionary behaviour might involve the access provider delaying providing number portability, making technological choices designed to favour the access provider over access seekers, or requiring access seekers to reveal commercially sensitive information. The resulting weakened competition would not be in the long-term interests of Australian end-users.

Therefore, in order to facilitate competition using the NBN infrastructure, an appropriate service definition is fundamental to encourage services to be provided in a NBN environment with open access, equivalence, product differentiation and effective competition in downstream retail communications markets – particularly if the NBN operator will be vertically integrated.

This appendix considers:

- the issues that arise in respect of implementing a NBN and the implications they have for the layers of communications networks at which access could be provided

³²⁷ Briefly, ‘exclusion’ involves an access provider’s profit-maximising strategy intended to loosen regulatory constraint. The intended result of the access provider is to shift their power in the bottleneck to the competitive segment. See J Laffont and J Tirole: *Competition in Telecommunications*, 2000, p.163.

³²⁸ Laffont and Tirole outline three broad groups involving various exclusionary practices by the access provider including ‘refusal and delays in interconnection’, ‘raising rivals’ costs’ and ‘lowering rivals’ demand’: pp.164-165. The concept of exclusion is also considered in Appendix H.

- the scope there is for discriminatory behaviour in supplying access services on the NBN
- the access services needed to ensure that access seekers have sufficient service offerings to ensure they can compete effectively in downstream markets

Because of the scope and incentive for discrimination between access seekers may be broadened where fibre capacity is shared between competitors, this Appendix focuses, in particular, on the considerations that arise for the supply of a bitstream access service.

G.3. Network layers

From a technological perspective, communication networks can be considered as a number of independent layers of communication. The concept of layered communication networks and how they relate to services as seen by the end customer is important because it assists in determining the most appropriate regulation to apply to the NBN.

The functional inputs necessary to provide Internet Protocol (IP) services³²⁹ and applications to end-users over the network are often categorised into various ‘layers’. There are a number of different ‘layering’ models used to implement communications networks. Figure 1 illustrates a typical layered model of a communications network³³⁰. The structure is representative of the kind of layering envisaged by most people when discussing NGN and IP networks.

³²⁹ Generally, internet protocol is a method by which data can be delivered between customers and can be considered to form the basis of communication on the internet.

³³⁰ Alternative models include, for example, the Open System Interconnection Reference Model which has seven levels and is referred to by OfCom in *Next Generation Networks: Further consultation annexes*, 30 June 2005, p. 17.

Layers	
5. Application	The application the end user is using, e.g., voice, email, TV
4. Transport	Ensures the data is not lost and is in order, e.g., the transmission control protocol (TCP)
3. Network	Gets the data across a network of links, e.g., wholesale DSL service
2. Data Link	Ensures that the data gets across a link, e.g., a bitstream service
1. Physical	The electronics that put the signals on the medium, e.g., DSLAM
0. Medium	The copper wire, optical fibre or radio channel, e.g., ULLS and LSS use the copper loop

Figure 1: Layered model structure for a communications network³³¹

In general terms, the lowest layer (Layer 0) equates to the physical connection (the actual transmission medium) between two points.³³² It could also refer to the use of other physical media, such as optical fibre or radio waves. The layers sitting above Layer 0 involve connections that are logical rather than physical. For example, Layer 1 is usually reserved for the signals using the physical transmission medium. Each layer sits on top of the preceding layers and assumes the lower layers perform the functionality required effectively and according to generally agreed protocols³³³ and standards. Competition can take place at a particular layer, not only at the physical medium.

³³¹ TCP is one of the core protocols of the Internet Protocol Suite. It provides a communication service between an application program and the Internet Protocol. When an application program needs to send a mass of data using IP, instead of breaking the data into IP-sized pieces and issuing a series of IP requests, the software can issue a single request to TCP and TCP handles the IP details.

³³² Many models do not include the concept of Layer 0, but instead refer to logical layers only.

³³³ A protocol is a self contained set of rules both parties to an interaction understand that is used to enable effective communication.

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To date, regulators have generally considered that, the lower the ‘layer’ in the network at which access is granted and the closer it is to the basic physical infrastructure that makes up the bottleneck:

- the less opportunity there is to discriminate between access seekers
- the greater the ability of access seekers to control their own costs and supply chain and to differentiate service offerings, innovate and improve service quality

The ACCC has previously considered that an approach to regulation providing access seekers with greater control over their own business and products, to the extent that it is economically efficient, is likely to minimise discrimination, promote competition and investment in new services, and be in the long-term interests of Australian end-users.³³⁴ Accordingly it would be important that access to services is provided as close to the bottleneck as feasible.

If the proposed NBN access service could be designed to give access seekers as much control as possible over their own customer traffic this is likely to increase the resulting levels of competition.

The current ULLS and LSS provide an access seeker with access at Layer 0 - that is they are provided physical access to the copper wires from the exchange to the customer’s premises. The access seeker is then able to utilise their own equipment (e.g., DSLAMs) for the higher layers, providing an opportunity to differentiate their product to that of the access provider and/or other access seekers. However, it is important to note that where an access seeker obtains access at Layer 0 and installs their own DSLAM, their ability to compete on a technical level is constrained by Industry Code ACIF C559/2006.³³⁵ Briefly, this mandatory code requires all users of DSLAMs to comply with a set of technical rules. As each access seeker at this Layer is constrained by the same set of technical rules, their ability to differentiate is limited to means other than technical differentiation, such as by marketing products in a vacant niche, offering end-users different speeds within the technical rules or through commercial arrangements.

In a NBN environment the likely network technology would make use of bitstream services. This commonly means a data connection at Layer 2. In this situation the current use of unbundled access to the copper loops via the ULLS is likely to become more difficult, if not impossible. Further, the ACCC understands that there is a limited business case for alternative providers to offer services from the node using sub-loop unbundling.³³⁶ Sub-loop unbundling is therefore unlikely to be a feature in a NBN

³³⁴ ACCC, *Fixed Services Review – a second position paper*, April 2007, p. 21.

³³⁵ *Industry Code ACIF C559/2006 Unconditioned Local Loop Service (ULLS) Network Deployment*, 2006, http://www.acma.gov.au/webwr/telcomm/industry_codes/codes/c559_es_2006.pdf accessed 13 November 2008.

³³⁶ In their respective regulatory submissions Optus and Telstra both argued that the new network would be incapable of being unbundled, and that to promote take-up of the higher bandwidth services and to drive competition, 100 per cent cutover should be considered as a defining event. More recently Internode has publicly commented that the NBN network would require 100 per cent cutover in order to be economically viable.

environment. The wholesale service that potential Proponents appear likely to make available to an access seeker would comprise not just the transmission medium (such as the copper wire pair), but the transmission medium plus some electronics. The service could be said to have ‘moved up two layers’.³³⁷ To provide the access seeker with as much control as possible over its own customer traffic in a NBN environment, it would generally be feasible for the access provider to offer at least a ‘Layer 2’ bitstream access service.

A Layer 2 bitstream access service would provide access seekers with significant flexibility and control to adopt the protocols that best support the services and applications used by their customers. This is in contrast to a higher layer wholesale access service, where the access provider controls the higher layer protocols and, as a result, effectively limits the ability of access seekers to control these higher layers and offer differentiated services.

It would be important for any future bitstream access service to be provided at a lower level in the network than a wholesale xDSL service where access seekers are provided with, typically, a Layer 3 service. That arrangement involves an access provider providing the DSLAM and operating Layers 1 and 2 over the copper loop. The concern with access providers only providing a service at this higher level stems from the importance of access seekers being able to directly control their own customer traffic so they can innovate on services and applications and not simply resell the access provider’s product. The user of a wholesale xDSL service has little control over the service and is often able to do little more than add its own marketing and call centre.

As noted, it is important that access seekers can differentiate their services to be able to appeal to and capture different types of customers, although they must do so in accordance with any applicable rules or codes.³³⁸ One instance where access seekers may wish to offer differing services is for symmetric and asymmetric services. An access seeker may believe that there is a niche where they could market a symmetric service offering customers equal bandwidth in both directions. To be able to make this choice, particularly in circumstances where the access provider does not opt to provide such a service, the access seeker will require access to at least a ‘Layer 2’ bitstream access service.

The UK communications regulator, Ofcom, similarly describes a future broadband access product as needing to offer high levels of flexibility and configurability, allowing competitive operators as much control as possible. Ofcom has stated that its approach to a future broadband access product would be consistent with seven key principles, the first principle being to “promote competition at the deepest levels of

³³⁷ In the case of other layering models that do not include Layer 0, the service has moved up one layer.

³³⁸ For instance, as mentioned above access seekers using their own DSLAM must comply with *Industry Code ACIF C559/2006 Unconditioned Local Loop Service (ULLS) Network Deployment*, 2006, http://www.acma.gov.au/webwr/telcomm/industry_codes/codes/c559_es_2006.pdf accessed 13 November 2008.

infrastructure where it will be effective and sustainable.”³³⁹ Ofcom argues that regulation should be focussed as deep in the layering model as possible. If, for example, some form of access was to be made available at the Multi Service Access Node³⁴⁰, then Ofcom would favour the access to be at the physical level rather than service specific level. However, Ofcom continues to support competition at different levels of active and passive assets in order to meet the needs of different types of providers.³⁴¹

The French regulator, ARCEP, has stated that it intends to mandate access to the duct network of France Telecom.³⁴² It has commissioned a study concluding that access seekers are likely to be permitted access to over 50 per cent of the ducts. This has been preceded by new entrants typically entering the market by purchasing broadband services on a wholesale basis from France Telecom and subsequently using their own equipment with the ULLS. More recently, given a stronger subscriber base, some companies have announced that they are commencing deployment of their own fibre to the home facilities in cities with dense population, leading to ARCEP’s announcement.

The European Regulators Group’s (ERG) recent response to a European Commission (EC) draft recommendation on regulated access to Next Generation Access Network (NGA) urged the EC to reconsider its draft approach to network access in a NGA environment. The ERG emphasised that, in the event of a NGA, duct sharing alone was likely to be insufficient to stimulate efficient investment in infrastructure by the incumbent as well as competitors.³⁴³ It indicated a preference to emphasise access to both active and passive assets such as enhanced bitstream products and/or backhaul products. The report further stated that “it is important that infrastructure and service competition are not seen as opposed to each other, but are linked through the ladder of investment allowing competitors through a sequence of regulated access products that are consistently priced to invest in a step by step manner in own infrastructure”³⁴⁴.

This approach is broadly the same as the ‘stepping stone’ or ‘ladder of investment’ hypothesis previously used by regulators (including the ACCC). The ‘stepping stone’ hypothesis supports access seekers having access to an incumbent’s fixed line network at different network access points (i.e. stepping stones). The hypothesis has attracted ongoing discussion by various regulation/industry agencies and

³³⁹ Office of Communications, *Next Generation Networks - Future arrangements for access and interconnection*, November 2004, at <http://www.ofcom.org.uk/consult/condocs/ngn>, accessed 27 October 2008.

³⁴⁰ A multiservice access node (MSAN) connects customer telephone lines to the core network, to provide services such as telephony and broadband from a single platform.

³⁴¹ Office of Communications, *Delivering super-fast broadband in the UK: setting the right policy framework*, 23 September 2008, p.34.

³⁴² Office of Communications in the UK is also considering mandating duct access. It is currently in the process of conducting a survey of BT’s ducts, similar to that conducted by ARCEP. *Delivering super-fast broadband in the UK: setting the right policy framework*, 23 September 2008, p.43.

³⁴³ European Regulators Group, *Response to the Draft Recommendation on the regulated access to Next Generation Access Networks of 18 September 2008*, ERG (08) 38rev2, 16 October 2008, pp.3-4.

³⁴⁴ *ibid.*, p.4.

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telecommunications companies.³⁴⁵ The ACCC considered the stepping stone approach in its Fixed Services Review.³⁴⁶ Proponents during that review suggested that as entrants gain market share over time, the risks associated with infrastructure investment diminish, increasing their incentive to ‘climb the ladder of investment’. At the limit, the hypothesis suggests that entrants will move towards full-facilities based competition, obviating the need for mandated access entirely.

The ACCC previously noted the stepping stone approach to competition with the important caveat that full facilities-based competition is not the end goal in all circumstances. The ACCC only seeks to promote facilities-based and quasi facilities-based competition where it is economically efficient.³⁴⁷ While the ‘ladder of investment’ concept may be a useful analogy for the process by which competition emerges, the ACCC does not consider that it forms a major part of the ACCC’s approach to regulation. The ACCC noted in a recent decision that one way of conceptualising the ‘ladder of investment’ is that a regulator should make all or several rungs available such that access seekers are able to make efficient investment decisions by choosing between them.

A number of regulatory submissions from Proponents state that the nature of services supplied using a NBN is subject to some degree of uncertainty.³⁴⁸ Traditionally a number of services have been regulated to allow market forces to determine the most appropriate access layer. Initially bitstream access will be required, however it appears reasonably possible that over time the service description may require some adjustment to account for changes in the cost of equipment and/or technical changes.

Similarly, while there appears little current demand for sub-loop unbundling, it is quite possible that costs could fall in the future and/or new applications are developed such that sub-loop unbundling becomes economically feasible. Given the long term during which NBN arrangements will apply, the ACCC considers it would be beneficial to provide for access seekers to access the NBN at varying layers of the network. Provided that access is available on a non-discriminatory basis that promotes efficiency and competition (including ensuring that the NBN operator also receives commercial returns on its investment), then access seekers could choose to invest at the level of the network and in the areas where they would achieve sufficient returns on their investments. This would allow competition to emerge where it is feasible and in a manner that best reflects competitive market outcomes.

³⁴⁵ For example, the European Regulators Group in *Response to the Draft Recommendation on the regulated access to Next Generation Access Networks (NGA) of 18 September 2008*, October 2008, pp. 3-4.

³⁴⁶ ACCC, *A strategic review of the regulation of fixed network services—ACCC position paper*, June 2006; ACCC, *Fixed Services Review – a second position paper*, April 2007; ACCC, *Telstra’s exemption application in respect of the Optus HFC network—final decision*, November 2008.

³⁴⁷ ACCC, *A strategic review of the regulation of fixed network services—ACCC position paper*, p. 13, reiterated in ACCC, *Telstra’s exemption application in respect of the Optus HFC network—final decision*, November 2008, p.28.

³⁴⁸ See for example, Telstra, *Public submission on the roll-out and operation of a National Broadband Network for Australia*, June 2008, pp.9 and 11; Optus Submission, *Regulating the National Broadband Network*, June 2008, p.66; Austar, *Regulatory issues associated with the National Broadband Network*, June 2008, p.19.

However, as noted above, at a minimum a ‘Layer 2’ bitstream access service should be provided on a NBN.

G.4. The scope for discrimination and differentiation on a NBN

Some regulatory submissions suggest that there will be far less scope and incentive for discrimination in the provision of access services over on a NBN. However, as outlined in Appendix F, the transition to a next generation access network may not remove the incentives of a NBN operator to discriminate. Further, regard needs to be had to whether, with the access service potentially moving up two layers, there may be more scope for discrimination.

In assessing the extent to which Proposals fulfil the Commonwealth’s objectives for the NBN, it is important to consider whether all access seekers can access the same service on equal terms as the access provider (if the access provider is vertically integrated) or as each other (where the access provider is not vertically integrated) to encourage conditions that allow them to compete on their relative merits. To achieve a platform where access seekers can access the same service on equal terms, any bitstream service description should have regard to minimising the potential for anti-competitive discrimination, while still allowing for product differentiation.

The ACCC has previously considered the minimum requirements for the supply of a bitstream access service on a FTTN in the context of its consideration of the FANOC Special Access Undertaking.

Section G.4.1 below considers the scope for discrimination in the provision of access services on a NBN while section 1.4.2 outlines what can be considered the minimum requirements of any bitstream access service.

G.4.1. Scope for discrimination

Discrimination can occur in a number of ways that can primarily be classified under various kinds of ‘product’ or ‘process’ discrimination. While product discrimination is readily detectable, process discrimination can be difficult to detect and therefore requires careful attention to identify and minimise it. The two forms of discrimination are discussed below.

Overall, it is possible to discriminate in the service provided to access seekers and at times it may be necessary to discriminate in the interest of ensuring a functional network. Sometimes an access seeker may actually request a differentiated service with a corresponding price in order to distinguish its service from other access seekers.

While it is possible to detect technical discrimination against an access seeker this can only be done where there is a clear understanding of the product to be provided. In the case of a vertically integrated access provider, there will also need to be a clear understanding of the service it provides to itself and monitoring arrangements to ensure that the service an access provider supplies to itself is equivalent to that it has agreed to provide itself, and equivalent to that it provides to access seekers.

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A clear service description also promotes industry awareness of specifications of services supplied to access seekers and access providers (where vertically integrated) and therefore assists in the prevention of discrimination. Unless service specifications available for all telecommunications competitors are transparent, discrimination will be inevitable and undetectable.

Product specification and functionality

The bitstream service can be technically specified in such a way that discrimination can be easily monitored by an industry body or technical regulator, based on internationally agreed standards. The following elements are generally set out in product specifications and can be specified so as to reduce the likelihood of discrimination. In assessing NBN Proposals, the Panel (and ultimately the Commonwealth) may wish to have regard to the following aspects of Proponents' proposed service descriptions:

- quality of service – covers the speed, accuracy and reliability of a service. The QoS is largely effected by the DSLAMs/MSANs, optical backhaul and router capacities used. This physical infrastructure capacity can be allocated in an open and fair manner.
- class of service – covers the manner in which traffic of different priority categories is handled. For example, real-time voice has different requirements to email and therefore requires a different class of service. Further, access seekers may elect to receive a different class of service for an identical end user application (which would not in itself be discriminatory in an anti-competitive sense). However, packets of an identical class of service should be handled identically by the bitstream service, and within a particular class of service. To avoid access seekers using the highest class of service for all applications there may need to be some mechanism to encourage efficient classification of traffic. This might involve establishing differential pricing or industry agreed standards.
- protocol management³⁴⁹ – the routers at Layer 3 in the network are able, in real time, to monitor the particular higher layer protocols being used and have the ability to proactively manage their performance. This can be done for any protocol on any layer of the network above Layer 2. For example, an access provider could proactively manage the performance of packets using a VoIP protocol. This might need to be done at times of high network stress – however, there should be no discrimination between access seekers.
- stream management – the routers in the network are able, in real time, to monitor and control the streams being used by a particular access seeker, such as the traffic of a particular access seeker or even a particular end user (e.g., a bank). This enables management of various network events, such as in the event of equipment malfunction which results in excessive and meaningless data being transmitted into the network. Stream management should occur in an open and non-discriminatory manner such that no particular access seeker's stream is

³⁴⁹ Together with stream management, protocol management is one of the key elements of the so-called 'net neutrality' debate.

targeted inappropriately and can be done by setting out what controls will be implemented for specific network events.

- protocol transparency – higher layer protocols should pass across the bitstream service transparently. Higher layer protocols manage end to end communications, as well as various end customer equipment including home gateways. Access seekers should all have equal ability to use protocols above the bitstream service. If an access provider sought to restrict a retail supplier's ability to supply end-to-end services by limiting what protocols the retailer uses at the upper layer this is likely to inhibit competition in downstream markets. If restrictions on the use of protocols for upper layers of the network are applied, then only if they are done in a uniform manner across all access seekers (and the access provider's retail arm if it is vertically integrated) would they not limit an access seeker's ability to differentiate its product and compete fully in downstream markets.
- point of interconnection (POI)³⁵⁰ – a bitstream service terminates at a point of interconnection. In a NBN environment, the location of the POI may be particularly important in relation to services such as TV, which is most appropriately delivered via a multicast service.³⁵¹ Where multicast services are involved, there is advantage in having the multicast point as close to the end users as possible to minimise the required transmission resources. Access seekers should have equal ability to use such points. However, the location of POIs can present difficulties because of the high cost of installing equipment at POIs. For instance, the ACCC understands that a very high speed port card needed for a router at each POI could cost up to \$100,000, with a port on such a card being used for each access seeker connection at that POI. Generally, where an access seeker has a small number of end users in widely dispersed areas it becomes uneconomic to connect their own backhaul networks at POIs. Different NBN Proposals are therefore likely to represent different trade-offs between the extent of competition they promote (in both the provision of transmission and end user multicast services) and the costs of access. That is, the more competition and POIs they facilitate, the more likely it is that access prices will be higher (relative to Proposals that have few POIs).
- ability of the network to discriminate – the routers at Layer 3 have full visibility of all packet headers. Consequently, they are able on a packet-by-packet basis to manage different streams differently in real time. Sometimes it is necessary to do so in order to manage network reliability, for example at times when the network is under heavy load or suffering from faults. The data within the packets can also be inspected in order to deal with a variety of network threats such as worms and denial of service attacks. Hence it is important that any such

³⁵⁰ For further discussion on POIs please see Appendix I.

³⁵¹ Multicasting is a method for the delivery of information to a group of destinations simultaneously. It uses the most efficient strategy to deliver messages over each link of the network only once. The nodes in the network take care of replicating the packet to reach multiple receivers where necessary. In the case of a TV service, this would involve sending one packet containing the video stream to the node (closer to the end-user) and then replicating it at the node to deliver to each end-user.

discrimination is conducted according to agreed principles, and based on objective rules.

Process and operational arrangements

While it is relatively easy to specify the NBN product (bitstream service) so as to minimise scope for discrimination, process arrangements applying to the supply of wholesale bitstream services can expose access seekers to discrimination. Further, monitoring operational aspects such as ordering, billing, complaint handling, repairs and service changes can be difficult due to the human element required to provide those services.

There are ways in which process discrimination can be reduced, however this would be likely to involve a high degree of intervention in respect of the contractual arrangements between individual access seekers and the access provider. As noted above, although some regulatory submissions indicated that the incentive to discriminate may ease in a NBN environment, the ACCC considers that where a vertically integrated access provider also competes in potentially competitive downstream markets it has strong incentives to exclude its rivals through non-price means.³⁵² The extent to which a Proposal to build a NBN establishes specific and detailed terms and conditions for general application to access agreements, or provides for the review and approval of terms and conditions as they apply to a particular access seeker will determine the extent to which they will permit anti-competitive discrimination.

The various operations, administration and management functions of the bitstream services need to be handled in an equal manner for all access seekers (and the access provider, where it is vertically integrated) in order to promote competition in downstream markets. For example the time taken to add or amend a service should be similar, as should the manner in which faults are handled. All parties should have equivalent views of network development plans. These issues are examined further in appendices related to transition and migration as well as key non-price terms and conditions.

However, there may be circumstances when services that are differentiated would not be considered anti-competitive, such as where access seekers elect to receive a differentiated service (as noted above with respect to the class of service specification). For instance, an access seeker may wish to pay a premium in order to receive a fast response or alternatively to pay a reduced cost and receive a slower response time. This is the case with respect to all access services such as sub-loop unbundling and duct access.

G.4.2. The minimum elements of a bitstream access service on a FTTN

In its draft decision on the FANOC special access undertaking (SAU) in which FANOC proposed to implement a FTTN network, the ACCC considered the minimum elements of a bitstream access service necessary to promote non-

³⁵²

See also Appendix F.

discrimination and competition in downstream markets.³⁵³ The box below outlines the minimum requirements the ACCC identified in the FANOC draft decision.

Box 1: Minimum requirements of a bitstream access service identified in the ACCC's draft decision on FANOC's special access undertaking

- A Layer 2 bitstream access service, which may be offered at a variety of speeds but should include a product that is not throttled as well as a product that is symmetric to the extent the technology permits. Products (both consumer and business-grade) should be available to all access seekers on a non-discriminatory basis
- A service (whether the bitstream access service or another service) that allows access seekers to provide a voice service
- Points of interconnection as close to customers as is appropriate and efficient, which in the first instance is likely to mean at or near existing local access switches and other points of interconnection for current ULLS and LSS products (it may have other points of interconnection as well)
- Interconnection protocols based on well-accepted standards for broadband, voice and, if applicable, video, which are sufficiently well-described to allow access seekers to design and build their own interconnecting facilities
- Arrangements for access to buildings, shelters and facilities for interconnection
- Well-described and appropriate protocols for how packets are to be prioritised and handled
- Well-described and appropriate protocols for how congestion in shared network elements is to be handled
- Equivalent treatment of access seekers in relation to quality of service parameters such as jitter, delay and packet loss
- Interaction by access seekers with operations support systems, including: a) visibility of provisioning, fault reporting and rectification and service assurance and b) control of own customer configuration and use of the access seeker's allocated part of the capacity

Ovum Consulting's review of the ACCC's draft decision³⁵⁴ generally approved of the 11 minimum specifications principles identified by the ACCC but offered some additions and amendments to streamline the parameters identified by the ACCC into three broad categories:

- Business Processes operated by the wholesale provider

³⁵³ *ibid.*, p.10-12.

³⁵⁴ Ovum Consulting, *Bitstream and Voice Services in a Next Generation Network*, 15 April 2008.

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- Specific interconnection arrangements and
- Network management and management of performance.

The first category relates to the ‘process and operational arrangements’ discussed above while the latter two categories fall within the ‘product specification and functionality’ aspects discussed at G.4.1.

The ACCC considers a bitstream access service with a service specification that addresses the following minimum elements would be likely to provide access seekers with sufficient flexibility and control over the access service to enable access seekers to compete effectively and make appropriate decisions in relation to the efficient use of and investment in infrastructure.

Business processes operated by the wholesale provider

- Arrangements for access to buildings, shelters and facilities for interconnection.
- Equivalent treatment of access seekers in relation to all interfaces (including quality of service provision) required to provide a service.
- An appropriate process for amending service specifications in later periods as needed or desirable, and adequate notice periods for any change.

Source: Ovum Consulting³⁵⁵

In the draft FANOC decision, the ACCC noted that at a minimum it would require similar terms and conditions for access to buildings, shelters and facilities for interconnection as currently exist.³⁵⁶ The existing terms and conditions are based on industry standards, the *Telecommunications Act 1997* and the Facilities Access Code. They should in theory allow each access seeker access to facilities on a non-discriminatory basis.

In Appendix A of this report, the ACCC noted that there may be scope to broaden the application of Part XIC of the TPA, to allow consistent regulation of access to both telecommunications carriage services and the facilities used in the installation of a NBN (i.e., ducts and exchanges) to facilitate more timely access to the physical infrastructure. This could allow access to physical NBN infrastructure by access seekers on a non-discriminatory basis in the event that NBN Proposals failed to adequately specify these arrangements.

In the FANOC draft decision, the ACCC considered that effective operations support system interfaces had been critical to competition on existing networks and would be equally so for a bitstream access service for an FTTN access network upgrade.³⁵⁷ Further, bitstream access networks also raise completely new issues, such as setting of

³⁵⁵ *ibid.*, p.67.

³⁵⁶ ACCC, *Assessment of FANOC’s Special Access Undertaking in relation to the Broadband Access Service – Draft Decision*, December 2007, p.71.

³⁵⁷ *ibid.*, p.75.

customer packet priorities (as discussed above). The ACCC considered that it was therefore important to ensure that there is sufficient up-front detail to allow access seekers to plan for a smooth migration.

Facilities access, ordering and provisioning issues are discussed in more detail in Appendix H.

Specific interconnection arrangements

- Layer 2 Bitstream access service,³⁵⁸ which may be offered at a variety of rates but should include a product that is not throttled as well as a product that is symmetric to the extent that technology permits. Products (both consumer and business grade) should be equally available to all access seekers on a non-discriminatory basis.
- A service (whether the bitstream service or another service) that allows access seekers to provide a voice service and that provides for standard E 164 numbering and addressing.
- Points of interconnection which are commercially feasible for service providers and support competition including competition for backhaul services from the first point of aggregation.
- Interconnection protocols based on well-accepted standards for broadband, voice and, if applicable, video, which are sufficiently well described to allow access seekers to design and build their own interconnecting facilities.

Source: Ovum Consulting³⁵⁹

The availability of a product that is not throttled is considered a fundamental requirement of a bitstream access service by the ACCC and Ovum. It facilitates a service that can be differentiated by the access seeker to accommodate requirements of different end-users, while ensuring it is provided in a non-discriminatory manner. In this sense the availability of a service that is not throttled can be considered to promote the Commonwealth's objective that the NBN facilitate competition through open access arrangements that ensure equivalence of price and non-price terms and conditions, and provide scope for access seekers to differentiate their product offerings.³⁶⁰

³⁵⁸ As discussed above, the ACCC uses the term 'Layer 2' to refer to the basic functionality required to transmit a data stream across a physical point-to-point link. A 'Layer 2 bitstream access service' would therefore require the access provider to provide an access service comprising both the physical layer, which in a FTTN network may equate to a hybrid fibre/copper link from the customer's premises to a point of interconnection, as well as the Layer 2 protocols necessary to enable data to be carried over that link. There could be a number of Layer 2 protocols that are used, for example Ethernet. The access seeker would then be responsible for providing all of the higher layer protocols necessary to deliver IP services and applications to end-users.

³⁵⁹ Ovum Consulting, p.67.

³⁶⁰ RFP, Commonwealth Objective 1.3.1(10).

To the extent that a symmetric bitstream access service is available it will also promote the Commonwealth's objective that the NBN support symmetric applications such as high-definition video conferencing.³⁶¹

Voice services continue to form a key role in communications networks. The ability of the NBN to support these services is also a Commonwealth objective in the RFP.³⁶² In its draft decision on the FANOC undertaking, the ACCC expressed concerns about the commercial viability of access seekers providing voice services in a transitional environment during the NBN rollout.³⁶³ The ACCC expected softswitches to be introduced across the network as a part of the transition to a next generation IP core. However, the ACCC considered that although softswitches had been deployed on a small-scale by some carriers,³⁶⁴ they were yet to be deployed on an extensive scale³⁶⁵ which involved a possibility that the reliability of voice services would deteriorate. Although the ACCC did not express any final conclusions, it noted that commonly other countries retained their existing copper network to run voice services, even if just for a transitional period. Issues involved in the transitional period in which a NBN is implemented are discussed in greater detail in Appendix I and further discussion about the transition of voice services is contained at G.5.1 below.

As discussed above, the location of POIs is likely to represent a trade-off between the promotion of competition and the cost of the access service. In the FANOC draft decision, the ACCC highlighted that the POIs should be as close to customers as is appropriate and efficient. The ACCC also noted that while it may not be efficient to provide access at individual nodes, the fact that access seekers that were currently using ULLS/LSS were able to interconnect efficiently at existing local exchanges suggested that they would be able to interconnect efficiently to a replacement bitstream access service at or near those exchanges.³⁶⁶ The ACCC therefore considered that it did not appear justifiable to restrict interconnection to points higher in the network where greater aggregation of traffic has occurred.³⁶⁷

This issue also received attention during the regulatory submission process. For example, both Terria and Optus submitted that access to backhaul capacity from a

³⁶¹ RFP, Commonwealth Objective 1.3.1(3).

³⁶² RFP, Commonwealth Objective 1.3.1(4).

³⁶³ ACCC, *Assessment of FANOC's Special Access Undertaking in relation to the Broadband Access Service – Draft Decision*, December 2007, p.78.

³⁶⁴ For example, the iiNet Naked DSL product uses softswitch technology. See iiNet, *What is Naked DSL*, http://www.iinet.net.au/products/naked/what_is_naked.html, accessed 19 November 2008; iiNet, *Media Release: iiNet Goes Naked*, 15 November 2007.

³⁶⁵ For instance, at the time of the draft decision Telstra had not commenced deployment of softswitches over its customer base. The ACCC understands that Telstra has been in a position to commence softswitch deployment, however it has recently announced that the rollout of softswitches has been put on hold until the NBN tender is decided: L Coleman, *NBN 'little impact' on Telstra figures*, Communications Day, 14 August 2008, p.4.

³⁶⁶ ACCC, *Assessment of FANOC's Special Access Undertaking in relation to the Broadband Access Service – Draft Decision*, December 2007, p.67. This, however, was based on a presumption that exchanges would continue to exist. To the extent that the implementation of a FTTN NBN allowed the retirement of a number of exchanges, then this would also reduce the scope for competition in related markets (transmission and downstream retail markets) and the costs of providing access (and other) services on the NBN.

³⁶⁷ ACCC, *Assessment of FANOC's Special Access Undertaking in relation to the Broadband Access Service – Draft Decision*, December 2007, p.67.

node to a POI on regulated terms should be a pre-requisite of a NBN service offering. Terria and Optus also submitted that the number and location of POIs in a NBN architecture should be designed to keep access seekers' costs down in order to encourage an efficient use of the NBN.

Use of well-accepted standards for IP protocol will promote non-discrimination and competition in downstream markets by giving access seekers certainty that their equipment will perform as required on the network.

Network management and management of performance

A wholesale service which offers:

- A range of data packet priority options.
- A range of quality of service options to allow retail service providers to offer commercially viable services
- Interfaces that permit a retail service provider to control the network and service configuration (including fault status, if relevant) of its own customers.

Source: Ovum Consulting³⁶⁸

The NBN will carry different types of traffic, including voice, data and video. These traffic types have different end-to-end requirements in terms of packet prioritisation and handling. For example, the quality of voice traffic deteriorates if there is excessive end-to-end delay or delay variation in the transport of packets. Conversely, email traffic is more tolerant of delay but it is preferable that email packets are not discarded by the network. Therefore, for the network to provide a good quality service it is necessary for packet prioritisation and handling to be treated differently for different traffic types. This may be achieved by assigning different 'Class of Service' for different traffic types on the network, as discussed above in section G.4.1.

As also discussed above in section G.4.1, it is important that the NBN operator offer various access services of differing qualities so that access seekers can determine the most commercially appropriate service to offer. However, access seekers at each level of service quality should be provided with a similar service.

In the FANOC draft decision the ACCC highlighted concerns that FANOC had not provided sufficient detail in relation to how capacity would be allocated between access seekers and what would happen with any spare capacity. The ACCC highlighted its view that there needed to be a significant amount of detail in relation to allocation of capacity and the extent to which access seekers could configure their services to meet the needs of the customers.³⁶⁹

³⁶⁸ Ovum Consulting, p.68.

³⁶⁹ ACCC, *Assessment of FANOC's Special Access Undertaking in relation to the Broadband Access Service – Draft Decision*, December 2007, p.74.

Further detail about the principles underlying these broad categories and principles are available in the FANOC draft decision and Ovum’s report for the ACCC, Ovum Consulting, *Bitstream and Voice Services in a Next Generation Network*, 15 April 2008.

G.5. Downstream services and the implications for the access service

The historical primacy of voice services has influenced the evolution of telecommunications systems, and specifically, the switching architecture of telecommunications networks that still exists in many parts of the network today. However, as the range of services supplied over the network has broadened over time, there has been more emphasis on data services such as email and internet.

The ability of access seekers to compete in downstream markets depends on the nature of the wholesale services available to them and how they can transform or use those services to provide compelling service offerings to consumers. It is therefore important that the wholesale services supplied on the NBN allow access seekers to provide a sufficient range of service offerings in order to compete in the relevant retail markets – for example, business markets (both large and small) and residential markets. While data services are becoming increasingly important and consumers are increasingly demanding a range of different data services, the ability to use voice services remains an essential component of any service offering. This is reflected in the RFP Commonwealth Objective for the NBN to be able to support *high quality voice*, data and video services.³⁷⁰ [Emphasis added] This raises questions about whether the wholesale services supplied on the NBN should include:

- a wholesale voice service; and
- a number of wholesale data or bitstream services.

The terms of the NBN RFP, specifically, the Commonwealth’s objective for the NBN of offering “broadband services with a minimum 12 Mbps dedicated downlink transmission speed over each connection provided to a premises”, also raise questions about the average speeds that consumers will see supplied to them using the NBN and the scope for access seekers to shape data speeds to meeting the different needs of different consumer types.

G.5.1. Voice services

A number of regulatory submissions such as those from Terria³⁷¹, Optus³⁷² and Primus³⁷³ have emphasised the importance of the provision of standard voice telephony services on the NBN.

³⁷⁰ RFP, Commonwealth Objective 1.3.1(4).

³⁷¹ Terria, *Terria regulatory submission*, June 2008, p.11. Terria submits that the NBN architecture and access arrangements should facilitate access seekers supplying a standard telephony service, among other things.

³⁷² Optus regulatory submission, June 2008, p.67.

³⁷³ Primus, *Submission in Response to Minister’s Invitation for Comments on Telecommunications Regulation*, June 2008, p.8.

The current definition of a voice service centres around the ‘standard telephone service’ (STS). While the introduction of the NBN and a move to a fully IP based network may necessitate some adjustment or broadening of the STS to include data services, voice services are likely to remain a fundamental service that is considered essential by consumers and the Commonwealth. The ACCC expects that any change to the range of services supplied subject to a universal service obligation (USO) would continue to include a basic voice service.

Where voice services are to be provided in a NBN environment it is likely that the nature of the IP architecture of the network will mean that voice services will be provided in a voice over internet protocol format (VoIP)³⁷⁴ across at least part of the network (most likely the core). The Communications Alliance has developed industry guidelines outlining the acceptable quality of VoIP.³⁷⁵

Given the importance of voice services it is essential that, during the transition to a potential NBN environment, the telecommunications industry can continue to provide the same, or a similar, product to existing voice services. A number of issues arise in the migration of voice services to a FTTN environment. These include:

Issues around changes to equipment

If a FTTN architecture is used, equipment at customer premises does not necessarily need to change where the voice service takes a bitstream form only at the local node (i.e., a voice signal is transmitted on the copper line from the node to the customer’s premises).

The ACCC notes that a number of Proponents (including Telstra) have expressed concerns that a complete cutover of all voice services from PSTN to NBN-based services would require switching based on softswitches.³⁷⁶ As already noted in section G.4.2, in the FANOC draft decision the ACCC expected softswitches to be introduced widely across the network as a part of the transition to a next generation IP core, but was concerned about the ability of carriers to smoothly deploy the softswitches on a large-scale. While a network-wide migration of voice services from the PSTN to a softswitch-reliant bitstream service is possible, it has yet to be attempted on the scale of a major carrier anywhere in the world without a mixture of PSTN and VoIP services involved. Ovum recommended caution, including that the switch only be undertaken on an incremental basis, over the course of the NBN roll-out, with testing mechanisms in place and the ability to revert customer services to PSTN voice services if teething problems arose.³⁷⁷ Effectively this would require maintenance of the copper between exchange and node for a period until the transition is finalised, which may be a more costly solution.

³⁷⁴ VoIP involves the provision of voice services, enabled by broadband, using software and hardware that allow voice signals to be carried over an IP-based network.

³⁷⁵ Communications Alliance Ltd, *Industry Guideline CA G634:2007: Quality of service parameters for Voice over Internet Protocol (VoIP) services*, October 2007, p.16.

³⁷⁶ Softswitch is a generic term for software that bridges a PSTN and VoIP by separating the call control functions of a phone call from the transport layer.

³⁷⁷ Ovum Consulting, pp.62-63.

The figure below demonstrates the two technical alternatives for the provision of voice services on a NBN that uses a FTTN architecture. The upper diagram shows the equipment that could be installed at the node to supply a standard voice signal to the end-user's premises along with a broadband data service. This would involve a Multi Service Access Node (MSAN) that comprises a DSLAM supplying the digital broadband signal and a customer access module (CAM) that supplies the voice signal. This would require no change to the customer's equipment.

The lower diagram demonstrates how a VoIP signal (specifically a VoDSL signal) could be supplied to the customer premises. This would necessitate the installation of an Analogue Telephone Adaptor (ATA) in the customer's home to transform the digital signal to an analogue signal, in order to convert a voice call on a standard telephone service. The ACCC notes that there would likely be significant coordination difficulties in a mass migration of customers from their current standard telephone arrangements to a voice service requiring an ATA at each premises.

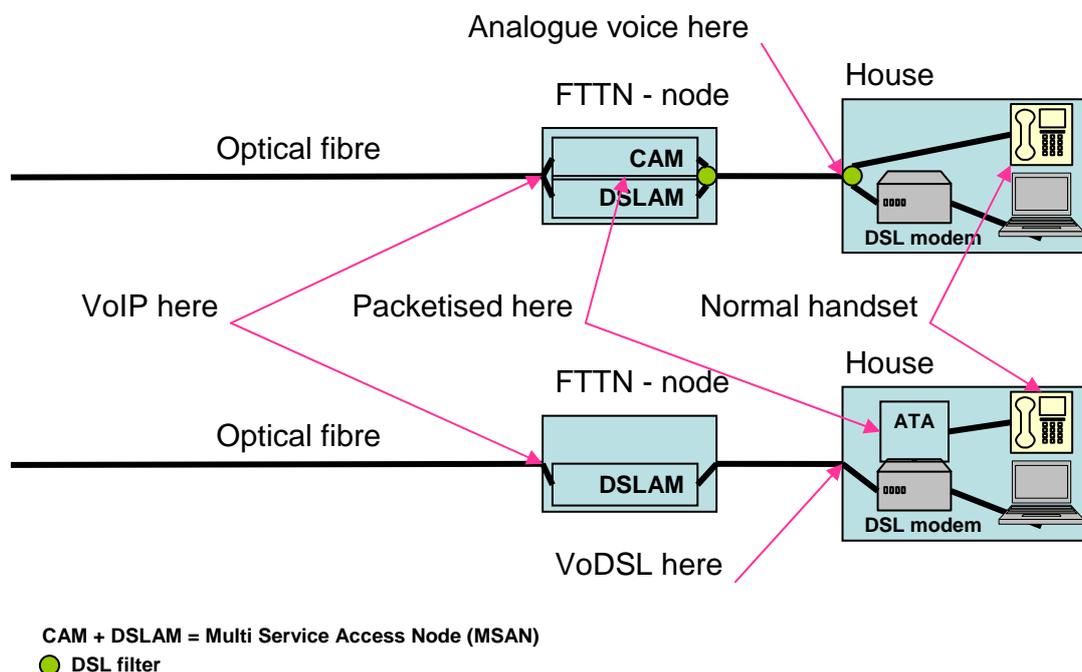


Figure 1. Voice services on a FTTN

The ability to supply 'special services' on the NBN

Services currently using the PSTN service are not limited to voice services. They also include systems such as burglar alarms, traffic light signalling, fax machines and EFTPOS (sometimes referred to as 'special services') which, because of the different technology required, may be stranded for a period.

This may particularly be the case where, as for instance with burglar alarms, they are sensitive to delay variation and require new equipment at the customer premises.³⁷⁸

The migration of these services to a NBN is likely to necessitate migration of end-users from current analogue equipment or devices to digital equipment. Unlike voice services, the ACCC is not aware of the general availability of equipment that could be installed at the node to obviate the need for such a change of customer premises equipment.

The ACCC notes, therefore, that there may be a need for copper to be retained between the node and the local exchange for some time after a node is upgraded as part of the NBN, in order to allow continuity of voice services and other ‘special services’. This will ensure that access seekers are able to compete effectively in relevant downstream markets and sub-markets. Further, transitional issues may be minimised where voice equipment is installed at the node rather than at the end-user’s premises. The transitional issues around the implementation of a NBN are considered in further detail in Appendix I.

G.5.2. Data services

Similar to voice services, high quality data services are also an objective of the Commonwealth in the RFP.³⁷⁹ Data services have become an increasingly important aspect of communications services. Over time there has been rapid development and uptake in applications requiring data services over the digital portion of the lines comprising the access network. This is primarily the case because applications and services offered over networks have expanded to include services such as broadband and video streaming.³⁸⁰ Therefore, while the physical characteristics of the network remain largely unchanged, the purposes for which the network has traditionally been used have changed substantially. This has opened a new market for competition in addition to traditional voice service market. The ACCC expects that as data applications/services continue develop and expand, this may provide an important area in which market participants can compete for customers.

The current NBN tender is not the first instance where the speeds of bitstream access services have been debated. As discussed above, FANOC presented the ACCC with a draft special access undertaking in May 2007. FANOC proposed a FTTN network offering standard broadband services at 1.5 Mb/s, 6 Mb/s, 12 Mb/s and 24 Mb/s, along with a basic access telephony service run on IP.³⁸¹ Before FANOC, the first instance initiating debate was in August 2005 where Telstra proposed a National Broadband Plan to the Commonwealth involving FTTN architecture with initial

³⁷⁸ Ovum Consulting, p.61.

³⁷⁹ RFP, Commonwealth Objective 1.3.1(4).

³⁸⁰ G Yarrow and C Decker, *Reflections on policy issues raised by next-generation access networks in communications*, Regulatory Policy Institute, June 2008, p.20.

³⁸¹ FANOC Pty Limited, *Special Access Undertaking to the Australian Competition and Consumer Commission Under Division 5 of Part XIC of the Trade Practices Act 1974 (Cth) in respect of the Broadband Access Service*, 30 May 2007, <http://www.accc.gov.au/content/index.phtml/itemId/788471>, accessed 11 November 2008.

download speeds of 6 Mb/s.³⁸² A subsequent Telstra proposal involved download speeds of up to 24 Mb/s, albeit with a lesser rollout.³⁸³

The ACCC considers that future competition in, and development of, applications using data services is closely linked to the access speeds to be provided by the NBN. Therefore, the ability to compete in key downstream markets or sub-markets such as large business, SMEs and retail businesses will be affected by the access speeds available. However, it is not clear from the RFP as to what proportion of time a customer can expect to be able to use the 12 Mb/s speed service, and hence how the network needs to be dimensioned. Network dimensioning is an important aspect as the backhaul connection will be a shared resource. For instance, in any given instant it may be possible for the end-user to receive speeds well in-excess of 12 Mb/s, however it is equally possible that the end user may receive an extremely low data speed, simply because the instantaneous demand ebbs and flows.

Depending upon the applications being used by customers it is normal to expect customers to not be using the full potential rate of the backhaul connection 100 per cent of the time. That is, the backhaul data rate is generally not equal to the number of customers times the maximum desired data rate per customer but somewhat less than that. This is often referred to as the ‘contention ratio’.³⁸⁴ Contention ratios of 1:10 to 1:100 are not unusual. It is possible, however, that as more streamed video applications are used the contention ratio will need to be lower (that is, less customers will share a certain bandwidth) in order to provide a satisfying customer experience.

A key implication of the selected contention ratio is the required capacity of the backhaul transmission link and the scale of the core IP network. The level of capacity can have a very significant impact on network cost, meaning that the contention ratio is a matter of trading-off cost versus customer capability. In the context of NBN proposals, the ACCC notes the Commonwealth’s objective that the NBN has sufficient capacity to meet current and foreseeable demand and has a specified upgrade path within clear timeframes, consistent with international trends. While it may be possible for a Proponent to offer a relatively low cost NBN that fulfils the Commonwealth’s objective of a 12 Mb/s speed service, such a network may not have sufficient capacity to meet future demand as new, more data intensive applications are developed. Accordingly, the Panel and the Commonwealth may need to consider the trade-offs between cost and capacity that different Proposals are likely to represent.

In any case, the speed of the network as seen by the customer is dictated by the least capable link along the route from the customer to the application, and in most cases

³⁸² Telstra ASX Release, *The Digital Compact and National Broadband Plan*, 11 August 2005, 7 September 2005.

³⁸³ Now We Are Talking, *Telstra’s Plan B*, <http://www.nowweareretalking.com.au/features/telstras-plan-b>, accessed 14 November 2008; Telstra ASX Announcement, *Telstra Fibre to the Node Briefing*, http://www.telstra.com.au/abouttelstra/investor/docs/tls442_fibretothenodetranscript.pdf, 7 August 2006.

³⁸⁴ The contention ratio is the ratio of the potential maximum demand to the actual bandwidth, given the maximum rate possible over each user’s access line. The higher the contention ratio, the greater the number of users that may be trying to use the actual bandwidth at any one time and, therefore, the lower the effective bandwidth offered per user, especially at peak times.

this is likely to be the end application server rather than the network or access link itself. That is, while it may be theoretically possible to achieve 12 Mb/s speeds on all links on the network, the data speeds experienced by end-users may be lower (and possibly even higher) in some areas.

G.6. Conclusion

Access seekers require a sufficient service offering to ensure that they can compete effectively in downstream markets. This appendix considered the various issues that arise in the attempt to ensure the service provided to access seekers in a NBN encourages effective competition.

It is likely that once the NBN is built, a bitstream access service may provide the greatest degree of functionality that is technically and commercially feasible. However, in accordance with various international approaches, the provision of access at various layers of the network would allow access seekers to make efficient investment decisions. This would allow competition to emerge where it is feasible as well as allow for future changes to supply costs and the development of new applications.

In many, if not most, cases capacity will be shared between competitors on the fibre component of the NBN. The question arises as to the scope that may exist for discrimination between access seekers in the way in which capacity is shared. There are a number of elements that can be specified in a service description so as to reduce the likelihood of discrimination. However, discrimination is harder to monitor where the service incorporates process arrangements involving a human element such as billing and repairs. In these circumstances discrimination can be reduced through contractual arrangements. However monitoring contractual arrangements would be more cumbersome than monitoring discrimination through a service description. Where a Proposal to build a NBN establishes specific and detailed terms and conditions for general application to access agreements, or provides for the review and approval of terms and conditions as they apply to a particular access seeker, this is likely to reduce anti-competitive discrimination.

The ACCC considers that a clear service description promotes industry awareness of specifications of services supplied to access seekers and access providers (where vertically integrated) and therefore assists in the prevention of discrimination. It is therefore important to technically specify the bitstream service in such a way that discrimination can be easily monitored. As noted, the ACCC has previously considered the minimum elements of a bitstream access service that are likely to be necessary to promote non-discrimination and competition in downstream markets. These elements have also been considered by Ovum, who suggested additions and amendments to the ACCC's list. The ACCC considers that the elements identified would be likely to provide access seekers with sufficient flexibility and control over the access service to enable them to compete effectively and make appropriate decisions in relation to the efficient use of investment and infrastructure.

As noted above, high quality voice and data services have been stated as a Commonwealth objective in the RFP. To avoid a situation where end-users are required to purchase new equipment to continue receiving their voice service it will be

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necessary to install equipment at the node. It may be necessary to continue to provide for access to the copper in the transitional period to ensure that there are no disruptions to voice services. In relation to data services the ACCC notes that the Panel and the Commonwealth face a number of trade-offs to ensure that capacity will be sufficient to enhance competition in the future, as well as to consider the costs associated with increased capacity.

Appendix H. Key non-price terms and conditions

H.1. Executive summary

- The Government’s request-for-proposals (RFP) specifically requires Proponents to address a number of non-price terms and conditions (NPTCs) in their Proposals and to specify the measures and models that will ensure equivalence.³⁸⁵
- NPTCs can deal with a variety of non-price matters relating to access, such as the processes for ordering and repairing services, the ability to connect those services to different networks and the way that information, including confidential information, is handled between the network operator and service providers. A number of NPTCs are specifically identified in the RFP. Additionally, other NPTCs may also affect access seekers’ ability to compete.
- All NPTCs have the potential to lead to competition concerns. Network operators, particularly where vertically integrated, have incentives to engage in anti-competitive exclusionary non-price conduct. For example, refusals or unjustified delays to interconnection, connecting new customers or repairing faults might be employed in order to raise rivals’ costs or lower rivals’ demand. The competition concerns relating to NPTCs and incentives for exclusionary behaviour are lessened if the network operator is not vertically integrated.
- Accordingly careful consideration needs to be given to which NPTCs need to be defined by the successful Proponent up-front, and which ones may be subject to later negotiations.
- It should be noted that not all forms of exclusionary non-price conduct are anticompetitive. There may in fact be pro-competitive reasons for particular types of exclusionary non-price conduct. For example, disclosure of some confidential information might be necessary for network planning reasons.
- Also, access seekers do not necessarily all want identical services—for instance, in relation to quality of service considerations, some access seekers are willing to pay a higher price for a better quality service, and *vice versa*.
- Concepts of equivalence and non-discrimination in non-price terms and conditions are therefore rarely clear-cut, easy to assess or easy to enforce. In particular, it may be difficult to ensure complete equivalence where the network operator also operates at a retail level, although under this scenario the need for equivalence becomes even greater.
- There is a wide range of NPTCs that may be important considerations in the National Broadband Network (NBN). In particular, notification of network changes, ordering and provisioning processes, fault repair and maintenance, facilities access, amendment of documents, treatment of confidential information and a number of other issues would all be important considerations in assessing the potential competition effects of NPTCs.

³⁸⁵ e.g. RFP, p. 2, [1.1.10]

- Given the complexity involved in identifying anti-competitive conduct (as well as the incentives and scope for a vertically integrated operator to engage in such conduct) in non-price commercial arrangements, a number of monitoring mechanisms have progressively been introduced in the existing regime in response to concerns that Telstra does not provide the same level of service (for example, in fault repair and maintenance) to its wholesale customers that it provides to its own retail arm.
- The appropriateness of any given regulatory tool will depend on structural issues and the nature of the incentives faced by the network operator to engage in anti-competitive exclusionary non-price behaviour.
- The ACCC in 2003 and 2008 made model NPTCs relating to a number of non-price matters, including those in the RFP and other matters.³⁸⁶ While these model NPTCs relate to core services supplied over the legacy network, the reasoning and analysis in relation to these NPTCs remains applicable to the NBN.

³⁸⁶ ACCC, *Final determination—model non-price terms and conditions*, October 2003; ACCC, *Final determination—model non-price terms and conditions*, November 2008.

H.2. Introduction and background

This appendix considers the role of non-price terms and conditions (NPTCs) that would govern the NBN and the relationship between the NBN operator and its wholesale customers.

H.2.1. What are NPTCs?

Historically, disputes about access between access seekers and access providers, and regulatory processes such as undertaking assessments, have largely focused on the price paid by access seekers to the access provider. However, NPTCs have become a more significant aspect in debate in recent years, and could be increasingly significant if an NBN were built. NPTCs can be just as significant an issue for access seekers as price terms, and may be less transparent and more difficult for both the regulator and access seekers to monitor.

These non-price matters can deal with a variety of aspects of access, such as the processes for ordering and repairing services, the ability to connect those services to different networks and the way that information, including confidential information, is handled between the network operator and service providers. A number of NPTCs are specifically identified in the RFP. Additionally, other NPTCs may also be relevant and may also best be specified in arrangements with the successful Proponent.

Not all NPTCs are necessarily controversial or the subject of significant debate. However, depending on the content of the access arrangements relating to these issues for the NBN, many could have a negative effect on competition.

H.2.2. Equivalence

An important consideration when considering the issue of NPTCs is the concept of equivalence, or non-discrimination, which is an overarching concept within the RFP.³⁸⁷ Relevantly, the RFP states that Proponents should submit on arrangements that ensure equivalence in certain NPTCs.³⁸⁸ As a general principle, equivalence means that carriers should be able to compete with each other on the basis of their individual merits, and is related to the concept of open access to the NBN. Broadly speaking, it requires consideration of whether the NPTCs faced by any given access seeker would be similar to or the same as those faced by other access seekers (and possibly the successful Proponent), and whether such NPTCs allow for competition to occur on the merits. Parties should not be disadvantaged by actions of the wholesale provider that unduly favour the retail arm of that provider or other access seekers, and prevent competition on the respective merits of market participants.

Equivalence and non-discrimination have more commonly been concerns in relation to price, but are equally a concern for NPTCs. It would be possible for a particular access seeker or a class of access seekers to be significantly disadvantaged by the NPTCs such that they were unable to compete on their merits. A lack of equivalence between parties on such issues will be particularly relevant if the successful Proponent, or related companies, also competes in the retail market.

³⁸⁷ e.g. RFP, p. 2, [1.1.10]

³⁸⁸ RFP, Schedule 2, Clause 1.4.2(c)(viii)

H.2.3. Why are NPTCs relevant?

The reason that NPTCs—and equivalence and non-discrimination in NPTCs—may be a competition issue is due to the strong incentives for a vertically-integrated network operator to engage in anti-competitive exclusionary practices in non-price aspects of access. This is particularly true where the network operator is subject to regulatory control over its wholesale pricing that constrains it from discriminating between itself and access seekers in order to allow it to earn above normal revenues and profits. The network operator in such a situation can still gain an advantage over its access seeker rivals by engaging in non-price behaviour that limits their ability to compete. A vertically integrated operator may then be free to raise, or maintain its retail prices above the competitive level. Broadly, there may be three categories of exclusionary behaviour that such an operator could engage in:

- refusals and delays in interconnection
- raising rivals' costs (eg, by requiring access seekers to purchase costly interface equipment)
- lowering rivals' demand (eg, by insufficiently maintaining and updating the network)³⁸⁹

The successful Proponent may be able to engage in some or all of these categories of behaviour through the use and manipulation of the NPTCs of access to the NBN. For example, it may make it time consuming for access seekers to order NBN wholesale services, or create difficulties in obtaining facilities access to allow interconnection. This would lead to access seekers being unable to provide services to end-users with ease, and being placed at a competitive disadvantage to the network operator. Such non-price, quality of service issues can lead to competitive detriment as directly as price issues, as consumers will judge a service provider not just on the price paid for the service but also the quality of the service they obtain for that price.

H.2.4. Specific examples of NPTCs

As noted above, the NPTCs of access can cover a range of issues. The RFP specifically requires Proponents to address a number of NPTCs in their Proposals and/or to specify the measures and models that will ensure equivalence in:³⁹⁰

- service qualification and activation
- billing
- fault repair
- maintenance
- access to buildings, shelters and facilities for interconnection
- any proposed approach to adjusting the above NPTCs
- arrangements for supplying wholesale customers with information about changes to the NBN
- methods for enforcing and resolving commercial disputes

³⁸⁹ Laffont and Tirole, *Competition in telecommunications*, 2000, p. 164-5.

³⁹⁰ RFP, Schedule 2, p. 13, [1.4.2 Technical aspects of open access (c)(viii) to (ix)]; p. 14 [1.4.3 Wholesale pricing and non-price terms and conditions (b) and (e)]; p. 15, [1.4.7 Information strategy (a)(ii) and (iv)].

- handling and protection of confidential information of wholesale customers.

Other NPTCs may also be relevant considerations. The ACCC in 2003 and 2008 made model NPTCs relating to a number of non-price matters, including those in the RFP and other matters.³⁹¹ While these model NPTCs relate to core services supplied over the legacy network, the reasoning and analysis in relation to these NPTCs remains applicable to the NBN. A number of the NPTC issues in both the RFP and the ACCC's model NPTCs also interact with rollout considerations covered in the transition and migration appendix.

H.2.5. Equivalence in NPTCs

Concepts of equivalence and non-discrimination in NPTCs are rarely clear-cut, easy to assess or easy to enforce. It may not be possible to ensure complete equivalence where the successful Proponent also operates at the retail level. However, under this scenario the need for equivalence and non-discrimination becomes even greater, given the incentives present and the potential effect on competition.

In particular, the appropriate benchmark for equivalence in NPTCs is not always obvious. Where a vertically integrated operator supplies services to itself, it may not be clear which operating unit or functional level of the vertically integrated operator (for example, retail, wholesale or network divisions) corresponds to the business of access seekers. Similarly, it may be difficult to ensure equivalence in NPTCs when a vertically integrated operator is supplying to itself because it may have different internal processes. It would be necessary for appropriate assurances to be given by the successful Proponent about how equivalence could be best achieved.

The concerns about non-price issues may be reduced where the network operator is not vertically integrated. This is because, in such a case, the incentives for anti-competitive non-price exclusionary conduct are likely to be significantly smaller. However, questions of equivalence and non-discrimination could remain important even if the successful Proponent is not fully vertically integrated. For example, the potential remains for particular access seekers to receive preferential treatment from the network operator, for reasons such as whether the access seeker had a part ownership interest in the network operator.³⁹² The ACCC examines structural issues further in [appendix F](#).

A variety of tools may be available to monitor and enforce NPTC issues, ranging from relatively light-handed to relatively prescriptive. The need for any particular approach will depend on the nature of the incentives to engage in anti-competitive non-price exclusionary conduct.

Overall, it is necessary to carefully assess the terms and conditions that may apply in relation to services provided over the NBN. The NPTCs would need to be of a type that did not unduly discriminate between access seekers and the network operator, should it be vertically integrated, or discriminate against one or more access seekers.

³⁹¹ ACCC, *Final determination—model non-price terms and conditions*, October 2003; ACCC, *Final determination—model non-price terms and conditions*, November 2008.

³⁹² ACCC, *Assessment of FANOC's Special Access Undertaking in relation to the Broadband Access Service—Draft decision*, December 2007, p. 105.

Given that structural and incentive issues are examined in detail in a separate appendix, this appendix examines the ability of the network operator to discriminate and the ways in which anti-competitive non-price exclusionary behaviour may occur.

H.3. NPTCs under the existing regime

H.3.1. Model non-price terms and conditions

The *Telecommunications Competition Act 2002* introduced a new regulatory requirement to establish model terms and conditions relating to access to core telecommunications services. Section 152AQB of the TPA requires the ACCC to make a written determination setting out model terms and conditions of access for each of the core services.³⁹³

The core services are set out in the legislation as:

- Domestic Public Switched Telephone Network (PSTN) Originating Access Service and Terminating Access Service (PSTN OA and TA)
- Local Carriage Service (LCS)
- Unconditioned Local Loop Service (ULLS).

No other declared services have been specified as core services.

Model terms and conditions are ‘non binding’. However, model terms and conditions still provide industry with an up-front view of the likely approach that the ACCC would take to a particular issue in conducting an arbitration, thereby assisting the parties to reach commercial agreement on access or to submit access undertakings.³⁹⁴

In developing model non-price terms and conditions of access, consideration is given to:

- the overall objective of Part XIC of the TPA, and
- the ‘reasonableness criteria’ contained in that Part.

As noted above, the ACCC has issued model non-price terms and conditions relating to legacy core services in 2003 and 2008. The reasoning and analysis applied in establishing these model NPTCs is equally relevant to the NBN.

H.3.2. Dispute resolution

Regardless of how prescriptive a set of NPTCs are, and how strong the enforcement and compliance mechanisms, they are unlikely to be comprehensive/exhaustive. Consequently, it is essential to retain clear and effective dispute resolution mechanisms in place to address any residual non-price issues. These residual issues could potentially relate to unspecified or future NPTCs.

The model NPTCs seek to establish how disputes should be managed including the procedures and timeframes that should apply. The general dispute resolution

³⁹³ *Trade Practices Act 1974*, ss152AQB(2)

³⁹⁴ Explanatory Memorandum, *Telecommunications Competition Bill 2002*, pp 2 and 39

procedures seek to facilitate the resolution of disputes in an expeditious manner without the need to resort to legal proceedings.

The general principle behind the dispute resolution provisions is that parties should seek to resolve disputes through alternative dispute resolution (ADR) prior to seeking arbitration or commencing legal proceedings. This is because it is likely that disputes will resolve more quickly, and with less cost, where parties are able to agree an outcome, either amongst themselves or as part of a mediation or expert determination process they agree upon. However, it should be noted that ADR will only be successful where both parties have incentives to resolve the dispute. This is unlikely in the case of a vertically integrated operator with market power.

The model non-price terms and conditions outline principles that form the basis for fair and reasonable dispute resolution procedures. If the parties are not able to agree on the terms and conditions on which access is to be provided, the matter may be notified to the ACCC and the ACCC must arbitrate the dispute.

If a dispute is notified for arbitration, it is general practice for the ACCC to seek the parties' views on whether ADR processes may be of assistance to resolving the dispute. The ACCC can order parties to participate in such processes and/or defer arbitration while these processes are followed.

H.4. What NPTCs would be significant in the NBN?

This section examines the specific NPTCs that may be significant to the NBN. It examines why particular NPTCs may be important and how the principle of equivalence or non-discrimination may be achieved in relation to those terms, where relevant.

The RFP requires Proponents to submit in regards to a number of specific NPTCs.³⁹⁵ In addition, other NPTCs may also be relevant considerations, particularly where the network operator is vertically-integrated. As noted above, concerns about NPTCs will be less of a concern where the network operator is not vertically integrated.

The ACCC also notes that another significant non-price issue relates to the service description of the access service(s) provided over the NBN. Product characteristics of the service such as jitter, delay, packet loss and other technical specifications would need to be specified. However, such technical specifications, or 'product' functionality NPTCS, are perhaps more easily monitored than more 'process' NPTC issues such as those discussed below. Service description for the NBN is examined in appendix G.

H.4.1. Network changes and notification

The ACCC discusses the competition issues relating to transition and migration from the copper network to the NBN in detail in a separate appendix. However, given that the NBN would be expected to be very long-lived, issues relating to notification of changes to the network will still be relevant after the NBN is primarily rolled out. In this regard, the RFP requires Proponents to specify that equivalence is provided in

³⁹⁵ e.g. RFP, schedule 2, p. 13, [1.4.7(c)(viii)]

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arrangements for supplying wholesale customers with information about future changes to the NBN.³⁹⁶

The reason that such changes will likely remain important is that network repair works and upgrades can be expected even after the NBN is deployed. The successful Proponent will be expected over time to undertake upgrade and maintenance work, such as relocating nodes, on the network. Such work, albeit smaller in scope than the initial transition to the NBN, may result in disruption to access seekers' ability to provide services or obtain interconnection. In contrast to the initial transition, the ongoing maintenance and upgrade work will happen on a more ad hoc basis.

A failure to have equivalence in notifications may mean that any retail arm of the successful Proponent, or particular access seekers, will have a significant advantage in planning over other access seekers. Such companies would be able to better compete as they would have a reduced risk of service disruption, a correspondingly higher degree of service continuity and better ability to serve end-user customers. This would have a negative impact on competition as significant disruptions would lead to the competitiveness of other companies being artificially limited by their inability to provide comparable service offerings.

If the successful Proponent was structurally separated, the issue becomes somewhat more straightforward. Equivalence in that context would require the network operator to inform all (affected) access seekers of upcoming work at the same time, which should mean an equal impact on the position of these firms in the retail market and therefore no undue competitive advantage to any particular retail operator.

Where the successful Proponent is vertically integrated or where some access seekers have an ownership interest in the NBN operator, equivalence is more important. In particular, it is necessary to determine when a decision to perform upgrade work is actually effectively made or notified to the network provider, triggering the requirement to give notice to access seekers.

As noted in the transition and migration Appendix (Appendix I), it would generally not be appropriate that information about a network upgrade only be provided to access seekers at the same time as a vertically integrated network operator informs its retail arm.³⁹⁷ Rather, that notification would better be given at the same time as the vertically integrated network operator informs an area such as its wholesale or network division. However, difficulties with the concept of equivalent notice may mean that consideration should be given to a minimum notice period that would ensure that network upgrades and maintenance did not take place before a certain period of notice was ensured for access seekers.

The ACCC has noted in the past that there is a wide range of potential network upgrade and maintenance activities that could take place, ranging from potentially highly disruptive to matters of little consequence for the availability or quality of

³⁹⁶ RFP, schedule 2, p. 13, [1.4.2(c)(ix)]

³⁹⁷ ACCC, *Assessment of Telstra's ULLS monthly charge undertaking—final decision*, August 2006, p. 177. The potential exception would be if the network operator informed its wholesale and retail arms at the same time.

services.³⁹⁸ Similarly, the Australian Competition Tribunal noted that recognising the range of work that could potentially be performed on a network was important.³⁹⁹

Given that the types of ongoing upgrade and maintenance work may vary, the appropriate length of time for a minimum notification period would depend strongly on the type of work taking place. As such, the specific terms and conditions may vary, and any minimum notification periods may have to draw a distinction between different categories of work.⁴⁰⁰ Too short a period would run the risk that access seekers would not have an appropriate length of time to conduct necessary activities in response to the upgrade or maintenance work, such as planning their own infrastructure works, negotiating revised access arrangements, or conducting marketing and end-user communications. Alternatively, too long a period would hamper the ability of the access provider to conduct work on the network, thus potentially harming its interests in properly maintaining its network and planning necessary infrastructure build.

Also, notice periods should generally be able to be bypassed with the consent of all affected access seekers. If companies are happy for amendments to occur before the minimum notice period, there would seem little point in requiring the full notice.

H.4.2. Ordering and provisioning

Ordering and provisioning terms and conditions have the potential to be significant non-price concerns. Effective operations support system interfaces have been critical to competition on existing networks and will be equally so for a bitstream access service.⁴⁰¹ It has also previously been noted that these operational systems need to be in place well before migration.⁴⁰² The standard access obligations under the current regime likewise emphasise that equivalent ordering and provisioning must be provided to access seekers.⁴⁰³ These issues are explicitly raised in the RFP requirement that Proponents outline arrangements for ensuring equivalence in service qualification and activation.⁴⁰⁴

Ordering and provisioning systems and processes allow access seekers to acquire access services from the network operator. In the NBN context, those services are likely to, at the least, include a bitstream service. It will be necessary for access seekers to readily be able to place orders to acquire services from the NBN operator.

Firstly, as noted in Appendix I, a key consideration is whether access seekers are able to order and provision new services before transition and migration take place. Similarly, if ad hoc upgrade work takes place, access seekers will need to be able to order replacement services if their existing services are no longer available.

³⁹⁸ ACCC, *Final determination – model non-price terms and conditions*, November 2008, p. 30.

³⁹⁹ Australian Competition Tribunal, *Telstra Corporation Ltd (No 3)* [2007] ACompT 3 at [304]

⁴⁰⁰ ACCC, *Model non-price terms and conditions determination 2008*, 17 November 2008, clause G.

⁴⁰¹ ACCC, *Assessment of FANOC's Special Access Undertaking in relation to the Broadband Access Service—Draft decision*, December 2007, p. 75.

⁴⁰² ACCC, *Assessment of FANOC's Special Access Undertaking in relation to the Broadband Access Service—Draft decision*, December 2007, p. 76.

⁴⁰³ *Trade Practices Act 1974* (Cth) section 152AR(4A)

⁴⁰⁴ RFP, Schedule 2, 1.4.2(viii)

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Equivalence in ordering and provisioning relates to various considerations including the availability of services, time taken for orders to be processed and the particular nature of the ordering process.

To ensure that the open access requirements of the RFP are met, it would be expected that there would be procedures in place that allow access seekers to order and provision all services that can be accessed by other access seekers (including the network provider if vertically integrated). Any inability to order particular products, and hence to provide the full range of services, could have a potentially serious affect a company's ability to compete in the provision of telecommunications services. This could negatively affect competition generally.

Equally, equivalence in ordering and provisioning would generally require that the time taken by any given access seeker to have an order fulfilled is no longer on average than any other service provider. This issue has been raised with the ACCC previously – for example the time taken for ordering and provisioning the ULLS was a matter raised in arbitration. That dispute centred on the disparity between the provisioning times for the ULLS at 5 to 13 days with the provisioning time for Telstra's retail services at 2 to 3 days.⁴⁰⁵ The impact on competition of significant disparities in the time taken for services to be provisioned will be felt if end-user customers regard access seekers as providing an inferior quality product because of long ordering times. In such a case, access seekers would be less able to compete because of a difference in service quality that is in the hands of the network provider rather than the access seeker. This exclusionary behaviour would deny the access seeker party a level playing field in the provision of services, and lead to a reduction in the access seeker's demand.

Existing differences in ordering and provisioning times to some extent reflects legacy ordering and provisioning systems that were not originally designed for access services, and newer access service systems that use different processes. For example, access seekers currently use the LOLO and ULLCIS ordering systems to order services from Telstra while Telstra uses a different ordering system for its internal products. The systems used by access seekers also include processes set out in existing Communications Alliance codes which may not be as efficient as internal ordering processes, and may not cater for the large amount of access services that are now ordered. Equivalence may not be easy to measure in such a case. An access seeker may acquire a wholesale input from the network operator in a certain period of time. However, if a vertically-integrated network operator regards itself as providing retail services only to its own end-users, it may be difficult to assess the time it takes to provision the wholesale service to itself, and therefore to assess whether provisioning times for access seekers constitute 'equivalent' terms of access.

That said, a small amount of extra time for provisioning a service might not necessarily be considered discriminatory or anti-competitive, or significantly affect a company's ability to compete – however a period of days or weeks would probably do so. It would be necessary to consider how much any retained disparity in ordering and

⁴⁰⁵ ACCC, *Unconditioned Local Loop Service Access Dispute Between Telstra (access provider) and Optus Networks (access seeker)—Statement of Reasons for Final Determination*, March 2008, p. 327.

provisioning times might actually affect parties' ability to provide a service that end-users regard as competitive.

A number of specific ordering issues have also been raised by industry and examined by the ACCC in the conduct of various regulatory processes. These include:

- the procedures that apply to 'managed network migrations' (MNM) of a large number of resale services to ULLS or LSS based supply, such as minimum order numbers, notice periods, the way in which jumpering work can be performed and the number of MNMs per day⁴⁰⁶
- the absence of a simple method to transfer from LSS- to ULLS-based supply⁴⁰⁷
- provisioning of ULLS on lines with soft dial tone only.⁴⁰⁸

The ACCC has noted that there are a number of competition implications of these ordering and provisioning issues. It has set out model terms to better manage these concerns, and issued arbitration final determinations that modify existing terms.⁴⁰⁹

For the NBN, a number of these issues may become less relevant, although they may remain issues in those areas where the NBN infrastructure is yet to be rolled out. The development of ordering systems for the NBN provides an opportunity for systems to be developed that remove some of these legacy ordering issues and limitations. The range of issues that have been raised with the ACCC in relation to ordering and provisioning emphasise that ordering and provisioning is a significant area for consideration in assessing the NBN Proposals.

H.4.3. Fault repair and maintenance

As with ordering and provisioning, fault repair and maintenance is recognised in the current regime as a non-price aspect of access that should be provided on an equivalent basis between access seeker and access provider.⁴¹⁰ However, fault repair and maintenance has perhaps been less contentious under the current access regime than ordering and provisioning. The ACCC does receive some basic accounting separation measures relating to fault repair for Telstra resale services only.⁴¹¹

In most senses, the same fundamental issues apply in relation to equivalence in fault repair and maintenance as apply to equivalence in ordering and provisioning. Access seekers need a way to readily report faults to the network operator, and need to have

⁴⁰⁶ ACCC, *Final determination – model non-price terms and conditions*, November 2008, p. 39.

⁴⁰⁷ *ibid.*

⁴⁰⁸ ACCC, *Access dispute between Optus Networks (access seeker) and Telstra (access provider)—provisioning of Unconditioned Local Loop Service to multi-dwelling units—Reasons for Final Determination*, 30 November 2007.

⁴⁰⁹ ACCC, *Final determination – model non-price terms and conditions*, November 2008, p. 39-51; ACCC, *Unconditioned Local Loop Service Access Dispute Between Telstra (access provider) and Optus Networks (access seeker)—Statement of Reasons for Final Determination*, March 2008, p. 239-283.

⁴¹⁰ *Trade Practices Act 1974* (Cth) section 152AR(3)(c). Similarly, the existing Communications Alliance code *ACIF C513:2004 Customer and Network Fault Management* specifies in clause 6.1 that, in implementing the code, carriers must act in a non-discriminatory manner.

⁴¹¹ see, e.g. ACCC, *Imputation Testing And Non-Price Terms And Conditions Report Relating To The Accounting Separation Of Telstra For The June Quarter 2008*, September 2008, p. 8.

faults attended to in a reasonably similar period of time and process to that of other access seekers and any retail arm of the network operator.

Access seekers not being able to readily report faults, or faults taking significantly longer to repair for one access seeker compared to another, could lead to a company suffering competitive detriment from being known as having poor service quality, despite such problems not being its fault. A vertically-integrated operator would in particular have incentives to provide different levels of fault repair and maintenance to access seekers compared to its retail arm in order to allow its retail arm to provide better quality of service and gain a competitive advantage. Significantly, such an advantage would be entirely in the hands of the vertically-integrated operator but would affect access seekers only. As with ordering and provisioning, such exclusionary behaviour would have the effect of reducing the demand of access seekers.

The ACCC notes also that equivalence in fault repair and maintenance should also mean that repair work, once scheduled, should be distributed on a non-discriminatory basis. That is, the faults reported by one or more access seekers should not be continually put to ‘the back of the queue’ if fault reports come from some other access seeker or the retail arm of the network operator. It would be preferable that systems are developed that do not distinguish, at the stage where fault repair work is allocated to technicians, between services provided by one access seeker compared to another.

H.4.4. Facilities access

Facilities access terms and conditions set out the way in which an access seeker will access the facilities of the network operator to acquire an access service and then interconnect equipment in order to supply services to end-users. The current access regime requires companies providing declared services to access seekers to allow interconnection of facilities to allow the use of declared services.⁴¹²

Facilities access has become a significant issue in recent periods, with access seekers raising concerns about, in particular, obtaining access to exchanges to install DSLAM equipment.⁴¹³ Parties have in particular raised concerns about exchange capping—where an exchange has no capacity in its distribution frame or floor space in which competitors are allowed to make infrastructure builds⁴¹⁴—and queuing—which relates to the procedures for the timing of entry into an exchange to conduct works and the order in which access seekers may carry out infrastructure works.

Under an NBN, facilities access issues may be somewhat different to those under the current market structure. In particular, if the primary access service is a bitstream service, access seeker parties are unlikely to need to obtain access to exchange buildings to install DSLAM equipment. Furthermore, many current exchange buildings may not be in existence, as deploying fibre in the access network may render a significant number of exchange buildings redundant.

⁴¹² *Trade Practices Act 1974* (Cth) section 152AR(5)

⁴¹³ ACCC, *Final determination – model non-price terms and conditions*, November 2008, p. 51.

⁴¹⁴ There may be physical space available, but the access provider is able to and does reserve space for its own anticipated requirements.

However, facilities access could still be a significant consideration in an NBN context. This is because access seekers may still require facilities access, albeit of different types. The first type of facilities access that may be sought would be access to facilities at different parts of the network to allow backhaul and core network interconnection with the NBN—for example, access seekers may seek access to the exchange buildings which currently house the POIs for their backhaul investments, or similar facilities. The second type of facilities access that might be relevant is if the successful Proponent provides, either initially or at some time in the future, an unbundled sub-loop access service. In such a case, access seekers would need to be able to obtain access to the cabinets at nodes in order to interconnect their own access technology (DSLAM/MSAN) infrastructure with that of the network operator. Accordingly, it is relevant to consider some of the issues that have arisen to date.

In general, parties should be able to readily obtain access to available facilities to allow interconnection. If interconnection is denied, access seekers will evidently be unable to provide services to end-users, limiting their ability to provide competitive services to end-users. It would also have the potential to raise rivals' costs, as they may have to install additional interconnection facilities or install them in locations where greater backhaul is required. This would similarly negatively affect the ability of access seekers to provide competition. Accordingly it is important that there are appropriate procedures in place to allow facilities access and hence the provision of services, to better permit competition on the merits. The fact that access seekers have currently had difficulty in gaining access to facilities suggests that existing procedures could be improved on.

As an overall proposition, equivalence in facilities access is best served by all parties, including any retail arm of the network operator, being subject to the same facilities access procedures. At present, Telstra is not subject to the same capping and queuing procedures as access seekers, and can reserve space for its 'reasonably anticipated requirements'. Accordingly, it may be appropriate, and better advance the principle of equivalence, if the successful Proponent and all access seekers have the same status under facilities access processes.

However there may be issues such as the universal service obligation (USO) or a need to supply special services such as EFTPOS and security systems that currently limit the extent to which true equivalence could be achieved. As the owner of the facilities, it is reasonable that Telstra has a degree of discretion in gaining access to these facilities and allowing for its anticipated requirements. That said, it would not be reasonable for Telstra to, for instance, reserve excessive space to the point that access seekers were denied competitive entry. The High Court has pointed out that Telstra's ownership of the copper network always brought with it obligations to provide third party access.⁴¹⁵ Furthermore, in the NBN context, reasonably anticipated requirements would appear less likely to be an issue. In particular, if access is being obtained to bitstream services, the NBN operator would only need to reserve space in relation to POIs or if sub-loop access was provided. It would not appear to be an issue in relation to access to bitstream services.

⁴¹⁵ Telstra Corporation Limited v The Commonwealth [2008] HCA 7, 6 March 2008, S42/2007, [19].

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The ACCC has previously considered, in the context of access to exchanges, that decisions by any network operator on whether access to a facility can be obtained at all should be made according to the most recent and accurate information, having regard to fair and reasonable criteria.⁴¹⁶ This same basic principle is equally applicable to the NBN context where access seekers may seek access to interconnection facilities or to node cabinets. Significantly, there may be ways in which the capacity of an apparently full facility can be expanded, and any facilities access approach would need to take account of the potential for building works to expand capacity. Accordingly, if a decision is made to classify a facility as full and not accessible to access seekers, such a decision would need to be made only after:

- a recent inspection of the facility has been made (this could be made by the network operator, although access seekers may wish to also inspect the facilities) and floor plans (for access to backhaul interconnection facilities) or cabinet plans (for access at the node) etc have been verified
- the potential for building works or other solutions by which to increase capacity has recently been investigated
- where the decision is based upon reasonably anticipated requirements of the access provider or another service provider (discussed below) – all relevant details of those requirements, including timing, have been documented, and all necessary internal approvals or contractual arrangements necessary for the implementation of that requirement have been established.⁴¹⁷

As noted above, if a decision is made to classify a building or facility as full, this should equally apply to any retail arm of the network operator, to the extent possible. It would not achieve equivalence if access seekers were not granted access but the retail arm of the network operator was then able to install significant further equipment.

The approach described above would help to provide certainty about facilities access issues. It would also help to ensure that decisions are made appropriately, and therefore allow access seekers to seek facilities access on an equivalent basis, and for competition to occur on its merits. Access seekers would also need to be able to examine facilities, examine documents about the available capacity in the facility, and consider possible expansion methods and suggest them to the network operator. However, equivalence would also require that the reasonable requirements of other parties also be recognised. An access seeker would not always have a right to place infrastructure inside a facility, as this might take away from the requirements of existing access seekers or the retail arm of the network operator. Equivalence in facilities access equally requires that existing providers in a facility do not lose or have to give up facilities access without appropriate reason. As noted above, under the NBN, such issues are likely to be more confined than the exchange access issues under the current market structure, and restricted to POI access or, should it be offered, sub-loop access.

⁴¹⁶ ACCC, *Final determination – model non-price terms and conditions*, September 2008, p. 53.

⁴¹⁷ ACCC, *Final determination – model non-price terms and conditions*, September 2008, p. 54.

In addition to consideration of whether a facility can be accessed at all, it may also be necessary in the NBN context to consider the way in which requests to gain access to facilities are ordered. This may be less significant for the NBN than under the current market structure, where multiple access seekers may be seeking to install DSLAMs into exchanges, but may still be a relevant consideration. In short, equivalence would be best served by allowing multiple parties to enter a facility to install infrastructure for interconnection where possible.⁴¹⁸ In particular, it would only be appropriate to not allow such shared access where reasonably necessary for health and safety reasons and/or to ensure network reliability. This will depend on the nature of the work that is carried out. Equivalence of access would be unlikely to be achieved if all work is automatically queued whether or not queuing is necessary, particularly if any retail arm of the access provider is not subject to the same limits. It would also be preferable that terms and conditions relating to facilities access allow for queues to progress quickly where they are necessary.

Equivalence in relation to queuing could be achieved by terms and conditions that require that the network operator be subject to the same queuing systems as access seekers. This would provide incentives for the network operator to provide an orderly and efficient queuing system, and would ensure a level playing field for competition.

H.4.5. Amendment of documents

A network operator would be likely to have operation manuals setting out issues such as the ordering and provisioning approach or facilities access rule that from time to time would need to be amended. Similarly, the access agreements between parties may need to be varied from time to time.

Such amendments may be necessary for the efficient operation of the network and to specify appropriate processes for new services. Accordingly, it is necessary for there to be NPTCs setting out how amendments may be made to both the access agreements and operational manuals can be made.

In general, there should not be a power that allows unilateral amendments by the network operator without consultation with an affected access seeker. In relation to access agreements, which are a contract between the access seeker and access provider, it would usually be necessary for agreement to be made by the two parties involved. A clause that reserved a unilateral right to amend access agreements would seem unlikely to achieve equivalence between the access provider and access seeker. Instead, access agreements should usually be amended by agreement between the parties.

It can be seen that, were unilateral amendments permitted, a vertically integrated network operator would have incentives to amend its access agreements in a way that disadvantaged competing access seekers. This may include arbitrary changes to requirements that raise the costs of the access seeker or prevent it from providing services. This would reduce the competition provided by such companies.

Operational manuals may have slightly different considerations. These documents do not describe the fundamental relationship between the parties, but can specify

⁴¹⁸ ACCC, *Final determination – model non-price terms and conditions*, September 2008, p. 58.

important information about exactly how a service can be acquired and operated. They will typically be documents that apply to all access seekers equally. An access provider can require flexibility to modify such a document to allow for necessary changes to properly manage the network. However, access seekers will equally adapt their systems to interact with the provisions of the operational documents, and changes to such specifications will therefore affect the ability of access seekers to provide competitive services to end-users.

The ACCC has considered previously that access seeker agreement to changes in operational manuals should only be required if the changes are specific to the particular access seeker.⁴¹⁹ For changes of general application, it would likely be sufficient that notice of planned changes is given to all access seekers to allow them to provide comment and that the access provider is required to consider such changes in good faith. Parties would also be able to use general dispute resolution procedures.

Equivalence in such a circumstance could be better achieved if the access provider is also required to follow the procedures in the operational manuals, which should be feasible if they are of general application. However, as noted previously, a vertically-integrated network operator may not consider that it acquires the same services as access seekers.

Overall, amendments to both access agreements and operational manuals should not be unilateral, and should include some consultation with affected parties. Amendments which materially affect a particular party to the exclusion of others should be required to be the subject of agreement between the parties, while amendments to generally applicable documents may simply require an appropriate period of consultation.

H.4.6. Confidential information

An access provider will have significant confidential information about the end-users served by its access seeker customers. Accordingly it will be necessary for there to be arrangements in place to handle and protect this confidential information. The RFP contains a requirement for an information strategy,⁴²⁰ and the ACCC has also previously considered the competition implications of confidentiality issues in its model non-price terms and conditions and in arbitration processes.⁴²¹ A related issue is the ability of the access provider to communicate with the end-users of an access seeker. Confidentiality restrictions should equally apply to the conduct of access seekers in relation to the confidential information of the access provider.

The most obvious category of confidential information that will be known by an access provider is the identity of the end-users served by any given access seeker. In the current regime, such information may be limited to the identity or location of the end-user, particularly when the end-user is served by ULLS, and the access provider

⁴¹⁹ ACCC, *Final determination – model non-price terms and conditions*, November 2008, p. 38.

⁴²⁰ RFP, Schedule 2, 1.4.7(a)(ii)

⁴²¹ ACCC, *Final determination – model non-price terms and conditions*, November 2008, p. 24; ACCC, *Unconditioned Local Loop Service Access Dispute Between Telstra (access provider) and Optus Networks (access seeker)—Statement of Reasons for Final Determination*, March 2008, p. 349.

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may have no visibility of the type of retail service provided by the access seeker. However, under an NBN, there will be a greater level of information known by the access seeker about each end-user, such as the particular bitstream service acquired for that end-user's requirements. The network operator may also have information related to other, more general aspects of the access seeker's business, such as forecasting information, planned entry into particular geographic areas, or information about the access seeker's facilities.⁴²²

It would not be appropriate for a network operator to pass end-user customer information on to its own retail arm (if vertically integrated), or other access seekers, thus allowing the end-users to be directly targeted. Such use of information would have a clear negative effect on competition, as the access seeker would have no reciprocal knowledge about the operations of the network operator (or the other retail operators). Accordingly, it would be necessary for there to be in place a restriction that states that any information concerning an access seeker's end-users can not be provided to or used by the retail arm of any other service provider, and that any use of the information only be for network operation and billing purposes. Without such a restriction, there would be strong incentives for such information to be used to target the access seeker's customers and impede competition. Confidential information could, however, be used in other ways if consent was provided by the access seeker.

Similarly, where the information relates to particular investment plans or forecasts of an access seeker, the network provider should not be able to target a competitive retail response based on the use of confidential information available to it through its wholesale operations.

Communications with end-users should also be restricted in other ways. As noted above, access seeker information about end-user customers should not be used to target those customers. The access provider should only be able to deal with that end-user customer where necessary for network management purposes or where they supply some other service to that end-user. Equally, in the course of conducting fault repair or maintenance work, the network operator's technicians should not target the end-user whose premises are being repaired for 'win-back'. Appropriate confidentiality arrangements should prevent such behaviour from taking place. Because the fault repair or maintenance work is being done on behalf of the access seeker, it should not be used as an opportunity to perform targeted marketing.

These restrictions on the use of information may be more relevant in a NBN context. With the current use of ULLS and LSS, physical jumpering must be performed to switch a customer away from one service provider to another, which requires some time and cost to perform. Comparatively, if most or all service providers are using bitstream services, and switching between service providers does not require any physical wiring changes, the transfer of end-user customers may be relatively straightforward. Accordingly there may be greater incentives to attempt target win back activity.

⁴²² A list of examples of information likely to be considered confidential information is contained in Telstra, *Information Security Strategy*, 23 June 2006, clause 3.2.

It should be noted that such restrictions on the use of information do not prevent customers being marketed to through the use of general marketing or offers to particular classes of end-users. This is part of a healthy competitive process. However, the restrictions would prevent the use of confidential information of the access seeker to inappropriately and anti-competitively target end-user customers.

H.4.7. Other issues

The ACCC has considered a number of other non-price terms and conditions in various processes under the TPA. Issues that have arisen include:

- billing
- creditworthiness
- suspension and termination of services.⁴²³

Billing has perhaps been a less contentious issue than others such as fault repair or ordering and provisioning. Equivalence in billing should be relatively straightforward to ensure between access seekers – parties should face the same terms, billing periods and rebilling periods as other access seekers. Issues related to billing may be more likely to arise when considering an access seeker and the retail arm of a vertically-integrated network operator. As the retail arm of the network operator would be unlikely to be charged a bill in the same sense as an access seeker would, it may not be possible to have the same terms and conditions applying to both companies.

Instead, equivalence in billing can best be served by an appropriate set of rules relating to billing. These would include rules that do not make it unduly difficult for the access seeker to pay its bills, such as a very short payment period after a bill is issued, or render it subject to rebilling a long period of time after a bill was initially paid. It would also require that an access provider has incentives to get bills correct and that billing disputes can be notified and dealt with in an appropriate way.

In relation to creditworthiness and suspension and termination of services, there will be times when it is appropriate for the network operator to inquire into the access seeker's ability to pay and require that security be provided, or to suspend or cancel services supplied to an access seeker where bills are not paid. Creditworthiness terms may be necessary to ensure that an access seeker can pay its bills. However, there should not be any blanket obligations to provide security or provide credit information before access can be given, as this may impede the access seeker's ability to readily compete in the market.⁴²⁴ Such steps should only be taken where necessary, such as for a new access seeker or a company with a history of poor creditworthiness. It would be unreasonable for a network operator to require increases in security or implement credit checks and require credit information at will.

Equally, such arrangements should not allow the network operator to suspend or terminate services without good reason. Notice should typically be given, unless there is a case where the access seeker is insolvent or there is some sort of emergency or

⁴²³ ACCC, *Final determination – model non-price terms and conditions*, November 2008, p. 14-19, 36-38.

⁴²⁴ ACCC, *Final determination – model non-price terms and conditions*, November 2008, p. 17.

threat to people or property.⁴²⁵ In other cases, such as where there is some sort of breach of the access agreement or a failure to pay a bill on time, notice should be given and an opportunity, such as 20 business days, be provided to allow the breach to be remedied.⁴²⁶

The ACCC has previously considered that there may be a need for separate procedures in relation to billing disputes as compared to other disputes.⁴²⁷ This recognises that the issues in a billing dispute may be relatively specific and more time critical than other disputes. Dispute resolution is considered further below.

H.5. Non-price terms and conditions—dispute resolution and compliance

The RFP states that Proponents should specify the proposed mechanisms for enforcing, and resolving commercial disputes, on the terms and conditions for access and interconnection services provided on the NBN.⁴²⁸

A variety of regulatory tools may be available to monitor and enforce obligations and resolve disputes regarding non-price terms and conditions. These tools will range from being relatively hands-off to being relatively interventionist. Examples of the various approaches can be seen in existing forms of regulation, although there may also be additional methods available. The workings and effectiveness of these regulatory options are discussed in more detail in Appendix F.

The appropriate tools will depend on the nature of the incentives of the network operator to engage in anti-competitive non-price exclusionary behaviour. The strength of these incentives will depend on structural issues, which are examined in more detail in Appendix F.

A less prescriptive approach to monitoring and enforcing the NPTCs of access would rely on the use of ex-post enforcement activity. The ACCC currently has an enforcement role in telecommunications under Part XIB of the TPA. This Part sets out the circumstances in which carriers and carriage service providers are said to engage in anti-competitive conduct and sets up a special regime for regulating anti-competitive conduct in the telecommunications industry. It applies in addition to Part IV of the TPA. This ex-post enforcement approach is less prescriptive in that it does not set any particular terms beforehand, allows parties to reach their own agreement on NPTCs, and then relies on subsequent complaints to, and enforcement action by, the ACCC, including the imposition of penalties and remedies. It is perhaps instructive that a number of ex-post competition notices in the early period of the telecommunications regulatory regime (around 1997 to 2001) related to non-price issues in wholesale markets.⁴²⁹

⁴²⁵ ACCC, *Final determination—model non-price terms and conditions*, November 2008, p. 36-38.

⁴²⁶ ACCC, *Final determination—model non-price terms and conditions*, November 2008, p. 37.

⁴²⁷ ACCC, *Model non-price terms and conditions determination 2008*, November 2008, clause A and D.

⁴²⁸ RFP, Schedule 2, 1.4.3(e)

⁴²⁹ For example, a number of competition notices issued in 1998 and 1999 dealt with the process for commercial ‘churn’ of a end-user customer to another provider. The ACCC’s competition notices

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An additional power under Part XIB that may facilitate the use of ex-post enforcement activity would be the use of the ACCC's power to make record keeping rules (RKR) to obtain information about NPTCs. For example, in 2003, the ACCC used those RKR powers to introduce accounting separation of Telstra, which was intended to provide greater transparency of Telstra's operations to ensure that it does not unfairly discriminate between access seekers using its network and its own retail operations.

Under accounting separation, Telstra is required to provide the ACCC with reports on key performance indicators (KPIs) on non-price terms and conditions that compare Telstra's customer service performance between specified retail and wholesale supplied services (NPTC reports). KPIs on non-price terms and conditions of access measure the difference between the percentage of Telstra wholesale and retail customers that meet a required performance standard (set out in the Customer Service Guarantee).

It should be noted, however, that the monitoring information captured under the accounting separation regime is highly aggregated and can hide specific instances of anti-competitive behaviour—indeed, the report is not intended to identify whether particular instances of discrimination may have occurred. It does not necessarily ensure that Telstra consistently applies equivalent treatment of its wholesale and retail customers in the normal course of business.

Another relatively light touch approach to monitoring non-price terms would be to continue the use of a set of model terms. As outlined above, the model non-price terms are non-binding and are designed to provide industry with an up-front view of the likely approach that the ACCC would take to a particular issue in arbitration. Although they are non-binding and therefore not enforceable, the model NPTCs may assist parties to reach commercial agreement on access or to submit access undertakings, assuming the power to make NPTCs of this type remains open to the ACCC.⁴³⁰

In contrast to the model non-price terms, a more prescriptive approach would be the use of access undertakings. Access undertakings can be lodged by access providers under Part XIC of the TPA and are, if accepted by the ACCC, legally binding. They are designed to promote certainty, the settlement of access arrangements and reduce regulatory gaming and delay, by setting price and/or non-price terms for access to declared services across the entire industry. However, undertakings lodged with the ACCC have traditionally covered mainly pricing matters. In recent undertakings given to the ACCC, the only significant non-price terms in the undertakings have related to network modernisation and the SAOs.

In the past, the ACCC has considered that access undertakings do not need to be exhaustive. Given that terms or matters not addressed in the undertaking can potentially be addressed by recourse to arbitration or commercial negotiation,⁴³¹ the

are available at the ACCC's website at <http://www.accc.gov.au/content/index.phtml?itemId=323962>.

⁴³⁰ A recent court decision raised the issue of whether model NPTCs need to be a comprehensive set of NPTCs for access: Federal Court, *Telstra Corporation Ltd v ACCC*, [2008] FCA 1758.

⁴³¹ ACCC, *Assessment of Telstra's Unconditioned Local Loop Service, Band 2 monthly charge undertaking—Draft Decision* (public version), November 2008, p. 46

ACCC seeks to be satisfied that any non-price terms and conditions would not create a barrier to access seekers gaining equivalent services.⁴³²

A more prescriptive approach to enforcing NPTCs would be the use of a ‘reference offer’—which would require the regulator or other third party to set binding terms and conditions for access to NBN services. In comparison to the current voluntary undertaking process, this is more interventionist as it does not rely on the access provider coming forward with a proposal, but instead sets terms and conditions that will apply to the industry. In effect, the reference offer could be considered a binding form of the model NPTCs and would to a large extent replace the existing negotiate/arbitrate model of access in the existing legislation. An advantage of this mechanism is that the threat of unfavourable regulatory intervention may tend to encourage more negotiation between access seekers and access providers in any case.

In determining the appropriate regulatory tools which form the framework applied to the NBN, it is relevant to consider the incentives for non-price discrimination, which closely relates to the structural form of the NBN operator. When applied to a vertically integrated operator, the various regulatory options can only *reduce* the scope and incentives for non-price discrimination, rather than *eradicate* them. As such, the need for a more interventionist approach to NPTCs, such as the use of a reference offer, may be more pressing where the incentives for anti-competitive exclusionary behaviour are high. Similarly, the need for particular NPTCs, in addition to those in the RFP, to be specified in the existing arrangements will depend on the extent of incentives to discriminate.

The effectiveness of various approaches, such as operational separation, to countering the structural incentives to discriminate and engage in anti-competitive behaviour is discussed further in the appendix about structural issues (Appendix F).

H.6. Overall conclusion on non-price terms and conditions

This report considers the role of non-price terms and conditions (NPTCs) that would govern the relationship between the NBN operator and its wholesale customers.

The Government’s RFP specifically requires Proponents to address a number of non-price terms and conditions in their Proposals and to specify the measures and models that will ensure equivalence.⁴³³ However, the objective of ‘equivalence’ cannot be readily guaranteed as network operators, particularly those which are vertically integrated, will have incentives to engage in anti-competitive conduct.

A vertically-integrated network operator has considerable scope and incentive to engage in exclusionary non-price behaviour that uses NPTCs to place rival firms at a competitive disadvantage. For example, the network provider might use refusals or unjustified delays to interconnection to raise rivals’ costs or lower rivals’ demand. Access seekers facing non-price discrimination from a vertically integrated operator could be significantly disadvantaged by anti-competitive NPTCs as they lose the ability to compete on the merits of their competitive offerings to end-users.

⁴³² Ibid., p. 52

⁴³³ e.g. RFP, p. 2, [1.1.10]

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There is a wide range of NPTCs that may be important considerations in the NBN. In particular, notification of network changes, ordering and provisioning processes, fault repair and maintenance, facilities access, amendment of documents, treatment of confidential information and a number of other issues would all be important considerations in assessing the potential competition effects of NPTCs.

Monitoring and enforcing anti-competitive conduct by a vertically integrated operator in non-price commercial arrangements can be complex. A number of monitoring mechanisms would be available to address concerns that the network operator is not providing an equivalent level of service in relation to NPTCs (for example, in fault repair and maintenance) to its wholesale customers as it provides to its own retail arm.

In determining the appropriate regulatory tools to monitor and enforce the NPTCs to apply under the NBN, consideration of the structural form of the NBN operator, and hence incentives for particular behaviour, is relevant. The ACCC examines structural issues in appendix F.

Appendix I. Transition and migration

I.1. Executive Summary

- The rollout of the National Broadband Network (NBN) should happen as quickly as possible but should be conducted in a way that promotes competition. If the rollout is not conducted in such a way, there could be significant competitive detriment arising from the rollout, meaning that the potential benefits of the NBN may not be realised. The successful Proponent could have the incentive and opportunity to perform the rollout in such a way that harms the competitive constraint currently provided by access seekers.
- The *transition* to the NBN can be thought of as the timeline for the overall rollout of the NBN into different geographic regions over a period of years. *Migration* can be thought of as the actual physical process of ‘cutover’ to the new network at a particular point in time.
- The main transition and migration issues centre on the ability of service providers and end-user customers to smoothly migrate services from copper to fibre (i.e. to the services delivered over the NBN). Any approach to transition and migration should ensure that both wholesale customers and retail end-users receive sufficient time and information to best guarantee continuity of service.
- The process and forecasting for the NBN roll-out, the length of notice that is received of pending infrastructure works, the content of any migration notice provided and commitments to equivalence and non-discrimination are all important considerations in ensuring transition and migration from the copper network to the NBN happen in a manner which does not harm competition or cause significant disruption and detriment to end-users.
- Some of the key benefits of a systematic transition and migration process include continuity of service, greater certainty for access seekers in making infrastructure investment decisions and greater certainty for all parties in negotiating access arrangements for the NBN.
- *Equivalence* and *non-discrimination* in both information and service availability are important principles in the rollout. A central principle might involve an obligation by the successful Proponent to give an equivalent *period* of notice (and equivalent notice *content*) to access seekers to that which it gives itself. Any equivalence commitments would be in addition to a sufficient *minimum notice period*.
- The Request for Proposals (RFP) provides for some key transition and migration documents. The Project Schedule and Information Strategy will be important documents in the rollout. In addition, a detailed Notice of Migration is likely to provide greater certainty. These documents would allow access seekers to undertake planning of activities relevant to their own network migration, such as equipment purchases, workforce planning and customer marketing and interaction.
- The Project Schedule should adequately set out the forecast timings for the rollout of the NBN across the different geographic regions of Australia. The notice of migration should provide confirmed details of the time and nature of upgrades in a

particular geographic area, and *lock in* the successful Proponent's commitments to wholesale customers. These documents will need to be detailed and provide for equivalence in the provision of information to the industry.

- The proposed initial rollout period is also significant. The successful Proponent will most likely begin deploying fibre soon after being awarded the NBN contract, leaving access seekers with limited notice. To avoid potential problems with this short notice period, the successful Proponent could—in the first part of the rollout period—begin deployment in areas with no competitive infrastructure (DSLAMs and MSANs).
- The geographic approach to the rollout ('inside-out' vs. 'outside-in') may also have an important impact on whether the future competitiveness of current access seekers is affected.
- However, concerns about competitive harm stemming from the geographic approach to the rollout may be lessened if documents such as the Project Schedule and notice of migration are appropriately specified.
- Information about the likely location of future points of interconnection is also likely to be crucial to the ability of access seekers to provide services over the NBN.

I.2. Introduction and background

One of the Commonwealth's objectives in its RFP is for the NBN to be 'rolled out and made operational progressively over five years from the date of execution of a contract between the Commonwealth and successful Proponent'.⁴³⁴

This appendix examines the specific provisions contained within the Government's RFP and also looks at approaches taken internationally, with a particular focus on the Netherlands and New Zealand.⁴³⁵

Significant competition issues could arise from the approach taken to the rollout of the new network. There would be, for example, significant potential and incentive for the successful Proponent to utilise the build to adversely affect the ability of certain competitors in the market to provide services.

This incentive would be particularly strong if the successful Proponent was vertically integrated. This stems from the fact that the NBN operator is likely to have market power. Where pricing of the wholesale services supplied over the NBN is subject to regulation, there will be incentives for a dominant vertically-integrated network operator to engage in exclusionary non-price behaviour to affect the competitiveness of its access seeker competitors. Broadly, there may be three categories of exclusionary behaviour that such an operator could engage in:

- refusals and delays in interconnection
- raising rivals costs
- lowering rivals demands.⁴³⁶

The successful Proponent may be able to achieve some or all of these by exploiting the transition and migration arrangements to the NBN.

Comparatively, such incentives might be lessened were the NBN operator not vertically integrated. However, an NBN operator that was not vertically integrated would still want to conduct a rollout in a particular way—for example to rollout the network in metropolitan regions first for the financial viability of the new network. Even if such a rollout is not intended as exclusionary, it will still have an impact on the competitive scenarios for existing access seekers. Further, it would be necessary to account for the fact that, if one or more access seekers had some ownership interest in and hence representation on the board of the network provider, they may be in an advantageous position compared to other access seekers. As such, transition and migration issues remain important even where the successful Proponent is not vertically integrated.

⁴³⁴ RFP, section 1.3.1.7

⁴³⁵ Fibre rollouts are being considered / undertaken in a number of countries, such as Germany, France, Italy, the UK, Japan and South Korea. However, the Netherlands and New Zealand examples provide a greater level of detail in terms of rollout forecasts and notice periods.

⁴³⁶ Laffont and Tirole, *Competition in telecommunications*, 2000, p. 164-5.

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Transition and migration are not necessarily distinct concepts in all circumstances, and are often used interchangeably. However, a distinction between the two terms might prove useful. This appendix emphasises the importance of both an initial forecast (a requirement under the RFP through the Project Schedule) and a shorter term ‘notice of migration’. The following descriptions are not meant as rigid definitions, but can instead be thought of as broad distinctions:

Transition: Timeline and details regarding the general rollout of the NBN—for example, the proposed approach to deployment by geographic area (involves a Project Schedule / forecast).

Migration: The actual ‘cutover’ of customers from the old network to the new, from X services to Y services on Z date—e.g. timeframes, operational and facilities information for a particular region, potentially provided through a notice of migration.

A major reason that the transition and migration between the copper and fibre networks is an issue relates to the type of technology that has been deployed by access seekers to date. Current exchange-based broadband equipment such as DSLAMs and MSANs, which is used in conjunction with unbundled services such as the ULLS and LSS, relies on a complete, unbroken copper line between the exchange equipment and the end-user to provide broadband and voice services. If the NBN is rolled out as a fibre to the node (FTTN) network, the upgrade will likely involve building new fibre out from the exchange to a node next to each street-pillar, in place of the previously existing copper. Accordingly, under such a deployment, the removal of part of the copper and replacement by fibre means there will be no complete copper path and hence no way for the exchange-based DSLAM/MSAN equipment to be used to supply broadband services. Accordingly the equipment would no longer be useful in the exchange. This is often referred to as the ‘stranding’ of DSLAMs and MSANs.

While in theory both a copper cable and fibre path between node and exchange could be maintained, there are potentially large technical and economic barriers to the co-existence of exchange-based competition with a NBN. The technical barriers include the possibility of interference between copper and fibre, while the economic barriers include the cost of maintaining two networks. Accordingly, existing investments in technologies used with unbundled services, such as current exchange-based DSLAMs and MSANs, may become redundant as the new network begins operation.

Of course, it is not expected that all unconditioned local loop services (ULLS) and line sharing services (LSS) will become redundant immediately after the Government awards the NBN contract. The NBN is to become operational progressively over an extended period and, as such, current services will be progressively phased out as customers are migrated to the NBN.

The way in which the NBN rollout occurs could therefore have significant competition effects. In particular, the notice periods that are received of pending works, and the order in which the NBN is rolled out to particular geographic areas, could be significant to whether the future competitiveness of current access seekers is affected. The competitiveness of downstream markets could be adversely affected if a vertically integrated access provider, or only certain access seekers, can provide a

service to retail end-users from day one while, absent sufficient up-front information, competing access seekers face a lag to provide services. This lag would arise from the time taken for access seekers to design and build the facilities required to migrate existing customers or commence marketing services provided over the NBN to win new customers.

Given the scale of an NBN upgrade, and the specification of new access services, access seekers may require greater certainty than would be needed for the introduction of an additional access service provided over the current copper access network.

Relevantly, the RFP requires Proponents to devise a high level framework for fibre transition and customer migration. The RFP asks Proponents to draft a Project Schedule, setting out how the network is to be rolled out,⁴³⁷ as well as an Information Strategy which places broad requirements to inform wholesale customers regarding transition to the new network and migration to new services⁴³⁸. Addressing these RFP requirements requires consideration of both the timing and project plans for the roll-out of the NBN across the country, and the manner in which any particular line or exchange service area (ESA) is migrated.

This appendix provides an overview of the competition issues in relation to the transition and migration from the copper-based network to the services provided by the NBN. Specifically:

- section I.3 will examine the Project Schedule and transition
- section I.4 will examine migration and notice
- section I.5 will examine the immediate start to the rollout, and the geographic approach taken
- section I.6 will examine points of interconnection (POIs)
- section I.7 will examine compliance and oversight.

I.3. Project Schedule and transition

Competition could be significantly affected by the approach taken to rollout of the NBN. In particular, if rollout occurs to a schedule that does not adequately allow existing service providers to perform the necessary activities to switch from provision over the existing copper-based network to the NBN, competition from those service providers might be significantly reduced once the NBN is rolled out. There would be a particular risk of this were the successful Proponent vertically integrated, as it would have incentives to engage in exclusionary behaviour that would give its retail arm a competitive advantage over access seekers.

The RFP requires Proponents to provide a Project Schedule, which asks that:

‘Proponents should provide, at a geographically disaggregated level, the start date and timeframes for the rollout of the proposed network infrastructure, the supply of wholesale and,

⁴³⁷ RFP, Schedule 2, Clause 1.3(b)

⁴³⁸ RFP, Schedule 2, Clause 1.4.7

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where relevant, retail services and any planned geographic expansions and technological upgrades’.

‘Proponents should include a detailed project schedule, including milestones, critical paths, key decision points and the identification of any required outcomes to move forward’.

‘Proponents should detail milestones reflecting the progressive coverage targets to be met during the deployment period’.

‘Where relevant, the Proponent should indicate whether the timeframes for the completion of the infrastructure build and supply of services and applications (e.g. voice and broadband services) would differ and any planned prioritisation of regions. All key assumptions upon which the timeframe is based should be set out and any risks to the schedule should be identified’.⁴³⁹

In relation to existing services and infrastructure, the RFP provides that:

‘In cases where the Proponent considers existing exchange-based services cannot feasibly co-exist with the NBN, Proponents should clearly set out the timetable and processes for transition between existing services and the NBN’.⁴⁴⁰

Further, Proponents are asked to detail:

‘the extent to which existing infrastructure is to be utilised in the NBN and the extent to which existing infrastructure is already capable of delivering a minimum dedicated downlink speed of 12 Mbps over each connection’.⁴⁴¹

‘how this is linked to the proposed roll-out schedule, including the proposed use of pre-existing FTTP and FTTP equipment, conduit, manholes, pits, exchange buildings, and existing backhaul transmission’.⁴⁴²

The RFP also requires that Proponents should provide information that substantiates the practicality and feasibility of fully implementing and successfully operating the NBN within the proposed timeframe.⁴⁴³

1.3.1. Transition and forecasting approach

The RFP requirement for Proponents to provide a Project Schedule is significant. The Project Schedule is important to access seekers because they may, in response to the NBN rollout, need to (among other things):

- negotiate access to new wholesale services, both in areas where they currently operate their own DSLAM/MSAN infrastructure and in areas where they currently buy resale services⁴⁴⁴

⁴³⁹ RFP, Schedule 2, cl 1.3(a) – (c), 1.4.7, 1.5.6

⁴⁴⁰ Schedule 2, *Clause 1.1.13(c)*, p. 8

⁴⁴¹ Schedule 2, *Clause 1.1.13(c)*, p. 7

⁴⁴² Schedule 2, *Clause 1.1.13(c)*, p. 8

⁴⁴³ Schedule 2, *Clause 1.3*, p. 9-10

⁴⁴⁴ According to an expert from the International Telecommunication Union, Ashish Narayan, migrating customers from existing networks onto a next generation network will take at least one to two years. Contract negotiation, according to the analyst, will mean that starting the process might be lengthy. ‘*NGN migration won’t be easy warns ITU*’, Commsday, 20 October 2008

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- know whether and when ESAs in which they currently operate infrastructure will be cut over to fibre-based access, potentially stranding their existing assets
- schedule technicians to install necessary equipment to interconnect with the NBN
- perform any necessary marketing to end-users.

These responses could take considerable time in sourcing and/or constructing necessary facilities, equipment and services in order to maintain service provision during and following the network upgrade.

The RFP asks for Proponents to set out a detailed Project Schedule including ‘milestones’, ‘critical paths’ and ‘key decision points’, but does not set out how these particular points should be addressed. Given that cutover to the new network may otherwise largely occur at the discretion of the successful Proponent, the Project Schedule would need to be transparent and sufficiently detailed, with specified planned periods and information about rollout, to allow access seekers to assess which ESAs will be cut over to an NBN with reasonable accuracy. The rollout schedule would in particular need to be provided and settled before the rollout actually commences, even if not finalised within Proposals. The information in the schedule would mean that access seekers were less likely to suffer competitive detriment from the rollout. Access seekers will be better able, with detail about the likely Project Schedule, to plan their infrastructure works and perform marketing relevant to the NBN, as well as negotiate access to new services. As mentioned, some access seekers will also need to inform their retail customers of any change (or temporary disruption) during the transition process. Provision of the rollout information will allow access seekers to compete on an equal footing with other service providers, including the retail arm of the network operator (should it be vertically integrated).

The competitive implications from not knowing detailed level of information about the timing of the planned NBN rollout is relatively straightforward. Access seekers need to know when and where rollout will occur in order to plan their deployments. Furthermore, the detail of the Project Schedule is also important. In the absence of detailed information, access seekers could plan unnecessary work or fail to perform planning and organisational work which is crucial to their ability to transition services properly. This would raise their costs, perhaps causing financial damage to these companies, and also in some cases prevent their ability to provide continuity of services to end-users. Access seekers who experience service dropouts and cannot guarantee continuity of service would be likely to be unattractive to many end-user customers and would therefore likely suffer competitive detriment. This would have negative competition effects. This could be particularly exacerbated were a vertically integrated network operator, or other access seekers, able to provide such continuity of service.

This timing issue also affects concerns about the effect on existing assets of access seekers and on the investment decisions to be made while the NBN is being rolled out. To the extent that service providers have installed infrastructure in exchanges, a lack of sufficient information about rollout plans would have the potential to harm the investment outcomes for those providers, as the assets may be suddenly stranded in

the absence of sufficient notice. It may also affect any potential installation of infrastructure now, in fear of these new assets being suddenly stranded by the rollout.

The RFP requires the Project Schedule to be ‘geographically disaggregated.’ In this regard, should the successful Proponent’s Project Schedule specify geographically small areas (such as those seen in the rollout forecasts required of Telecom New Zealand discussed further below), then it will provide greater certainty for access seekers transitioning to the new network. Access seekers would have greater certainty by, for example, being provided with a DA or ESA list rather than a capital city or municipal council list.

Infrastructure work and customer interaction would need to be targeted towards the particular regions that are being cut over to the NBN. A geographically detailed Project Schedule would allow this to occur. Much of the work involved in transitioning to the NBN will be specific to particular and small geographic regions. Were access seekers not to know which geographic area work was to be conducted in, they would be significantly hampered in their ability to plan the necessary activities to manage transition.

It would be reasonable to expect that some deviations from the original Project Schedule might occur within the overall 5-year build envisaged by the RFP, and that not all arrangements for migration to the new network would necessarily be in place at the time the NBN contract is signed. Accordingly, the successful Proponent might be asked to publish *rolling* forecasts, updated on a pre-defined basis. This would allow access seekers to tailor their own planning appropriately, and be able to better assess where work is required rather than being subject to changing targets.

I.3.2. International examples

An example of how to address project scheduling concerns can be drawn from New Zealand, where the Commerce Commission, Telecom New Zealand and access seekers have been addressing transition and migration issues stemming from Telecom New Zealand’s ‘cabinetisation’ plans. These plans involve the deployment of roadside cabinets and new fibre optic cable for a fibre-to-the-node network, and replacement of copper local loops from distribution cabinets in the street.

Telecom New Zealand is required to provide access seekers with a cabinetisation forecast and notice to ensure access seekers receive sufficient notice of any planned cabinetisation within an exchange area, for use in their service and investment planning.⁴⁴⁵ The cabinetisation forecasts and notice are provided in the same document and Telecom New Zealand is required to provide a 3-year forecast with 6-monthly updates. The cabinetisation forecast, which is published on Telecom’s web site, will:

- be for the three-year period commencing on the date the forecast is provided,
- broadly outline Telecom’s **indicative** [emphasis added] investment plans (as at the date of the forecast) for cabinetisation over the three years, and

⁴⁴⁵ Commerce Commission, *Standard Terms Determination for the designated service Telecom’s unbundled copper local loop network*, Decision 609, 7 November 2008

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- include an evaluation of the impact such investment plans may have on individual Exchanges, an estimate of the number or percentage of Metallic Path Facilities (MPFs) in each Exchange that may be affected and an indication of which MPFs in each Exchange may be affected.⁴⁴⁶

More specifically, the ‘cabinetisation’ forecast and notice includes the following information:

- exchange code and name (similar to an ESA in Australia), number of MPFs in that Exchange that may be affected and Cabinet ID
- planned dates for cabinetisation and for cessation of supply of unbundled copper local loop network
- planned date status (this indicates whether the planned dates are part of the binding notification or are only indicative. The term ‘indicative’ refers to information that TNZ has provided that is part of the cabinetisation forecast rather than the cabinetisation notice)
- council area and suburbs affected
- nature of work
- changes to previous forecasts
- expected cabinet type.⁴⁴⁷

The level of detail in these forecasts provides an example of the kind of information that could be useful to access seekers in planning their responses to the NBN rollout.

In the Netherlands, the incumbent KPN announced its all-IP transformation (which encompasses Next Generation Access and Next Generation Core components) in 2005. KPN stated its intention to discontinue Main Distribution Frame (MDF) access services (which essentially involves the phasing out of local loop unbundling for alternative operators) from mid-2010.

The regulator, OPTA, is overseeing a market-based solution and is holding back from setting any guidelines and specifications. In this context, KPN has reached a Migration Agreement with access seekers. The agreement provides for future consultation in drafting a ‘Migration Project Plan’ which will be drawn up in consultation with all customers of MDF access services. The agreement was developed to head off plans by OPTA to take a more prescriptive approach to a fibre rollout, and may also be referable to the competitive pressure provided by independent cable operators. Essentially, the Migration Agreement provides a framework for migration, with the future Migration Project Plan providing the actual detail.

In summary, KPN’s Migration Project Plan must:

⁴⁴⁶ Commerce Commission, *Standard Terms Determination for Telecom’s Unbundled Copper Local Loop Network Service UCLL General Terms*, 7 November 2007

⁴⁴⁷ *Cabinetisation Forecast and Cabinetisation Notice - May 2008*, available online at: http://www.chorus.co.nz/f289,10609/10609_Cabinetisation_List_Aug08.xls

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- be agreed between KPN and access seekers
- migrate all ULLS access seekers within the same time period ("all together" principle)
- migrate the broadband services (wholesale or retail) of KPN and its ESA competitor access seeker simultaneously
- provide, at least 9 months prior to migration, a generic plan; an operational plan per customer; and a per location ULLS migration plan
- under service level agreements, provide wholesale bitstream products with same functionalities & service levels as previous ULLS
- further, termination of ULLS supply can occur only after an access seeker's services have been migrated.⁴⁴⁸

The Migration Agreement (and future Migration Project Plan) in the Netherlands outlined above provides for a high degree of industry cooperation and sets a non-discriminatory approach to migration. As with Telecom New Zealand's cabinetisation notice, KPN's Migration Agreement provides for detailed information about notice periods and changes to the network and services. In this regard, the Migration Agreement (which is published on KPN's web site) seems to be a transparent way of ensuring commitments to minimal disruption for its wholesale customers. However, the Dutch process is quite different to that being followed in Australia and hence may not be as applicable.

I.4. Migration and notice

In addition to a Project Schedule, it will be necessary for the NBN builder to provide ongoing notification of upcoming migration activity. Both the notice period and the information to be provided in such a notice of migration are important considerations. A detailed notice of migration may also provide for firm commitments by the successful Proponent and greater certainty for access seekers.

The RFP specifies requirements for the migration of both retail and wholesale customers:

‘The Government will need to be assured that existing retail customers will experience no or minimal disruption to their services, and also that the migration of wholesale customers will not be subject to anti-competitive delays or processing timetables. Proponents should ensure that equivalent (or superior) services to those that are currently available can be offered to all existing customers’.⁴⁴⁹

‘Proponents should describe in detail arrangements to migrate existing wholesale services and customers to the NBN’.⁴⁵⁰

As noted above, the RFP also requires that the Proponent have an information strategy that sets out how wholesale customers will be notified of changes to the network.⁴⁵¹

⁴⁴⁸ KPN, *Draft MDF Migration Agreement, 25 April 2008* Online at http://www.kpn-wholesale.com/templates/dispatcher.asp?page_id=1933

⁴⁴⁹ *Clause 1.5.13*, p. 8-9.

⁴⁵⁰ *Schedule 2, Clause 1.4.6(a)*, p. 15

A notice of migration would operate as a confirmation, at some certain period before actual physical infrastructure work took place, that work was scheduled for a particular date and time. It would also provide specific information about the work that would occur.

The benefits of a sufficient migration notice are likely to include minimal disruption to current retail customers and the wholesale customers of the NBN operator. Minimal disruption to wholesale customers will ensure that the competition provided by these customers is not negatively affected. Large disruptions would limit the competitiveness of the service offerings and hence position in the market of such firms, particularly if the same level of disruption was not experienced by any retail arm of the successful Proponent or by other access seekers. This imbalance could occur where a vertically integrated network operator provided more information about the timing or nature of upcoming migration to its own wholesale and retail arm than to other companies. This would mean that it would better be able to manage the transition issues compared to those other companies, which would be an anti-competitive effect stemming from the rollout.

I.4.1. Equivalent notice

An approach might be taken which obliges the successful Proponent to give an equivalent period of notice to access seekers. Should the successful Proponent be vertically integrated, this will most likely require something more than previously suggested approaches (within the context of the copper access network) of simultaneously notifying the retail arm of the vertically integrated operator and notifying access seekers at the same time. For example, in relation to network modernisation notification periods, Telstra has previously proposed the use of a website that would be used to notify Telstra retail and access seekers at the same time of pending network modernisation activities.⁴⁵² However, a notification to the retail arm of a vertically-integrated provider at the same time as access seekers would not necessarily ensure equivalence between the vertically-integrated provider and access seekers, as the company's wholesale arm would be able to engage in infrastructure planning and building before the notification was posted.

To this end, equivalence provisions might be measured not only against the successful Proponent's retail arm, but also to its business units responsible for organising interconnection and arranging for technical work to be planned.⁴⁵³ This approach would ensure access seekers would be informed of network modernisation activities at the same time as the network operator's wholesale arm, in order to give access seekers the time for their own infrastructure planning and service continuity arrangements such as negotiating access to new services. Notably, Telstra has not in the past even

⁴⁵¹ RFP, Schedule 2, Clause 1.4.7

⁴⁵² ACCC, *Assessment of Telstra's ULLS monthly charge undertaking—final decision*, August 2006, p. 177.

⁴⁵³ The concept of 'equivalence' is currently in Telstra's Operational Separation Plan. As part of the Information Equivalence Strategy (EIS) obligations under its Operational Separation Plan, Telstra undertakes that any 'information provided by the Key Network Services Business Unit or the Wholesale Business Unit to wholesale customers about relevant changes to Telstra's network is, to the extent possible, equivalent to the provision of the same or similar information to the Retail Business Unit.'⁴⁵³

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provided a commitment to give an equivalent period of notice of a proposed network upgrade to an access seeker to that which it gives to its retail business units.⁴⁵⁴

The timing of decisions to perform migration work has been an issue examined by the ACCC in arbitrations.⁴⁵⁵ That assessment noted that appropriately defining the point in time at which the access provider is deemed to have received notice would be crucial to the success of implementing equivalent notice. In the context of the legacy copper CAN, one possible approach would be to base the time of the decision, and hence the requirement to provide notification to access seekers, on the date on which Telstra approves or allocated any capital expenditure to an upgrade.⁴⁵⁶ However, in the transition to the NBN, where capital expenditure may be allocated at the start of the project, this may be less suitable. Alternatively, some other particular event or approval within a company may be appropriate, as long as it was clearly defined and compliance could be observed.

Equivalence is desirable because it leads to a level playing field between competitors and allows them to compete based on their respective merits. The Australian Competition Tribunal recognised the importance of equivalence in notice periods for network upgrades, stating that a failure to give an equivalent period of notice of a proposed network upgrade to an access seeker as the network operator gives to its retail business units was a reason for objection to Telstra's network modernisation provisions.⁴⁵⁷ The importance of equivalence in provision of information is also implied in certain documents forming existing operational separation obligations. For example, Telstra is required to produce an Information Equivalence Strategy under its Operational Separation Plan (OSP).⁴⁵⁸

If truly equivalent notice is provided between all companies, the ability to compete and to manage the transition to the NBN will largely come down to the respective merits of the companies' operations, rather than an artificial advantage to one or more operators due to the withholding of information. The degree to which Proponents can make commitments on equivalent procedures is therefore a relevant consideration.

It would also be necessary to account for the fact that, if one or more access seekers had an ownership interest in and hence representation on the board of the NBN provider, they may receive information about proposed deployments earlier than other access seekers.⁴⁵⁹ Any equivalence of notice provisions would need to account for this source of information as well as any official notice methods.

⁴⁵⁴ See, e.g., *Telstra's Access Undertaking – ULLS Monthly Charges 2006-07; Telstra's Access Undertaking – ULLS Monthly Charges 2007-08*

⁴⁵⁵ ACCC, *Unconditioned local loop service access dispute between Telstra and Optus Networks—statement of reasons for final determination*, April 2008, p. 318.

⁴⁵⁶ ACCC, *Unconditioned local loop service access dispute between Telstra and Optus Networks—statement of reasons for final determination*, April 2008, p. 318.

⁴⁵⁷ Australian Competition Tribunal, *Telstra Corporation Ltd (No 3)* [2007] ACompT 3, at [320].

⁴⁵⁸ Telstra, *Information equivalence strategy*, 23 June 2006, available at http://telstrawholesale.com//dobusiness/customer-commitment/docs/op_sep_equivalence_strategy.pdf

⁴⁵⁹ ACCC, *Assessment of FANOC's Special Access Undertaking in relation to the Broadband Access Service—Draft decision*, December 2007, p. 105.

I.4.2. Minimum notice periods

Alternatives may exist to equivalent notice, which may be a difficult concept to realistically assess and may not by itself provide sufficient certainty to service providers of the likely notice periods that would apply. It may be more realistic to assess what a reasonable length of time would be for access seekers to be able to make alternative arrangements to the current exchange-based ULLS, and then simply enforce this minimum notice period.

In its access arrangements with access seekers, Telstra typically specifies a 15-week notification period for major network upgrades. However, the Australian Competition Tribunal has expressed the view that a notice period of 15 weeks is inadequate for a major network upgrade such as fibre-to-the-node.⁴⁶⁰

Similarly, the ACCC concluded in its recently published determination on model non-price terms and conditions that equivalent notice, but also a minimum period of six months notice, should be provided to access seekers for major network upgrades.⁴⁶¹ A fibre deployment in the access network would certainly constitute a major network upgrade, although the model non-price terms and conditions do not apply to the NBN⁴⁶². In this regard, the government's consultative process would be the more appropriate forum within which non-price issues should be developed.

Specifying a minimum notice period is largely an exercise in balancing the concerns and requirements of the party rolling out the fibre and access seekers. The ACCC commented in its model non-price terms and conditions that six months would represent a reasonable approach and balance the competing interests of access provider and access seeker.

I.4.3. Service disruption

The ACCC's latest model non-price terms and conditions may also provide for an appropriate approach to the RFP's continuity of services and minimal disruption requirements. The model non-price terms and conditions proposed that the LSS to ULLS migration process should provide for end-user service disruption of less than three hours.⁴⁶³ Further, any end-user involvement in that migration is not required. This target timeframe of three hours has also recently been specified by the European Regulators Group (ERG) for Managed Network Migrations (MNM) processes in its report on best practices on regulatory regimes in wholesale unbundled access and bitstream access.⁴⁶⁴ As an indicative approach, this maximum three-hour service disruption would be broadly appropriate for any cutover to bitstream access services in Australia. The inclusion of such a requirement would limit any potential competitive damage from a greater amount of disruption being experienced by a particular access seeker's customers compared to others.

⁴⁶⁰ Telstra Corporation Ltd (No 3) [2007] ACompT 3 (17 May 2007).

⁴⁶¹ ACCC, *Final determination—model non-price terms and conditions*, November 2008, p. 35

⁴⁶² ACCC, *Final determination—model non-price terms and conditions*, November 2008, p. 32

⁴⁶³ ACCC, *Final Determination – Model Non-price Terms and Conditions*, p. 49

⁴⁶⁴ ERG, *Report on ERG best practices on regulatory regimes in wholesale unbundled access and bitstream access*, June 2008

I.4.4. Operations support systems

It is important that effective operations support systems are in place well before migration. Effective operations support system interfaces have been critical to competition on existing networks and are likely to be equally so for the access services supplied over the NBN. Notice periods become irrelevant if a company is unable to order an equivalent replacement service for those no longer available after network transition work has taken place. Should there be no way to order an equivalent replacement service, access seekers may suffer significant competitive detriment from not being able to supply replacements for the access products they currently use to supply services to end-users. Not having such systems in place at the time of the rollout could have significant competition consequences, as competitors of the network operator could lose their existing customer base. These competition consequences would be particularly strong if a vertically-integrated successful Proponent is able to provide services. Fundamentally, access seekers would want to be reassured—via both a well detailed Project Schedule and migration notice—that the processes for ordering new NBN services is transparent and supplied on an equivalent basis.

Just as importantly, access seekers would want to have sufficient visibility of provisioning and fault reporting and rectification.

I.4.5. Locking in migration commitments

Finally, it is clear that the importance of any notice of migration rests in the fact that it can *'lock in'* commitments made by the successful Proponent. The notice of migration would essentially require Proponents to commit to the migration of a particular geographic area at a particular time – for example, a 6-month migration period, the maximum 3-hour end-user service disruption and operations support system requirements. Without some form of lock-in, and penalties for not meeting migration commitments, Proponents may not have sufficient incentive to conduct transition and migration in a way that is equivalent for all retail providers. This would lead to an uneven competitive playing field for the parties in the market.

This need for a lock-in would be particularly relevant given that the overall transition project schedule may need to vary over time. As noted above, there may be a need for the rollout schedule to be published on a rolling basis as the network is rolled out.

I.4.6. International examples

Examples of how to address migration and notice considerations can be drawn from New Zealand and The Netherlands.

Under its unbundled copper local loop (UCLL) standard terms determination, Telecom New Zealand is required to provide access seekers with:

- an initial notice of cabinetisation for the first 24 months, and
- a cabinetisation notice at least 24 months before any other cabinetisation takes place (i.e. that was not addressed in the initial notice).

Content of the notice will include affected:

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- exchanges, lines per exchange, access seekers per exchange and UCLL per exchange and UCLL cessation date.
- termination of UCLL supply and the completion of cabinetisation required within 3 months of the planned date for cabinetisation as set out in the cabinetisation notice or the initial notice

In some circumstances, such as where there is a material risk to the UCLL service, Telecom may amend these notices or may cabinetise a part of its network by giving less than 24 months notice. In these events, and if requested by the access seeker, Telecom must pay for the transfer of the access seeker's customers to other Telecom services.⁴⁶⁵ Further, the notice must explain the effect on any access seekers in receipt of the UCLL service.

This cabinetisation notice requirement would serve a similar function to that which a notice of migration might serve in the Australian context – providing detailed and specific information about each actual upgrade as it takes place, as well as providing confirmed dates for upgrade work to take place.

As noted above, the Migration Agreement in the Netherlands (and future Migration Project Plan) in the Netherlands contains provision for at least nine months notice of migration activities – and a requirement on the incumbent KPN to provide a generic plan, an operational plan per customer and then a per location ULLS migration plan. Similar to the New Zealand example, this requirement to have specific information for particular regions provides an example of an approach to a notice of migration. As such, a Migration Agreement may help to ensure commitments to minimal disruption for its wholesale customers.

I.5. Immediate rollout and geographic approach

As the rollout of the NBN in Australia may take place almost immediately after a contract is awarded to the successful Proponent, it is necessary to consider how such an immediate start might be best facilitated. The approach would need to recognise that there may not be sufficient time for an industry-led migration approach to be agreed before the start of the rollout.

A related issue is the approach that is taken to prioritising particular geographic regions and, in particular, prioritising areas that cannot currently access minimum speeds of 12 Mbps, as required by the RFP.⁴⁶⁶ Consideration must therefore also be given to the approach to deploying NBN to different geographic areas, such as whether an 'outside in' approach to roll-out—where the deployment of fibre initially commences in rural and regional areas—should be applied.

I.5.1. Immediate rollout

With the release of the RFP, the government stated that it is approaching the rollout of the NBN as a policy priority. Given this, it is likely that the rollout of the NBN will begin as soon as possible following the conclusion of the competitive bid process.

⁴⁶⁵ Commerce Commission, *Standard Terms Determination for the designated service Telecom's unbundled copper local loop network*, Decision 609, 7 November 2008

⁴⁶⁶ RFP Part 1 overview clause 1.5.5

This may affect the operation of the Project Schedule and the manner in which the notice periods operate for the initial part of the NBN rollout.

If the NBN operator begins deploying fibre immediately after being awarded the contract, there is the potential for the competitive process to be harmed. For example, if work began on a particular ESA the day after the NBN contract was signed, access seekers would need to negotiate arrangements for infrastructure works and access to new services while their existing services were already being lost. This would negatively affect their ability to continue to provide services to their end-users. If they were unable to perform all necessary tasks, the immediate rollout may therefore lead to increased costs and decreased revenues, and overall financial damage, for access seekers. As a result, the competitive offerings of access seekers would be compromised.

As such, facilitating an immediate rollout requires balancing of the need to have the network upgrade begin as soon as possible with the need to ensure sufficient notice and information is provided to access seekers.

However, if access seekers can readily obtain access to equivalent new services, and particularly if they can obtain access for equivalent or better terms and conditions than they get currently, the immediate rollout of the NBN may not present competition concerns. This outcome would require that access arrangements are negotiated rapidly, and that minimal infrastructure deployment by access seekers was needed to begin service provision.

Overall, an important issue for consideration is the need to reconcile the need to provide existing access seekers with reasonable notice periods without delaying the commencement of an NBN construction. To address the issue of access seekers being affected—and services potentially being disrupted during the initial period after the contract is awarded—a possible option might be that the successful Proponent be obliged to initially migrate only those ESAs in which there is no significant presence of competitor infrastructure. As noted, the need for this would depend on the difficulty for access seekers of acquiring equivalent wholesale services and successfully providing services to end-users once the NBN is in place.

1.5.2. Geographic approach

The RFP asks that Proponents should state to what extent they are able to prioritise areas that cannot currently access *minimum* speeds of 12 Mbps.⁴⁶⁷

The geographic aspect of the rollout of next generation networks seems to be a less prominent consideration in other countries than in it is in Australia. This may be because Australia is unusual in terms of its land mass and population distribution, and because of the requirement for 98 per cent coverage for a NBN. In contrast, the much smaller land-mass of other countries where network upgrades are being undertaken, such as the Netherlands and New Zealand, significantly lessens the impact of different geographic approaches to rollout.

⁴⁶⁷ RFP Part 1 overview clause 1.5.5

Central to access seeker concerns about the geographic approach to the NBN rollout is the issue of ‘asset stranding’—that is, a concern that their exchange-based investments (DSLAMS or MSANs) will be made redundant as a fibre rollout bypasses existing exchange buildings. On this issue, as with concern regarding migration service disruption for retail and wholesale customers, the migration notice period is important.

Regulatory submissions to the expert panel highlighted that there remains divergent views among industry on whether there can be continued supply of current ULLS/LSS alongside an NBN, and hence as to whether asset stranding is necessarily an issue. iiNet and Internode (part of the Terria group), for instance, argued that existing facilities-based competition should be kept operational in parallel with the NBN for a minimum of 5 years, (although Internode’s managing director, Simon Hackett, considers that a full copper cutover is required to roll out a viable NBN⁴⁶⁸).

Optus and Telstra argued in their regulatory submissions that 100 per cent node cutover needs to be part of the fibre build.⁴⁶⁹

Terria’s regulatory submission to the NBN panel submitted that target roll-out schedules and transitions that avoid stranding competitive assets could be “marked up” as more favourable to bids that immediately target more competitive existing ESAs.⁴⁷⁰

iiNet⁴⁷¹, Internode⁴⁷², AAPT and PowerTel⁴⁷³ submitted that there should be ‘outside-in’ deployment. These parties argued that an outside-in network deployment would best serve disadvantaged consumers and reduce the effect of stranded assets by allowing owners of existing infrastructure to retire their investments efficiently and reduce the need for compensation.

The South Australian government suggested that stranded assets should be phased out over a period of time so that competitors can recoup some of their investment or alternatively a mechanism should be created to compensate providers for stranded assets. The NSW Department of Commerce favoured a roll out focusing initially on areas of high demand, to ‘generate both enthusiasm and education about infrastructure’ and stimulate innovation and new business opportunities.

⁴⁶⁸ Commsday, *Internode backflip: now supports full copper cutover, Terria monopoly*, 10 September 2008

⁴⁶⁹ Telstra, *Public submission on the roll-out and operation of a National Broadband Network for Australia*, 25 June 2008, p. 32; Optus, *Optus Submission Regulating the National Broadband Network*, June 2008, p. 25.

⁴⁷⁰ Terria, *Submission on regulatory issues associated with the NBN*, Schedule 1, p. 27.

⁴⁷¹ iiNet, *Submission on regulatory issues associated with the NBN*, p. 7.

⁴⁷² Internode, *Submission on regulatory issues associated with the NBN*.

⁴⁷³ AAPT and Powertel, *Submission on regulatory issues associated with the NBN*, p. 7.

Geographic approach: issues and scenarios

The current ‘payback’ period on new DSLAMs/MSANs is understood to be between 18 and 24 months.⁴⁷⁴ Some access seekers have expressed concerns that an immediate NBN roll out in the currently most competitive areas will result in their exchange-based investments being written off. This would be due to an insufficient time to recoup investment costs (i.e. DSLAMs/MSANs will become ‘stranded’ by the fibre rollout before the cost recovery period).

Telecommunications firms, investing in a dynamic industry, would usually be expected to factor into their business plans the risk of technological obsolescence. In the context of transition and migration arrangements to the NBN, the central issue is that the geographic approach to the rollout promotes competition and does not serve to disrupt the competitive process. In essence, a geographic approach that promotes competition would ensure that end-users can migrate smoothly between service providers or products.

The Australian Competition Tribunal said in its assessment of Telstra’s ULLS undertaking that:

‘We accept that access seekers do not have an unlimited right of access to Telstra’s ULLS, or the right to prevent network modernisation ...’⁴⁷⁵

However, the Tribunal also stated that:

‘... [access seekers] ought not to be placed in a position where their substantial investments in infrastructure might be isolated and made redundant as a result of [the network owner’s] timing and location of network upgrades’.⁴⁷⁶

Given that unbundled services (ULLS and LSS) provide for a greater level of competitive pressure than pure resale competition, there would be an incentive for a vertically integrated NBN operator to deploy fibre to those ESAs which have access seeker DSLAMs and MSANs in order to eliminate ULLS and LSS competition. Some parties have been open about their desire to progress the fibre upgrade as soon as a contract is awarded in early 2009.⁴⁷⁷

Relative to the expansive land mass of Australia, most commercially attractive ESAs are situated within small, densely inhabited geographic areas—i.e. within metropolitan population centres. Accordingly, some Proponents may seek to deploy in these areas first to better recover the costs of investment, which may also have the effect of removing ULLS and LSS competition even if that is not the purpose.

⁴⁷⁴ On p. 73 of its *Final Decision on Telstra’s Wholesale Line Rental / Local Carriage Service Exemption Application*, the ACCC stated the following: ‘The ACCC understands that an efficient access seeker is likely to make a return on a DSLAM investment within two years of deployment’.

⁴⁷⁵ Telstra Corporation Ltd (No 3) [2007] ACompT 3 (17 May 2007).

⁴⁷⁶ *ibid.*

⁴⁷⁷ For instance, Telstra claimed that it ‘stands ready to start building a fibre network in 48 hours’. Quote from Telstra’s ‘Now we are talking’ web site: *Wheels starting to fall off the G9 Trojan horse*, 3 September 2008 <http://www.nowwearetalking.com.au/opinion/wheels-starting-to-fall-off-the-g9-trojan-horse>

Alternatively, Terria suggested—in submissions to the Senate Select Committee public hearing on the NBN—that ‘areas that are currently under serviced relative to other parts of Australia should be the first focus of the NBN’ and that the network should be “rolled-in” from under-serviced areas rather than “rolled-out” from already better serviced areas’.⁴⁷⁸ The Senate Select Committee reached a similar view in its interim report.⁴⁷⁹

Given that the RFP asks Proponents to indicate the extent to which they are able to prioritise areas that cannot currently access minimum speeds of 12 Mbps, it is relevant whether Proponents can outline an approach to phasing out ULLS / LSS provisioning that best limits the loss of value of competitive assets.

There are also a considerable number of consumers in metropolitan areas who cannot currently access broadband at minimum speeds of 12 Mbps, despite having a choice of providers, due mainly to their distance from the exchange. Consequently, requiring rollout to begin in areas without broadband speeds of 12 Mbps may not require that deployment begins in rural areas first.

In any case, and related to points noted above, if access seekers can readily obtain access to equivalent new services, and particularly if they can obtain access for equivalent or better terms and conditions than they get currently, access seekers may be less concerned about asset stranding.

The discussion below outlines three possible geographic approaches to the rollout, as well as the possible incentives for the successful Proponent under each approach and the resulting implications.

1. Start in rural and regional areas before finishing in metropolitan regions (the ‘outside-in’ approach)

If the rollout commences in regional areas, service providers who have deployed access technologies in metropolitan areas will be better placed to fully recoup their investments. This is because the longer time periods until assets in metropolitan ESAs would be made redundant would better allow for the costs of these assets to be recovered. This would likely avoid the potential lowering of competition via increased costs to access seekers should they not be able to fully recover their investments.

The disadvantages of this approach largely lie in the fact that the benefits of the NBN will be slow to be delivered to the majority of end-users.

As such, for the initial years of the NBN rollout, the successful Proponent might not be able to recover enough of its costs, impacting the financial viability of the project. This is because there will be relatively little demand for services and the revenue generated might be too low to cover expenditures. The principal competition concern

⁴⁷⁸ Terria media release, *TERRiA presents evidence to Senate Select Committee Hearing on National Broadband Network*, 8 October 2008. Available online: <http://www.terria.com.au/www/488/1001127/displayarticle/08-oct-2008-terria-presents-evidence-to-senate-sel--1001627.html>

⁴⁷⁹ Senate, Select Committee on the National Broadband Network—Interim report, December 2008, p. 72.

in this scenario largely stems from the concern that costs will be raised industry-wide—for instance, that the NBN operator will pass on these increased costs to its wholesale customers, which in turn will be passed on to end-users in higher prices.

A further issue is that the successful Proponent would upgrade ESAs in regional areas where the incumbent is the only service provider. This may entrench the Proponent in rural and regional areas as the main wholesale provider of telecommunications services. Furthermore, if the successful Proponent is vertically integrated, it may be able to use this to entrench its position in the retail market as well.

2. Begin in metropolitan areas and then go out to rural and regional areas (the ‘inside-out’ approach)

This approach has the advantage of delivering NBN services to the majority of end-users in Australia as soon as possible. Further, via increased traffic on the network, the successful Proponent should be able to recover a larger amount of its costs during the initial stages of the build.

However, the inside-out approach may strand the DSLAM/MSAN assets of service providers if they do not have sufficient time to appropriately consider investment decisions. In this scenario, DSLAM operators would not have had enough time to fully recover investments made and would face increased costs. The increased cost to access seekers is likely to have a competitive detriment on the market as they may find it harder to compete with the NBN operator (where it is vertically integrated). However, as noted above, this may not be a concern if access seekers are able to readily obtain access to equivalent new services on appropriate terms and conditions.

Another possible issue might arise if the NBN builder sought to stop part way through the roll-out after deploying to urban areas.

3. Commencing in ESAs where there is currently no access seeker infrastructure

Given that there are a number of ESAs without competitor infrastructure in both regional and metropolitan Australia, the advantage of this approach is that the successful Proponent will still largely be able to decide on the geographic approach to the rollout. This could apply for some period of time before switching to a more conventional ‘inside-out’ or ‘outside-in’ approach. The approach may mitigate some of the potential concerns about asset stranding—which, as mentioned above, may have a competitive detriment on the market as access seekers would find it harder to compete with the NBN operator.

The disadvantages of this approach are largely found in the loss of scale efficiencies through having the initial period build focused on sparsely located or less attractive ESAs. Building in dispersed areas may also reduce the benefits of a systematic rollout.

Overall, this third option could be considered a hybrid approach. The successful Proponent would be obliged, during the initial part of the rollout (say, 6 months), to begin rollout in ESAs with no competitive infrastructure. This would ensure that every access seeker receives a minimum notice period. Given that these exchanges have not been a focal point for strong infrastructure-based competition, this approach

is also likely to be consistent with the RFP's expressed desire to 'prioritise areas that cannot currently access minimum speeds of 12 Mbps'.

After the initial period, the successful Proponent might want to begin deploying in ESAs with competitive infrastructure. Under this scenario, the successful Proponent might be asked to simultaneously publish a detailed migration notice about the pending work when it publishes the first Project Schedule, which would likely be soon after an NBN contract is signed. This third option might not be necessary where there was a significant lag time between signing the NBN contract and the commencement of widespread rollout. However, in such a circumstance it could provide an appropriate approach to planning test rollouts of infrastructure.

I.6. Points of Interconnection

In addition to issues about the timing and rollout of transition and migration, there are also relevant considerations about the effect of transition to the NBN on the points of interconnection between networks.

A point of interconnection (POI) refers to an agreed location which is a physical point of demarcation between the networks of two or more service providers.⁴⁸⁰ Calls or data between the two service providers are handed over at the POI.

Confirmation on the location and number of POIs well before migration is likely to be a relevant consideration. Presently, some access seekers have existing investments in backhaul / transmission at existing exchange buildings. Where backhaul facilities operated by access seekers are already in place, they may prefer to interconnect close to existing PSTN exchange points. For the NBN, POI issues are a relevant consideration as interconnection as close as possible to existing investments is likely to facilitate a smooth migration. If POIs need to be moved, and information on the move or technical configuration is withheld or insufficiently detailed, then access seekers' costs might be raised to the point where they were not able to provide services. This would not promote competition.

The number of POIs may not necessarily change markedly. The issue regarding existing backhaul infrastructure is more prominent where the NBN operator is not the existing incumbent. The NBN operator may seek access to exchange buildings on the transmission ring (along with the ducts leading into the exchange), which are likely to be the current location for access seekers' backhaul interconnection equipment, to install POIs. However, the present incumbent may choose to deny access to these exchange buildings, making it difficult for access seekers to interconnect with the NBN and, as a result, compete.

Regardless of the identity of the successful Proponent, details of the number and location of POIs in the NBN will most likely provide access seekers with greater certainty about the implications for existing backhaul infrastructure.

⁴⁸⁰ See, for example, ACCC, *Declaration inquiry for the ULLS, PSTN OTA and CLLS—Final determination*, July 2006, p. 67, which contains a definition of POI for the purposes of the declared PSTN originating and terminating access services.

I.7. Mechanisms for ensuring compliance

Once a transition and migration regime is established, it is relevant to consider the possible ways that it could be ensured that the regime is adhered to by the successful Proponent.

An approach to establishing a viable alternative to an oversight body might be found in the RFP's requirement for an 'Information Strategy'.⁴⁸¹ The Information Strategy could provide the mechanism for providing disclosure of roll-out 'milestones', 'critical paths' and 'key decision points' and how this information is to be published. Without this clarity, there would be the potential for anti-competitive harm, such as excessive delays to the rollout.

The Government could link its financial contribution to compliance with commitments made under both the Information Strategy and the Project Schedule. In addition, key performance indicators (KPIs) could be used which would be designed to provide for a high level of up-front detail and guard against the potential for deliberate or inadvertent anti-competitive discrimination, by the successful Proponent, against access seekers. The KPI's could cover commitments to equivalent and/or minimum standards on the provision of appropriate information to all access seekers and downstream users about the rollout schedule. These KPIs could link funding to the successful Proponent meeting a range of both short and long-term goals, thus providing positive financial incentives rather than financial 'penalties'.

Should the successful Proponent not meet its obligations under the KPIs through, for instance, failing to provide required minimum notice periods, the government could withhold funding until the behaviour was rectified.

However, a well defined transition and migration regime, which provides for a detailed Project Schedule, a transparent migration process—possibly via use of a notice of migration—along with a practical approach to ensuring compliance, would significantly lessen concerns about the potential for the rollout of the NBN to disrupt the competitive functioning of telecommunications markets.

A sufficiently certain transition timetable would allow access seekers to smoothly transition to an alternative service. Having a systematic process should clarify the time in which investment costs can be recovered, reduce the uncertainty of the upgrade and provide access seekers with the relevant information to make a decision on investing in infrastructure. Such a transition schedule would need to be supported with appropriate notice of specific migration activity.

A Proponent advancing a transition and migration framework with these characteristics would most likely create a level of confidence for stakeholders that fair and reasonable outcomes will be achieved, avoid asset stranding and address other concerns discussed above.

For instance, the geographical approach to the rollout is less crucial if the successful Proponent provides a sufficiently detailed Project Schedule and notice of migration.

⁴⁸¹ RFP, Schedule 2, Clause 1.4.7.

Further, forecasts and notices would provide access seekers with certainty in relation to their capital investment planning, both in relation to current unbundled services and in relation to future capital works in preparation for the NBN (interconnection, system interfaces etc).

I.8. Conclusion

The transition to the NBN could have significant competitive implications. Transition and migration should be conducted in a way that promotes competition. If not, rollout of the network could instead lead to significant competitive detriment, as the rollout could be conducted in such a way that damages the competitive constraint provided by access seekers.

The key transition and migration considerations relate to the following:

- project schedule
- migration and notice
- the immediate start to the rollout, and the geographic approach taken
- points of interconnection
- compliance and oversight

Access seekers and end-user customers need to be able to smoothly migrate service provision from copper to fibre (i.e. to the new services delivered over the NBN). Any approach to transition and migration should ensure that both wholesale and retail end-users receive sufficient time and information to best ensure continuity of service between the copper network and the NBN.

Issues relating to roll-out forecasts, length of notice periods (and content of any migration notice provided) and commitments to equivalence and non-discrimination are significant for ensuring that the rollout occurs appropriately and not in an anti-competitive way.

An appropriately specified and systematic transition and migration regime can lead to significant competitive benefits, including:

- greater certainty for access seekers in making decisions on investing in infrastructure,
- clarity around the time in which investment costs can be recovered, which would lead to less immediate asset stranding,
- greater certainty for all parties in negotiating access arrangements for the NBN, and
- continuity of service.

In this regard, equivalence and non-discrimination of both information and service availability are important principles for the rollout. A central principle might be an obligation on the successful Proponent to give an *equivalent* period of notice (and equivalent notice *content*) to access seekers to that which it gives itself. Any

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equivalence commitments would be in addition to a sufficient *minimum notice period*. Equivalence in information and notice would better achieve a rollout which did not lead to possible stranding and financial damage to access seekers that would reduce their ability to compete.

Together, a well devised Project Schedule and Notice of Migration (supported by a transparent Information Strategy) would allow access seekers to undertake planning of their own customer migration, such as equipment purchases, workforce planning and customer marketing and interaction.

Concerns about competitive harm stemming from the geographic approach to the rollout may be lessened if these transition and migration documents are detailed, non-discriminatory and transparent.

The proposed *initial* rollout period is an important period to consider. The successful Proponent will most likely begin deploying fibre as soon as possible after being awarded the NBN contract, leaving access seekers with potentially little official notice. To avoid this potential problem, the successful Proponent might be asked—in the first part of the rollout period—to begin in areas with no competitive infrastructure (DSLAMs/MSANs). This approach has two benefits:

- it allows access seekers with competitive infrastructure time to transition from unbundled provision over the copper network to the NBN
- it allows access seekers greater time to recoup the costs incurred from investment in this infrastructure.

Finally, it will be necessary to consider the approach that is taken to the points of interconnection under the new network. The location of POIs will be important to assess seeker parties' ability to continue to provide services over the NBN.